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January 8, 2019

Job #B80709N1

Citymark Development
Attention: Russ Haley
3818 Park Boulevard
San Diego, California 92103

Subject: Response to Comments for 32nd and C Street (City of San Diego Project No. 595288)

This letter is in response to City of San Diego staff review comments for the 32nd and C Street project (City of San Diego Project No. 595288). Comments are found in the City's review dated December 14, 2018, and this letter will reference the location of each comment response or requested changes in the revised report.

Italics are added to indicate City of San Diego staff comments.

City of San Diego Comments:

101. EAS received Acoustical Analysis Report for 32nd and C Street, San Diego, California, prepared by Eilar Associates, September 26, 2018. The report requires the following revisions;

102. FIGURES: Label Buildings A, B, C, and D on the plans. The figures need to be consistent with the plans.

> **RESPONSE:** The figures have been revised to show labels for Buildings A, B, C, and D. The figures have also been updated to be consistent with plans.

103. Page 10: Based on the analysis it looks like sound attenuation barriers are required on the balconies of Units 15 through 19. Clearly state the location of these barriers in the analysis and what these sounds barriers would be constructed of (e.g. stucco, etc.) Also provide a note on the Site and Elevations Plans clearly stating what the sound attenuation barriers would be constructed of and their location.

> **RESPONSE:** Page 10 of the report has been revised to state the location of sound attenuation barriers in the analysis. Page 10 of the report also details the materials that should be used in the construction of sound attenuation barriers. Regarding the note on the Site and Elevations Plans, this item has been brought to the attention of the architect.

104. Page 17, first paragraph: Revise the last sentence to state "No mitigation is necessary."

> **RESPONSE:** The last sentence of the first paragraph of page 17 has been revised to state, "No mitigation is necessary."

105. Provide 3 copies of the revised noise report for the Project Manager, EAS and Long Range Planning in the next submittal.

If you have any questions or require additional information, please feel free to contact Mo Ouwenga at 760-738-5570 or mouwenga@eilarassociates.com.

EILAR ASSOCIATES, INC.

M J Ouwenga

Mo Ouwenga, Acoustical Consultant

Jonathan Brothers, Principal Acoustical Consultant

ACOUSTICAL ANALYSIS REPORT

32nd and C Street
San Diego, California 92102

City of San Diego Project No. 595288

Prepared For

Citymark Development
Attention: Russ Haley
3818 Park Boulevard
San Diego, California 92103
Phone: 619-231-1161

Prepared By

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Job #B80709N1

Original Report: August 7, 2018
Revised: January 8, 2019

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APPENDICES

1.0 EXECUTIVE SUMMARY

The proposed project, 32nd and C Street, consists of the construction of four multi-family dwelling buildings, consisting of 19 residential units, on a currently vacant lot. The project site is located at the southeast corner of 32nd Street and C Street in the City of San Diego, California.

The current and future noise environment consists primarily of traffic noise from C Street, 32nd Street, and State Route 94 (and associated ramps), as well as noise from aircraft overflight associated with San Diego International Airport. Worst-case combined noise levels at building facades are expected to range from approximately 67.0 CNEL to 72.5 CNEL.

As this project will be required to provide an avigation easement to the San Diego County Regional Airport Authority, aircraft noise levels can exceed 65 CNEL at outdoor use areas, provided interior noise levels are reduced to below 45 CNEL in residential spaces. However, worst-case impacts from traffic noise sources were calculated at private balconies considering shielding from proposed buildings on site. Calculations show that traffic noise impacts at outdoor use areas of units 15 through 19 will exceed the 65 CNEL limit as designed; however, with the sound attenuation barriers shown in Table 6 herein incorporated as a project design feature, and the provision of an avigation easement, the outdoor use areas are expected to comply with the City of San Diego Noise Element to the General Plan.

Due to high exterior noise levels at building facades, an exterior-to-interior analysis was performed to determine building features necessary to reduce interior noise levels in residential units to 45 CNEL or less, as required by the City of San Diego and State of California. Calculations show that, with the acoustical recommendations shown herein, interior noise level requirements of the City of San Diego and State of California are expected to be met in all residential spaces.

Noise levels from temporary construction activities associated with this project are expected to comply with the applicable City of San Diego construction noise limits at all surrounding property lines, with activity limited to the daytime hours of 7 a.m. to 7 p.m. during all phases of construction, as designed. Construction is prohibited between the hours of 7 p.m. and 7 a.m. and on Sundays or legal holidays. Though it is not required by regulations, the general good-practice construction noise control methods listed herein should be followed, as a courtesy to surrounding properties.

2.0 INTRODUCTION

This acoustical analysis report is submitted to satisfy the acoustical requirements of the City of San Diego Noise Element to the General Plan and Municipal Code and California Building Code. Its purpose is to assess noise impacts from nearby roadway traffic and aircraft overflight to identify project features or requirements necessary to achieve interior noise levels of 45 CNEL or less in habitable residential spaces, in compliance with the City of San Diego and State of California noise regulations. Additionally, temporary construction noise impacts on nearby noise-sensitive properties were analyzed.

All noise level or sound level values presented herein are expressed in terms of decibels, with A-weighting to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ}, for a specified duration. The Community Noise Equivalent Level (CNEL) is a calculated 24-hour weighted average, where sound levels during evening hours of 7 p.m. to 10 p.m. have an added 5 dB weighting, and sound levels during nighttime hours of 10 p.m. to 7 a.m. have an added 10 dB weighting. This is similar to the Day-Night sound level, L_{DN}, which is a 24-hour average with an added 10 dB weighting on the same nighttime hours but no added weighting on the evening hours. According to the California Department of Transportation's Technical Noise Supplement to the Traffic Noise Analysis Protocol (see reference), peak hour traffic noise levels are typically found to be close to predicted CNEL values. Sound levels expressed in CNEL are always based on A-weighted decibels. These metrics are used to express noise levels for both measurement and municipal regulations, for land use guidelines, and for enforcement of noise ordinances. Further explanation can be provided upon request.

2.1 Project Description

The proposed project, 32nd and C Street, consists of the construction of four multi-family dwelling buildings, consisting of 19 residential units, on a currently vacant lot. Each residential unit contains an individual parking garage. Additional information is provided in the project plans, included as Appendix A.

2.2 Project Location

The project site is located at the southeast corner of 32nd Street and C Street in the City of San Diego, California. The project site is located on a rectangular lot with an overall site area of approximately one acre. The Assessor's Parcel Number (APN) for the property is 539-563-01-00.

The project location is shown on the Vicinity Map, Figure 1, following this report. An Assessor's Parcel Map, Satellite Aerial Photograph, and Topographic Map of this area are also provided as Figures 2 through 4, respectively.

2.3 Applicable Noise Standards

This acoustical report is submitted to satisfy the acoustical requirements of the City of San Diego Noise Element to the General Plan and Municipal Code and the State of California Building Code.

The City of San Diego Noise Element to the General Plan and California Building Code require interior noise levels not exceeding 45 CNEL in habitable residential space. The City of San Diego requires that noise levels at residential outdoor use areas do not exceed 65 CNEL.

Additionally, Section 59.5.0404 of the City of San Diego Municipal Code states that construction activity is prohibited between the hours of 7 p.m. and 7 a.m. and on Sundays or legal holidays. During permissible hours of operation, noise levels from construction activity must be limited to a twelve-hour average of no greater than 75 dBA at any property line zoned for residential use. As this project is not anticipated to generate any significant vibration due to construction equipment, no significant vibration impacts are expected.

Please refer to Appendix B for pertinent sections of the City of San Diego Noise Element to the General Plan, City of San Diego Municipal Code, and California Building Code.

3.0 ENVIRONMENTAL SETTING

3.1 Existing Noise Environment

The primary noise sources in the vicinity of the project site include automobile and truck traffic noise from C Street, 32nd Street, and State Route 94 (and associated ramps), as well as noise contribution from aircraft overflight from the San Diego International Airport. No other noise source is considered significant.

3.1.1 Aircraft Overflight Noise Sources

San Diego International Airport is located approximately three miles to the northwest of the proposed project site. According to the most current Airport Influence Area for San Diego International Airport, the project site lies within the 65-70 dB CNEL contour. Based on the location within the contour, the aircraft noise impact at the project site is estimated to be approximately 67 CNEL. Please refer to Figure 5 for a graphical representation of these contours.

3.1.2 Roadway Traffic Noise

Current traffic volumes are given based on information from the San Diego Association of Governments (SANDAG) Transportation Data and Caltrans Traffic Census Program (see references).

C Street is a two-lane, two-way Light Collector running east-west along the north boundary of the project site. The posted speed limit is 30 mph. According to SANDAG, the current (2015) traffic volume of C Street is approximately 4,700 Average Daily Trips (ADT) in the vicinity of the project site.

32nd Street is a two-lane, two-way roadway running north-south along the west boundary of the project site. There is no posted speed limit; however as 32nd Street is a residential roadway that comes to a dead-end both to the north as well as to the south of the proposed project site, a speed limit of 25 mph was used. No current or future traffic information was available for 32nd street. Based on surrounding roadways, a conservative estimate of 500 ADT was applied to 32nd street in the vicinity of the project site for the current traffic environment.

State Route 94 (SR-94) is an eight-lane, two-way Freeway running generally east-west to the south of the project site. The posted speed limit is 65 mph. According to Caltrans, the current (2016) traffic volume of SR-94 is approximately 159,000 ADT in the vicinity of the project site.

SR-94 Westbound Off-Ramp is a one-lane, one-way Freeway Ramp running generally west to the southwest of the project site. The posted speed limit is 55 mph. According to Caltrans, the current (2016) traffic volume of SR-94 Westbound Off-Ramp is approximately 9,000 ADT.

SR-94 Westbound On-Ramp is a one-lane, one-way Freeway Ramp running generally west to the southwest of the project site. The posted speed limit is 30 mph. According to Caltrans, the current (2016) traffic volume of SR-94 Westbound On-Ramp is approximately 1,900 ADT.

No current or future truck percentages were available for C Street or 32nd Street in the vicinity of the project site. However, based on neighboring and surrounding land use, roadway classification, professional experience, and on-site observations, a truck percentage mix of 0.5% medium and 0.5% heavy trucks was used for C Street and 32nd Street. According to Caltrans truck traffic volumes, State Route 94 and associated ramps have a truck percentage of 3.4% medium and 0.8% heavy trucks.

Current and future traffic volumes and vehicle mixes for roadway sections near the project site are shown in Table 1. For more information, please refer to Appendix C: Traffic Noise Model (TNM) Data and Results.

Table 1. Overall Roadway Traffic Information

Roadway Name	Speed Limit (mph)	Vehicle Mix (%)		Current Traffic (Year)	Future Traffic (2035)
		Medium Trucks	Heavy Trucks		
C Street	30	0.5	0.5	4,700 (2015)	8,500
32nd Street	25	0.5	0.5	500[1]	1,000[1]
State Route 94	65	3.4	0.8	159,000 (2016)	81,600 / 94,700[2]
SR-94 Westbound Off-Ramp	55	3.4	0.8	9,000 (2016)	6,000
SR-94 Westbound On-Ramp	30	3.4	0.8	1,900 (2016)	2,700

[1] Current traffic volumes were not available from SANDAG; therefore current and future traffic volumes are based on a conservative estimate.

[2] Future traffic volumes for State Route 94 are given for segments running westbound and eastbound, respectively.

Without proposed on-site structures, the current traffic noise contours calculated at ground level, without considering shielding from existing off-site structures, show that traffic noise impacts to the project site are expected to be between 62.9 and 70.4 CNEL. Additional information is provided in Appendix C: Traffic Noise Model (TNM) Data and Results. For a graphical representation of these contours, please refer to Figure 6: Site Plan Showing Current Traffic CNEL Contours and Noise Measurement Location.

3.1.3 Measured Noise Level

An on-site inspection and traffic noise measurement were made on the morning of Monday, July 30, 2018. The noise measurement was made using the methodology described in Section 4.1, approximately 30 feet south of the C Street centerline and approximately 32 feet east of the 32nd Street centerline. The microphone was placed at approximately five feet above the road grade. Traffic volumes for C Street were recorded for automobiles, medium-size trucks, and large trucks during the measurement period. After a continuous 15-minute sound level measurement, no changes in the L_{EQ} were observable and results were recorded. The measured noise level and related weather conditions are found in Table 2. Additional information is provided in Appendix C: Traffic Noise Model (TNM) Data and Results. Please refer to Figures 6 and 7 for a graphical representation of the noise measurement location.

Table 2. On-Site Noise Measurement Conditions and Results	
Date	Monday, July 30, 2018
Time	11:10 a.m. – 11:25 a.m.
Conditions	Mostly sunny skies, 8 mph winds, temperature in the low 90's with moderate humidity
Measured Noise Level	65.5 dBA L_{EQ}

3.1.4 Calculated Noise Level

Noise levels were calculated for the site using the methodology described in Section 4.1 for the location, conditions, and traffic volumes counted during the noise measurements. The calculated noise levels (L_{EQ}) were compared with the measured on-site noise level to determine if adjustments or corrections (calibration) should be applied to the traffic noise prediction model in the Traffic Noise Model software (TNM). Adjustments are intended to account for site-specific variances in overall reflectivity or absorption, which may not be accurately represented by the default settings in the model. The measured noise level of 65.5 dBA L_{EQ} at approximately 30 feet south of the C Street centerline and approximately 32 feet east of the 32nd Street centerline was compared to the calculated (modeled) noise level of 66.0 dBA L_{EQ}, for the same weather conditions and traffic flow. According to the Federal Highway Administration's Highway Traffic Noise: Analysis and Abatement Guide (see reference), a traffic noise model is considered validated if the measured and calculated noise impacts differ by three decibels or less. No adjustment was deemed necessary to model future noise levels for this noise model as the difference between the measured and calculated levels was found to be less than three decibels. The Traffic Noise Model is assumed to be representative of actual traffic noise that is experienced on site. This information is presented in Table 3.

Table 3. Calculated versus Measured Traffic Noise Data

Calibration Receiver Position	Calculated	Measured	Difference	Correction
30' south of C Street C.L. and 32' east of 32nd Street C.L.	66.0 dBA L_{EQ}	65.5 dBA L_{EQ}	0.5 dB	None applied

3.2 Future Noise Environment

3.2.1 Transportation Noise Sources

The future on-site noise environment is expected to be the result of the same noise sources. Future aircraft noise is not expected to change significantly, and therefore, was modeled as described above.

The future (year 2035) traffic volumes for surrounding roadways were provided by the SANDAG Series 12 Transportation Forecast Information Center, located on the SANDAG website at http://tfic.sandag.org, with the exception of 32nd Street. Future traffic information was not available for 32nd Street; therefore, a conservative estimate was used.

By the year 2035, the traffic volume of C Street is expected to increase to 8,500 ADT in the vicinity of the project site. The traffic volume of 32nd Street is expected to increase to 1,000 ADT in the vicinity of the project site by the year 2035. By the year 2035, the traffic volume of SR-94 (including future HOV lanes) is expected to increase to 81,600 ADT westbound and 94,700 ADT eastbound in the vicinity of the project site. The traffic volume of SR-94 Westbound Off-Ramp is expected to decrease to 6,000 ADT in the vicinity of the project site by the year 2035. By the year 2035, the traffic volume of SR-94 Westbound On-Ramp is expected to increase to 2,700 ADT in the vicinity of the project site.

The same truck percentages of the current traffic volumes were used for future traffic volume modeling. For further roadway details and projected future ADT traffic volumes, please refer to Appendix C: Traffic Noise Model (TNM) Data and Results.

Future traffic noise contours were calculated at ground level, without considering shielding from existing off-site buildings, and show that traffic noise impacts to the project site are expected to be between 63.2 and 70.6 CNEL. Additional information is provided in Appendix C: Traffic Noise Model (TNM) Data and Results. For a graphical representation of these contours, please refer to Figure 7: Site Plan Showing Future Traffic CNEL Contours and Noise Measurement Location.

3.2.2 Temporary Construction Equipment

Detailed construction equipment information for the project was not available at the time of this analysis; however, typical construction equipment noise levels were used. Please refer to Table 4 for typical noise levels of construction equipment expected to be used on site. Unless otherwise noted, construction equipment noise levels were obtained from the Department for Environment, Food & Rural Affairs (DEFRA) and duty cycles were obtained from the Federal Highway Administration (see references).

Table 4. Typical Construction Equipment Noise Levels

Noise Source	Duty Cycle (%)	Noise Level at 50 feet (dBA)
Excavator	40	72
Front End Loader	40	72
Dump Truck	40	75
Air Compressor	40	61
Telescopic Forklift	40	67
Concrete Mixer Truck	40	72
Concrete Pump Truck	20	71
Paver	50	71
Roller[1]	20	80

[1] The equipment noise level of the roller was obtained from the Federal Highway Administration.

These noise levels were incorporated into the temporary construction noise analysis for the site, provided in Section 5.3.

4.0 METHODOLOGY AND EQUIPMENT

4.1 Methodology

4.1.1 Field Measurement

Typically, a "one-hour" equivalent sound level measurement (L_{EQ}, A-Weighted) is recorded for at least one noise-sensitive location on the site. During the on-site noise measurement, start and end times are recorded, vehicle counts are made for cars, medium trucks (double-tires/two axles), and heavy trucks (three or more axles) for the corresponding road segment(s). Supplemental sound measurements of one hour or less in duration are often made to further describe the noise environment of the site.

For measurements of less than one hour in duration, the measurement time is long enough for a representative traffic volume to occur and the noise level (L_{EQ}) to stabilize. The vehicle counts are then converted to one-hour equivalent volumes by applying an appropriate factor. Other field data gathered include measuring or estimating distances, angles-of-view, slopes, elevations, roadway grades, and vehicle speeds. This information is subsequently verified using available maps and records.

4.1.2 Roadway Noise Calculation

The Traffic Noise Model, Version 2.5 program released by the U.S. Department of Transportation is used to calculate the current and future daytime average CNEL contours at the project site, taking into account surrounding buildings, elevation, and additional topography. The CNEL is calculated as 0.092 times the ADT for surrounding roadways, based on the studies made by Wyle Laboratories (see reference). Future CNEL is calculated for desired receptor locations using future road alignment, elevations, lane configurations, projected traffic volumes, estimated truck mixes, and vehicle speeds. Noise attenuation methods may be analyzed, tested, and planned with TNM, as required.

In order to determine the estimated traffic volumes of roadways during the traffic noise measurement made on site for model calibration, the approximate percentage of the Average Daily Trips (ADT) value for the time period in which the measurement is made is incorporated into the traffic model. These percentages have been established in a study performed by Katz-Okitsu and Associates, Traffic Engineers (see reference). For purposes of calibrating the TNM, 6.2% of the ADT values for the current environment were used in calculations (for roadways that were not manually counted) to account for traffic between the hours of 11 a.m. and 12 p.m. in the vicinity of the project site. Further explanation can be supplied on request.

4.1.3 Exterior-to-Interior Analysis

The City of San Diego and the State of California require buildings to be designed in order to attenuate, control, and maintain average interior noise levels not greater than 45 CNEL in residential space. Contemporary exterior building construction is expected to achieve at least 15 decibels of exterior-to-interior noise attenuation with windows opened, according to the U.S. EPA (see reference). As a result, exterior noise levels of more than 60 CNEL often result in interior conditions that fail to meet the 45 CNEL requirements for habitable space.

Analysis for the interior noise levels requires consideration of:

- Number of unique assemblies in the wall (doors, window/wall mount air conditioners, sliding glass doors, and windows)

- Size, number of units, and sound transmission data for each assembly type
- Length of sound impacted wall(s)
- Depth of sound impacted room
- Height of exterior wall of sound impacted room
- Exterior noise level at wall assembly or assemblies of sound impacted room

The Composite Sound Transmission data is developed for the exterior wall(s) and the calculated noise exposure is converted to octave band sound pressure levels (SPL) for a typical traffic type noise. The reduction in room noise due to absorption is calculated and subtracted from the interior octave noise levels, and the octave band noise levels are logarithmically summed to yield the overall interior room noise level. When interior noise levels exceed 45 CNEL in residential space, the noise reduction achieved by each element is reviewed to determine which changes will achieve the most cost-effective compliance. Windows are usually the first to be reviewed, followed by exterior doors, and then exterior walls.

Modeling of exterior wall assemblies, roof/ceiling assemblies, and glazing units are accomplished using INSUL Version 9.0, which is a model-based computer program, developed by Marshall Day Acoustics for predicting the sound insulation of walls, floors, ceilings and windows. It is acoustically based on theoretical models that require only minimal material information that can make reasonable estimates of the sound transmission loss (TL) for use in sound insulation calculations. INSUL can be used to quickly evaluate new materials or systems or investigate the effects of changes to existing designs. It models individual materials using the simple mass law and coincidence frequency approach and can model more complex assembly partitions, as well. It has evolved over several versions into an easy to use tool and has refined the theoretical models by continued comparison with laboratory tests to provide acceptable accuracy for a wide range of constructions. INSUL model performance comparisons with laboratory test data show that the model generally predicts the performance of a given assembly within 3 STC points.

4.1.4 Cadna Noise Modeling Software

Modeling of the outdoor construction noise environment is accomplished using Cadna Version 2018, which is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. Cadna (Computer Aided Noise Abatement) assists in the calculation, presentation, assessment, and alleviation of noise exposure. It allows for the input of project information such as noise source data, barriers, structures, and topography to create a detailed model and uses the most up-to-date calculation standards to predict outdoor noise impacts. Noise standards used by Cadna that are particularly relevant to this analysis include ISO 9613 (Attenuation of sound during propagation outdoors). Cadna provides results that are in line with basic acoustical calculations for distance attenuation and barrier insertion loss. Further explanation may be provided upon request.

4.2 Measurement Equipment

The following equipment was used at the site to measure existing noise levels:

- Larson Davis Model LxT Type 1 Sound Level Meter, Serial #4084
- Larson Davis Model CA250 Type 1 Calibrator, Serial #1081
- Tripod, microphone windscreen, measuring tape

The sound level meter was field-calibrated prior to and following the noise measurement to ensure accuracy. All sound level measurements conducted and presented in this report, in accordance with the regulations, were made with a sound level meter that conforms to the American National Standards

Institute specifications for sound level meters (ANSI S1.4). All instruments are maintained with National Bureau of Standards traceable calibrations, per the manufacturers' standards.

5.0 IMPACTS AND MITIGATION

The future noise environment of this project site is primarily composed of vehicle traffic noise on surrounding roadways, as well as noise contribution from aircraft overflight from the San Diego International Airport. Exterior and interior noise levels must be evaluated to ensure their compliance with City of San Diego regulations. As some current traffic volumes exceed those projected for the future noise environment, the higher of the two values have been used for a worst-case analysis of traffic noise at the project site.

5.1 Exterior

5.1.1 Noise Impacts to Outdoor Use Areas

As per the City of San Diego Noise Element to the General Plan, outdoor use areas of multi-family land uses that are affected by aircraft noise greater than 65 CNEL are allowed, provided an avigation easement for the project has been provided to the San Diego County Regional Airport Authority. Worst-case combined noise impacts at private residential balconies were calculated and show that noise levels will range from approximately 67 CNEL to approximately 72 CNEL. While combined traffic and aircraft noise levels exceed a noise level of 65 CNEL at all receivers, worst-case noise impacts from traffic noise sources alone were calculated to range from 51 CNEL to approximately 71 CNEL. Worst-case traffic noise impacts at outdoor use areas are shown in Table 5, and receiver locations are shown in Figure 8. Please refer to Appendix C for more information.

Table 5. Worst-Case Traffic Noise Levels at Outdoor Use Areas – As Designed

Receiver	Location	Exterior Noise Level (CNEL)
OU1	Building A, Unit 1	52
OU2	Building A, Unit 2	52
OU3	Building A, Unit 3	52
OU4	Building A, Unit 4	51
OU5	Building A, Unit 5	51
OU6	Building A, Unit 6	54
OU7	Building B, Unit 7	58
OU8	Building B, Unit 8	58
OU9	Building B, Unit 9	58
OU10	Building B, Unit 10	58
OU11	Building B, Unit 11	58
OU12	Building C, Unit 12	64
OU13	Building C, Unit 13	63

Table 5. Worst-Case Traffic Noise Levels at Outdoor Use Areas – As Designed		
Receiver	**Location**	**Exterior Noise Level (CNEL)**
OU14	Building C, Unit 14	64
OU15	Building C, Unit 15	**71**
OU16	Building D, Unit 16	**69**
OU17	Building D, Unit 17	**69**
OU18	Building D, Unit 18	**69**
OU19	Building D, Unit 19	**69**

As shown above, outdoor use areas at units 15 through 19 are expected to be exposed to traffic noise levels that exceed 65 CNEL in the worst-case noise environment, and therefore, mitigation is required in those areas. Please refer to Table 6 for worst-case traffic noise levels at outdoor use areas and required mitigation.

Table 6. Worst-Case Traffic Noise Levels at Outdoor Use Areas – with Barrier Mitigation			
Receiver	**Location**	**Barrier Height (ft)[1]**	**Exterior Noise Level (CNEL)**
OU15	Building C, Unit 15	4.5	64
OU16	Building D, Unit 16	3.5	64
OU17	Building D, Unit 17	3.5	64
OU18	Building D, Unit 18	3.5	64
OU19	Building D, Unit 19	3.5	63

[1]The barrier height shown is relative to the floor height.

The barrier at Unit 15 should be 4.5 feet high relative to floor height and should be located along the southern and eastern boundaries of the Unit 15 balcony. The barriers at Units 16, 17, and 18 should be 3.5 feet high relative to floor height and should be located along the southern boundaries of their respective balconies. The barrier at Unit 19 should be 3.5 feet high relative to floor height and should be located along the southern and western boundaries of the Unit 19 balcony. With the incorporation of the sound attenuation barriers shown above, and the provision of an avigation easement, the outdoor use areas are expected to comply with the City of San Diego Noise Element to the General Plan.

A sound wall should be solid and constructed of masonry, wood, plastic, fiberglass, steel, or a combination of those materials, with no cracks or gaps, through or below the wall. Any seams or cracks must be filled or caulked. If wood is used, it can be tongue and groove and must be at least 7/8-inch thick or have a surface density of at least 3½ pounds per square foot. Where architectural or aesthetic factors allow, glass or clear plastic may be used on the upper portion, if it is desirable to preserve a view. Sheet metal of 18-gauge (minimum) may be used, if it meets the other criteria and is properly supported and stiffened so that it does not rattle or create noise itself from vibration or wind.

5.1.2 Noise Impacts at Building Facades

Worst-case combined (aircraft and traffic) noise impacts were calculated at building facades to determine noise levels to be implemented in interior noise calculations. Calculations show that noise levels are expected to range from 67 CNEL (at the Floor 1 north facade of Building D) to 73 CNEL (at the Floor 3 south facade of Building D). Worst-case combined noise levels at building facades are shown in Table 7, and receiver locations are shown graphically in Figure 9.

Table 7. Worst-Case Combined Exterior Noise Levels at Building Facades

Receiver	Location	Exterior Noise Level (CNEL)								
		First Floor			Second Floor			Third Floor		
		Traffic	Aircraft	Combined	Traffic	Aircraft	Combined	Traffic	Aircraft	Combined
F1	Building A - West	--	--	--	66	67	70	68	67	70
F2	Building A - West	--	--	--	65	67	69	66	67	70
F3	Building A - West	--	--	--	63	67	68	64	67	69
F4	Building A - West	--	--	--	63	67	69	65	67	69
F5	Building A - North	61	67	68	61	67	68	62	67	68
F6	Building A - East	60	67	68	62	67	68	63	67	68
F7	Building A - East	60	67	68	63	67	68	63	67	69
F8	Building A - East	63	67	68	65	67	69	66	67	69
F9	Building A - East	66	67	69	68	67	71	69	67	71
F10	Building A - South	68	67	70	70	67	72	70	67	72
F11	Building B- North	59	67	68	60	67	68	--	--	--
F12	Building B- North	59	67	68	60	67	68	--	--	--
F13	Building B- North	59	67	68	60	67	68	--	--	--
F14	Building B - East	57	67	67	64	67	69	--	--	--
F15	Building B - South	63	67	68	67	67	70	--	--	--
F16	Building B - South	61	67	68	62	67	68	--	--	--
F17	Building B - South	56	67	67	59	67	68	--	--	--
F18	Building B - West	57	67	67	62	67	68	--	--	--
F19	Building C - North	60	67	68	61	67	68	62	67	68
F20	Building C - East	67	67	70	68	67	71	68	67	71
F21	Building C - East	68	67	70	69	67	71	69	67	71
F22	Building C - East	68	67	71	70	67	71	70	67	72
F23	Building C - South	68	67	70	71	67	72	71	67	72
F24	Building C - West	--	--	--	68	67	70	71	67	72
F25	Building C - West	--	--	--	65	67	69	68	67	70
F26	Building C - West	--	--	--	64	67	69	67	67	70
F27	Building D - North	44	67	67	48	67	67	52	67	67
F28	Building D - North	43	67	67	45	67	67	52	67	67
F29	Building D - North	51	67	67	52	67	67	58	67	67
F30	Building D - East	67	67	70	69	67	71	69	67	71
F31	Building D - South	69	67	71	71	67	72	71	67	72
F32	Building D - South	68	67	71	70	67	72	71	67	72
F33	Building D - South	68	67	70	70	67	72	71	67	72
F34	Building D - West	62	67	68	65	67	69	66	67	70

5.2 Interior

The City of San Diego and State of California require buildings to be designed in order to attenuate, control, and maintain interior noise levels to below 45 CNEL in habitable residential space. Contemporary exterior building construction is generally expected to achieve at least 15 decibels of exterior-to-interior noise attenuation, with windows opened, according to the U.S. EPA (see reference). Therefore, proposed project building structures exposed to exterior noise levels greater than 60 CNEL could be subject to interior noise levels exceeding the 45 CNEL noise limit for residential habitable space.

As shown in Table 7, worst-case combined noise levels exceed 60 CNEL at all residential building facade locations. For this reason, an exterior-to-interior noise analysis was conducted for the residential spaces to evaluate the sound reduction properties of proposed exterior wall assembly, window, and door construction designs in the building. As aircraft overflight is a significant noise source, the roof assembly was included in this evaluation.

According to project plans, the exterior wall is proposed to consist of a stucco exterior mounted on 2-inch by 4-inch timber studs, with 5/8-inch Type X gypsum board installed on the interior, and batt insulation in the cavity. This assembly was evaluated using INSUL and was shown to achieve an STC rating of 38. Due to high noise levels on site, some spaces may require an exterior wall assembly with a higher STC rating (see Table 8 below for more information). Where this occurs, either a staggered stud assembly should be used (staggered 2-inch by 4-inch wood studs on a 6-inch bottom plate), or the proposed assembly can be improved by attaching the layer of gypsum board to the wood studs using resilient channels. The staggered stud exterior wall assembly was evaluated using INSUL and was shown to achieve an STC rating of 59. With a single row of studs (non-staggered) and the gypsum board mounted to the studs using resilient channels (on the interior side), the assembly was evaluated using INSUL, and was shown to achieve an STC rating of 59. Please refer to Appendix D for more information.

According to project plans, the roof is proposed to consist of built up roofing over tongue-and-groove plywood, on wood joists (evaluated as 12-inches deep), with 1/2-inch Type X gypsum board installed on the interior, and batt insulation in the cavity. This assembly was evaluated using INSUL and was shown to achieve an STC rating of 34. Due to high noise levels on site, some spaces may require a roof assembly with a higher STC rating (see Table 8 below for more information). Where this occurs, proposed roof assembly can be improved by attaching the layer of gypsum board to the wood joists using resilient channels. The roof assembly with gypsum board mounted to the joists using resilient channels (on the interior side) was evaluated using INSUL, and was shown to achieve an STC rating of 57. Please refer to Appendix D for more information.

Calculations have been performed using the assemblies detailed above to determine whether future combined interior noise levels of 45 CNEL can be achieved. Table 8 shows interior noise levels for worst-case spaces. The units shown in parentheses are considered comparable spaces to those analyzed, and will require the same design considerations as their corresponding evaluated spaces. Please refer to Appendix E for additional information.

Table 8. Interior Noise Levels in Worst-Case Habitable Spaces

Plan Type	Room	Maximum Exterior Facade Impact (CNEL)	Minimum STC Rating Required for Glazing	Interior Noise Level (CNEL)		Mechanical Ventilation Required?
				Windows Open	Windows Closed	
1	Kitchen / Great Room (Units 1, 6, 16, 19)	72	28	58	45	Yes
	Kitchen / Great Room (Units 2, 3, 4, 5, 17, 18)	69	25	56	45	Yes
	Master Bedroom (Units 16 and 19)	73	31	64	45	Yes
	Master Bedroom (Units 1, 6, 17, 18)	72	28	62	45	Yes
	Master Bedroom (Units 2, 3, 4, 5)	70	25	61	45	Yes
	Bedroom 2 (Unit 1)	72	31	63	45	Yes
	Bedroom 2 (Units 2, 3, 6, 16, 19)	71	28	60	44	Yes
	Bedroom 2 (Units 4, 5, 17, 18)	69	25	61	45	Yes
	Bedroom 3 (All Units)	71	25	62	44	Yes
2	Kitchen / Dining Room / Great Room (All Units)	68	25	54	43	Yes
	Master Bedroom (All Units)	69	25	55	45	Yes
	Bedroom 2 (Unit 7)	68	28	61	45	Yes
	Bedroom 2 (Units 8, 9, 10, 11)	68	25	61	44	Yes
	Bedroom 3 (Unit 11)	70	28	65	45	Yes
	Bedroom 3 (Units 7, 8, 9, 10)	68	25	61	44	Yes
3	[1]Kitchen / Dining Room / Great Room (All Units)	72	37 / **28**	59	45 / **44**	Yes
	Master Bedroom (Units 12 and 15)	72	28	63	45	Yes
	Master Bedroom (Units 13 and 14)	71	25	63	45	Yes
	Bedroom 2 (All Units)	71	25	62	43	Yes

Table 8. Interior Noise Levels in Worst-Case Habitable Spaces						
Plan Type	**Room**	**Maximum Exterior Facade Impact (CNEL)**	**Minimum STC Rating Required for Glazing**	**Interior Noise Level (CNEL)**		**Mechanical Ventilation Required?**
				Windows Open	**Windows Closed**	
3	Bedroom 3 (Unit 15)	71	28	62	44	Yes
	Bedroom 3 (Units 12, 13, 14, 15)	70	25	62	45	Yes

[1] This space (and similar spaces) requires exterior glazing with a high STC rating when the proposed exterior wall and roof assemblies are used. In order to avoid high STC glazing, this space was also evaluated using exterior walls with a staggered stud wall (or a wall with the interior layer of gypsum board attached to the studs using resilient channels) and a roof assembly with the interior layer of gypsum board attached to the joists using resilient channels, to determine the minimum STC rating required for glazing with improved exterior wall and roof assemblies. Calculated results with both configurations (higher window STC ratings, or lower STC ratings [with improved wall and roof assemblies], respectively) are shown in Table 8. Please see Section 5.2 above for more details.

As shown above, with the acoustical recommendations given in Table 8 in place, interior noise levels are expected to remain at or below 45 CNEL in residential units with windows closed. As there are no residential units that meet the 45 CNEL interior noise level requirement with windows open, mechanical ventilation is required for all units on site. The ventilation system shall meet the criteria of the California Mechanical Code, including the capability to provide appropriate ventilation rates. The ventilation system shall not compromise the sound insulation capability of the exterior wall or be dependent on ventilation through windows. A Forced Air Unit (FAU) or its equivalent meeting the criterion described must be installed in these required spaces to satisfy code requirements.

Exterior door installation should include all-around weather-tight door stop seals and an improved threshold closure system. The additional hardware will improve the doors' overall sound reduction properties. The transmission loss (TL) of an exterior door without weather-tight seals is largely a factor of sound leakage, particularly at the bottom of the door if excessive clearance is allowed for air transfer. By equipping exterior doors with all-around weather-tight seals and an airtight threshold closure at the bottom, a loss of up to 10 STC points can be prevented. Manufacturers of these products include companies such as Zero and Reese. Manufacturer sheets are provided in Appendix F: Recommended Products.

Additionally, it is imperative to seal and caulk between the rough opening and the finished door frame for all doors by applying an acoustically resilient, non-skinning butyl caulking compound. Sealant application should be as generous as needed to ensure effective sound barrier isolation. The same recommendation would apply to any other penetrations through the assembly. The OSI Green Series Draft and Acoustical Sound Sealant and the Pecora AC-20 FTR Sealant are products specifically designed for this purpose. Please see Appendix F: Recommended Products.

The proposed residential units were analyzed for worst-case exterior noise impacts from roadway traffic and aircraft noise. With mechanical ventilation installed in residential units and the acoustical recommendations given in Table 8 incorporated into the project design, all interior residential space is expected to comply with City of San Diego and California Building Code interior noise requirements. No additional project design features are deemed necessary.

5.3 Temporary Project-Related Noise Impacts on Surrounding Property Lines

According to the City of San Diego Municipal Code, construction activity is prohibited between the hours of 7 p.m. and 7 a.m. and on Sundays or legal holidays. During permissible hours of operation, noise levels from construction activity must be limited to a twelve-hour average of no greater than 75 dBA at any property line zoned for residential use.

An anticipated construction schedule was formulated using information provided in project plans, discussion with Brad Miller of Boretto + Merrill Consulting, and professional experience. According to project plans, there will be approximately 4,800 cubic yards of cut and approximately 4,800 cubic yards of fill at the project site. According to discussion with Mr. Miller, the Framing / Construction and Landscaping / Paving / Site Concrete phases are expected to be constructed simultaneously; therefore these phases were calculated together (Phase 2) for a worst-case analysis. These considerations were taken into account when making typical equipment assumptions. The anticipated construction activities are shown in Table 9.

Table 9. Anticipated Construction Activity

Phase	Anticipated Large Equipment
1. Grading / Utilities	Excavator, Front End Loader, Dump Truck
2. Framing / Construction and Landscaping / Paving / Site Concrete	Air Compressor, Telescopic Forklift, Concrete Mixer Truck, Concrete Pump Truck, Paver, Roller

As the site covers an overall area of approximately one acre, it is expected that the construction equipment will be concentrated in smaller areas to develop them, and then moved around the entire site during development. Therefore, the construction activity has been evaluated in halves of the buildable area of the site, to show anticipated noise impacts as construction equipment is centered at different locations on site. Construction noise calculations were performed using Cadna noise modeling software.

Construction equipment noise sources were placed at the center of each half in order to account for the varying distance from source to receiver as equipment moves around the site. Receivers on property lines to the north, east, and west were calculated for the phases of construction listed above considering construction activity centered on each half of the project site. As residential buildings at the receiver locations have two floors, receivers have been placed at first and second floors to ensure compliant noise levels at the second floor elevation along the property line. All other noise-sensitive receivers are located at a greater distance from potential construction activity and are expected to have lower noise levels. Noise calculations consider typical duty cycles of equipment, to account for periods of activity and inactivity on the site.

Noise levels for each phase of construction are shown in Table 10. Detailed calculations can be found in Appendix G. Graphical representations of the construction noise contours and receiver locations can be found in Figures 10 through 13, respectively.

Table 10. Temporary Construction Noise Levels at Nearby Residential Properties

Phase	Equipment Used	Source Area	Receiver Name	Receiver Location	12-Hour Average Noise Level of Equipment (dBA)	
					Floor 1	Floor 2
1. Grading / Utilities	Excavator, Front End Loader, Dump Truck	East	R1	West	58	59
			R2	North	61	62
			R3	East	61	68
		West	R1	West	65	66
			R2	North	64	65
			R3	East	51	58
2. Framing / Construction and Landscaping / Paving / Site Concrete	Air Compressor, Telescopic Forklift, Concrete Mixer Truck, Concrete Pump Truck, Paver, Roller	East	R1	West	59	60
			R2	North	62	63
			R3	East	64	70
		West	R1	West	67	68
			R2	North	66	67
			R3	East	54	60

As shown above, temporary construction noise impacts are not expected to exceed 75 dBA any noise-sensitive receivers during any phases of construction. Therefore, it has been determined that noise levels from construction activities associated with this project are expected to comply with the applicable City of San Diego construction noise limits at all surrounding property lines, as designed, with activity limited to the daytime hours of 7 a.m. to 7 p.m. during all phases of construction.

Although noise levels are shown to be in compliance with the construction noise limit of 75 dBA, the following good-practice noise control measures should still be practiced as a courtesy to surrounding properties.

1. Staging areas should be placed as far from occupied receivers as possible on the project site to limit any additional unnecessary noise exposure at sensitive receivers.

2. Place stationary equipment in locations that will have a lesser noise impact on nearby sensitive receivers.

3. Turn off equipment when not in use.

4. Limit the use of enunciators or public address systems, except for emergency notifications.

5. Equipment used in construction should be maintained in proper operating condition, and all loads should be properly secured, to prevent rattling and banging.

6. Schedule work to avoid simultaneous construction activities that both generate high noise levels.

7. Use equipment with effective mufflers.

8. Minimize the use of backup alarms.

With work limited to daytime hours permissible by the City of San Diego and adherence to the general good practice construction noise control techniques listed above, temporary construction noise is expected to remain in compliance with City of San Diego noise limits as designed. No mitigation is necessary.

6.0 CONCLUSION

As this project will be required to provide an avigation easement to the San Diego County Regional Airport Authority, aircraft noise levels can exceed 65 CNEL at outdoor use areas, provided interior noise levels are reduced to below 45 CNEL in residential spaces. However, worst-case impacts from traffic noise sources were calculated at private balconies considering shielding from proposed buildings on site. Calculations show that traffic noise impacts at outdoor use areas of units 15 through 19 will exceed the 65 CNEL limit as designed; however, with the sound attenuation barriers shown in Table 6 herein incorporated as a project design feature, and the provision of an avigation easement, the outdoor use areas are expected to comply with the City of San Diego Noise Element to the General Plan.

Due to high exterior noise levels at building facades, an exterior-to-interior analysis was performed to determine building features necessary to reduce interior noise levels in residential units to 45 CNEL or less, as required by the City of San Diego and State of California. Calculations show that, with the acoustical recommendations shown herein, interior noise level requirements of the City of San Diego and State of California are expected to be met in all residential spaces.

Noise levels from temporary construction activities associated with this project are expected to comply with the applicable City of San Diego construction noise limits at all surrounding property lines, with activity limited to the daytime hours of 7 a.m. to 7 p.m. during all phases of construction, as designed. Construction is prohibited between the hours of 7 p.m. and 7 a.m. and on Sundays or legal holidays. Though it is not required by regulations, the general good-practice construction noise control methods listed herein should be followed, as a courtesy to surrounding properties.

7.0 CERTIFICATION

All recommendations for noise control are based on the best information available at the time our consulting services are provided. However, as there are many factors involved in sound transmission, and Eilar Associates has no control over the construction, workmanship or materials, Eilar Associates is specifically not liable for final results of any recommendations or implementation of the recommendations.

The findings and recommendations of this acoustical analysis report are based on the information available and are a true and factual analysis of the potential acoustical issues associated with the 32nd and C Street project, to be located at the southeast corner of 32nd Street and C Street, in the City of San Diego, California. This report was prepared by Mo Ouwenga and Jonathan Brothers.

M L Ouwenga

Mo Ouwenga, Acoustical Consultant

Jonathan Brothers, Principal Acoustical Consultant

8.0 REFERENCES

1. City of San Diego Noise Element to the General Plan, June 2015.

2. City of San Diego Municipal Code, Section 59.5.0404: Construction Noise, Amended January 3, 1984.

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18. DataKustik, CadnaA (Computer Aided Noise Abatement), Version 2018.

FIGURES

Eilar Associates, Inc.
210 South Juniper Street, Suite 100
Escondido, California 92025
760-738-5570

Vicinity Map
Job # B80709N1

Figure 1

San Diego County Assessor's Parcel Number:

539-563-01-00

Project Location

Eilar Associates, Inc.
210 South Juniper Street, Suite 100
Escondido, California 92025
760-738-5570

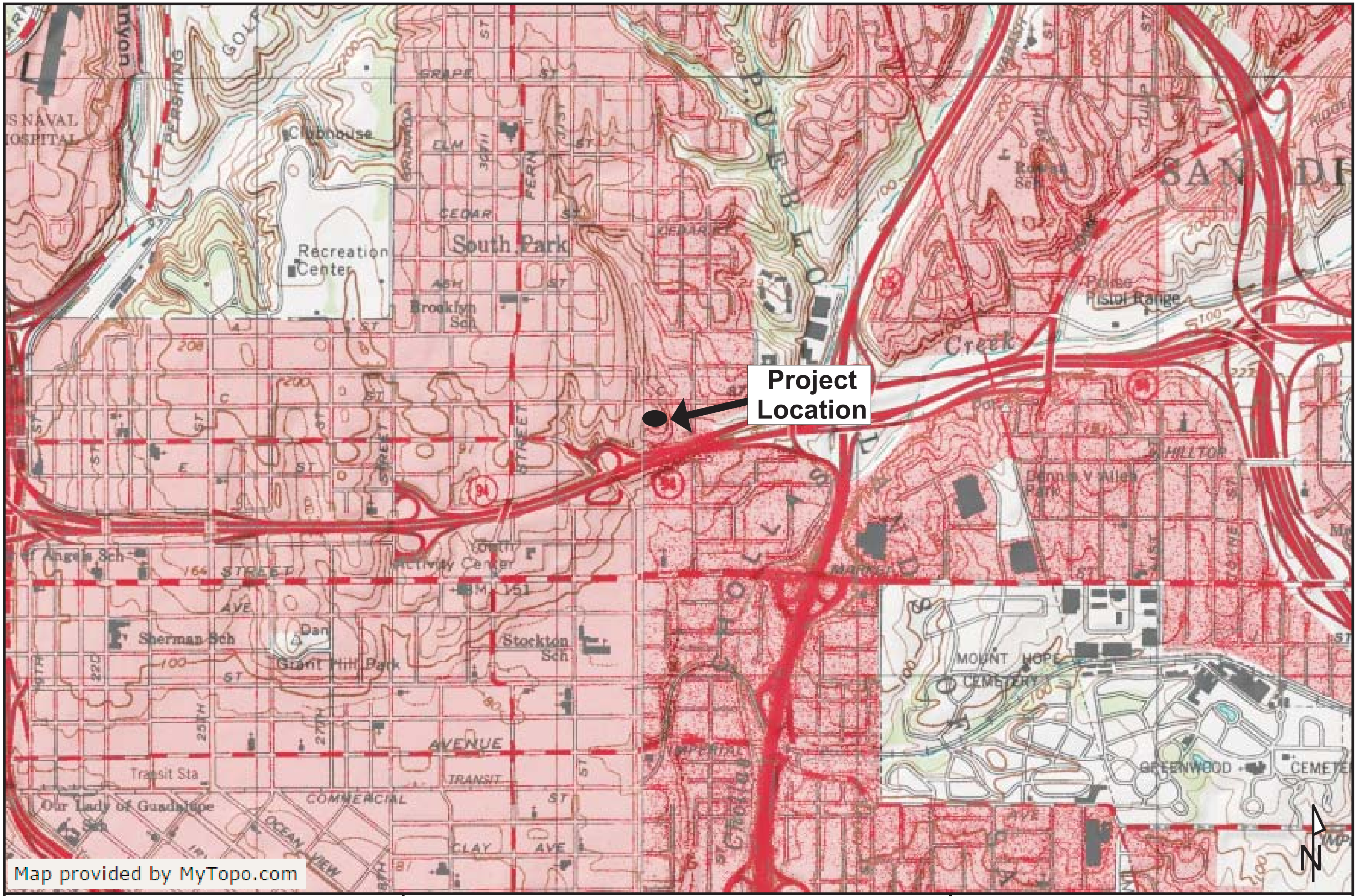
Assessor's Parcel Map
Job # B80709N1

Figure 2

Eilar Associates, Inc.
210 South Juniper Street, Suite 100
Escondido, California 92025
760-738-5570

Satellite Aerial Photograph
Job # B80709N1

Figure 3



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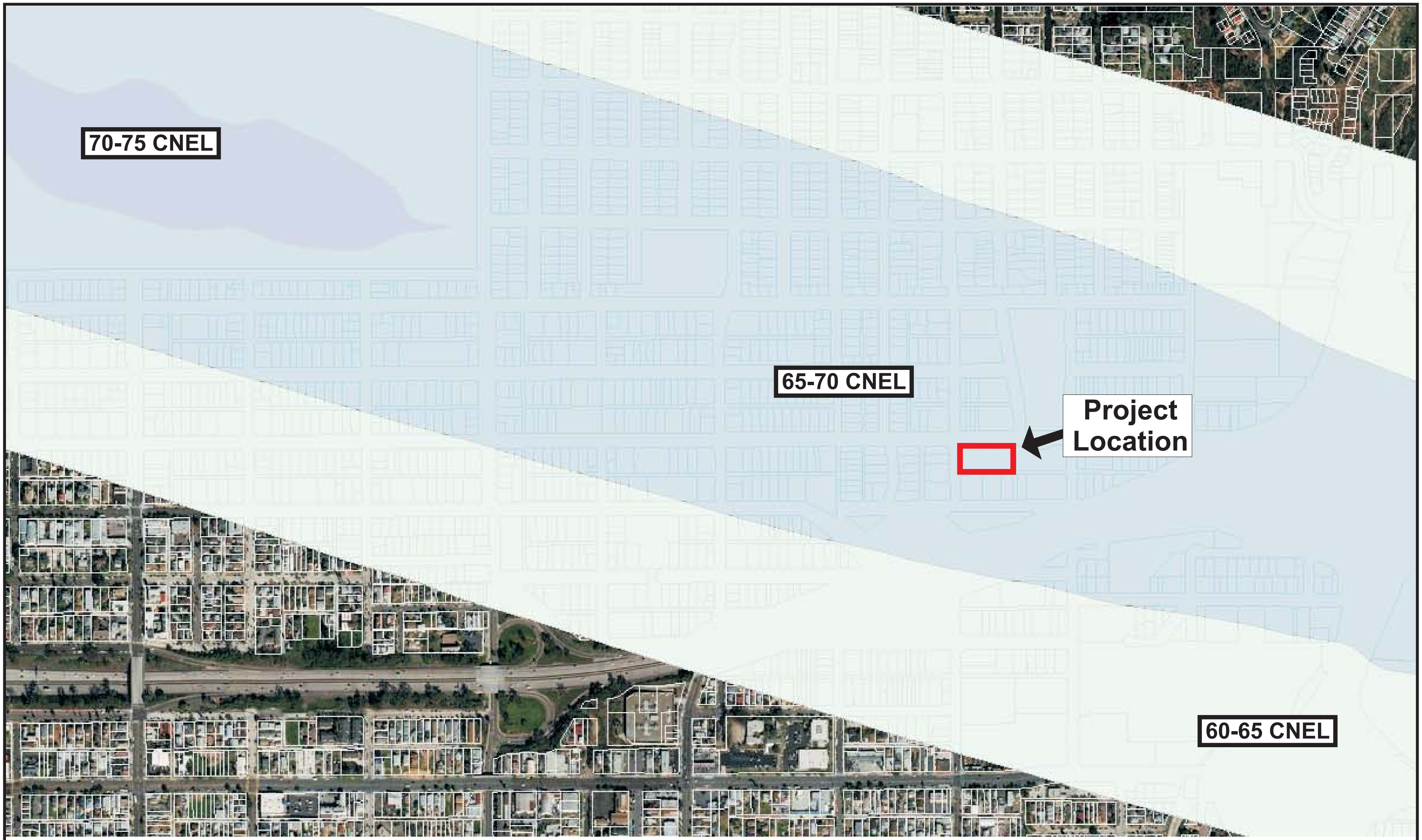
Escondido, California 92025
760-738-5570

Topographic Map
Job # B80709N1

Figure 4



San Diego County Regional Airport Authority

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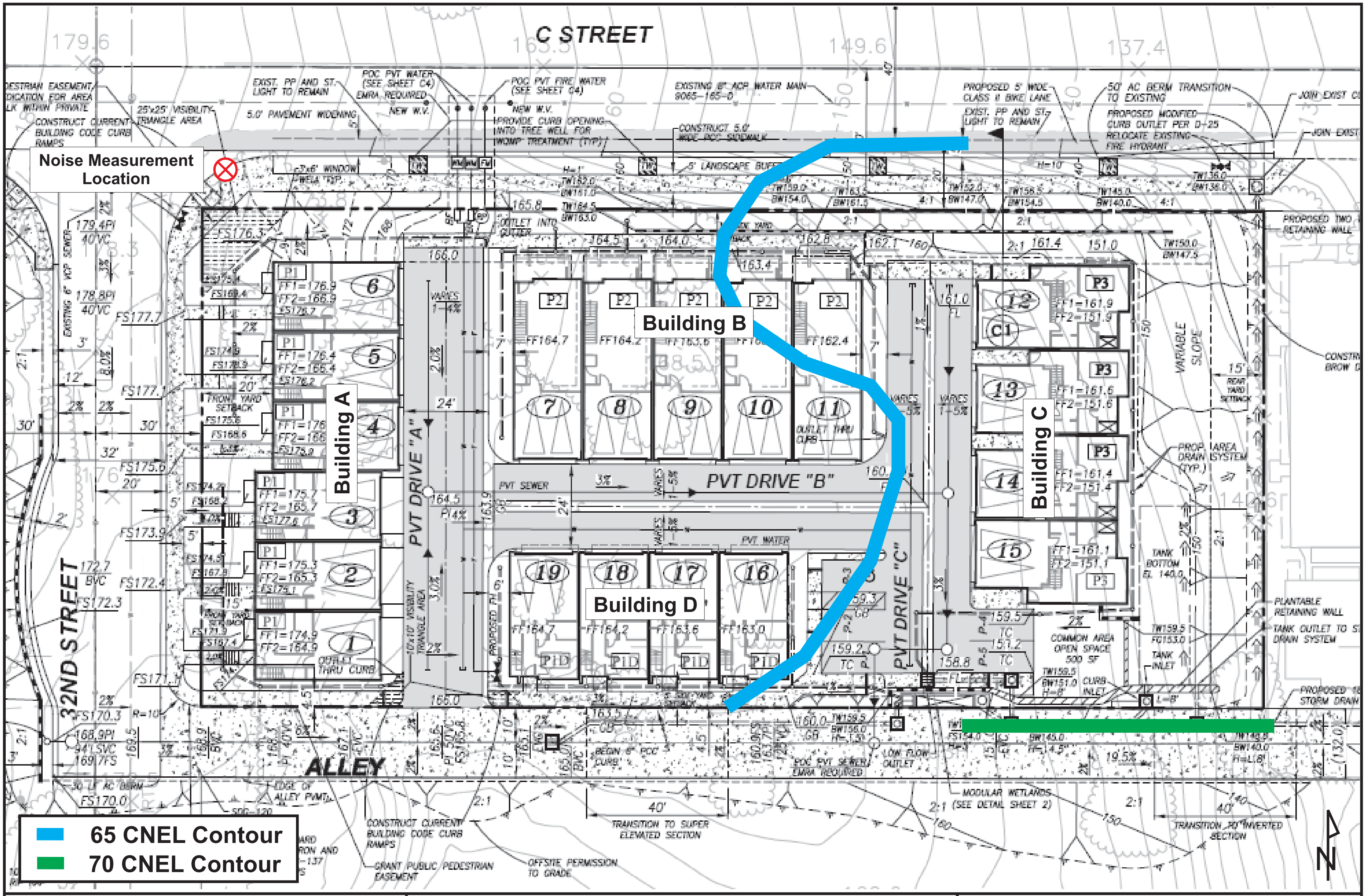
Escondido, California 92025
760-738-5570

San Diego International Airport
CNEL Contours and Project Location
Job # B80709N1

Figure 5



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Escondido, California 92025
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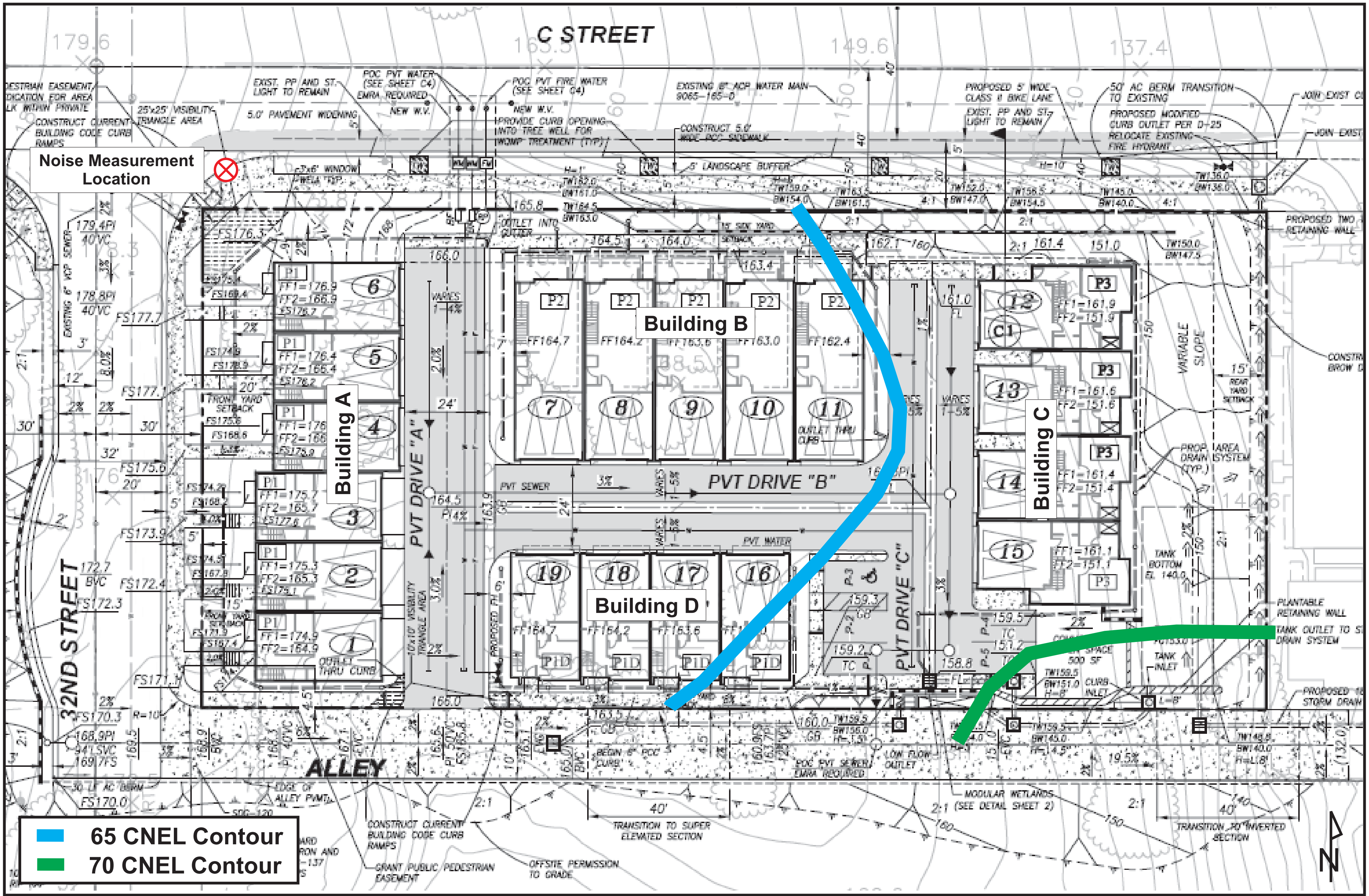
Site Plan Showing Current Traffic CNEL Contours and Noise Measurement Location
Job # B80709N1

Figure 6



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Escondido, California 92025
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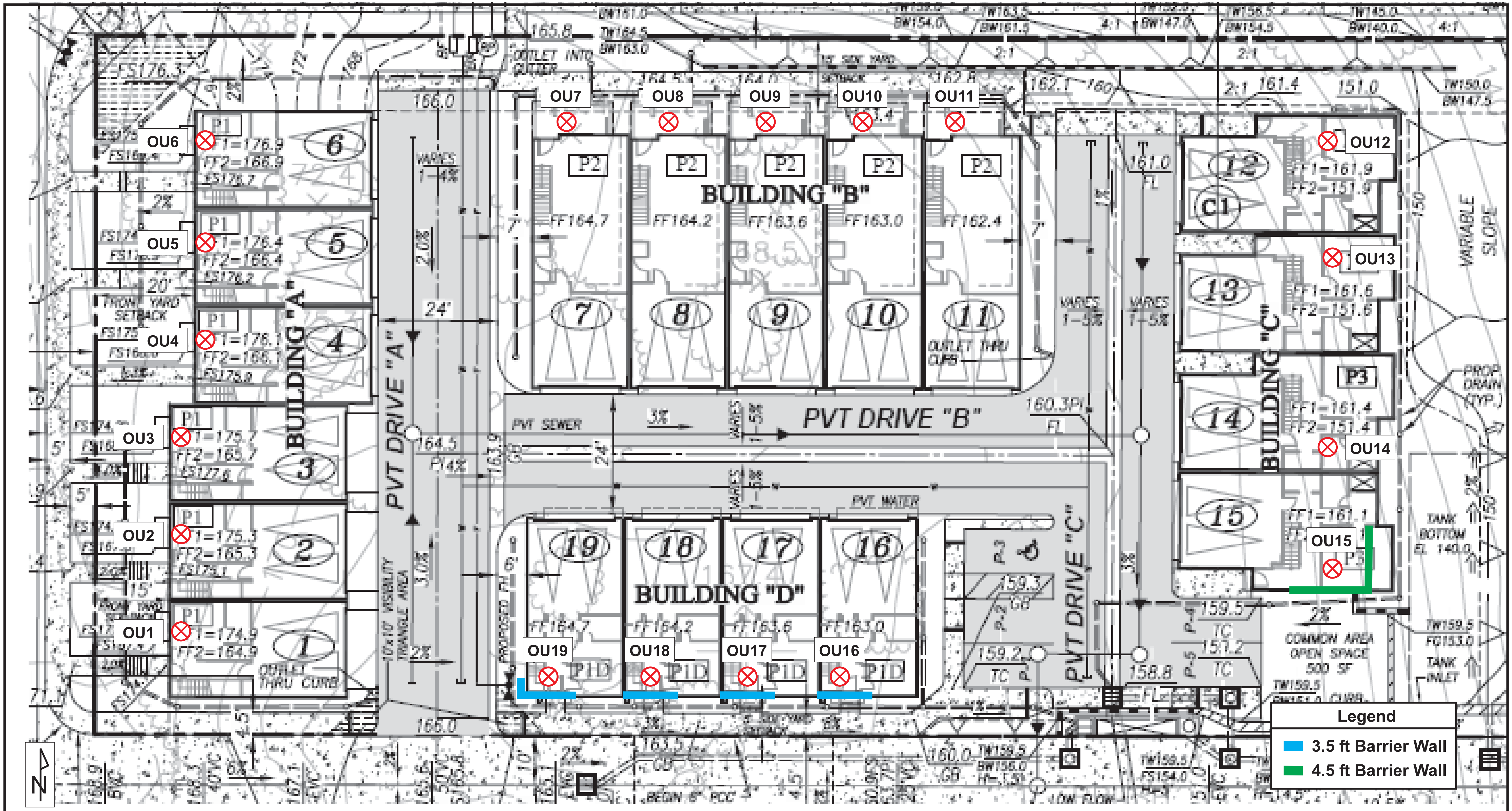
Site Plan Showing Future Traffic CNEL Contours and Noise Measurement Location
Job # B80709N1

Figure 7



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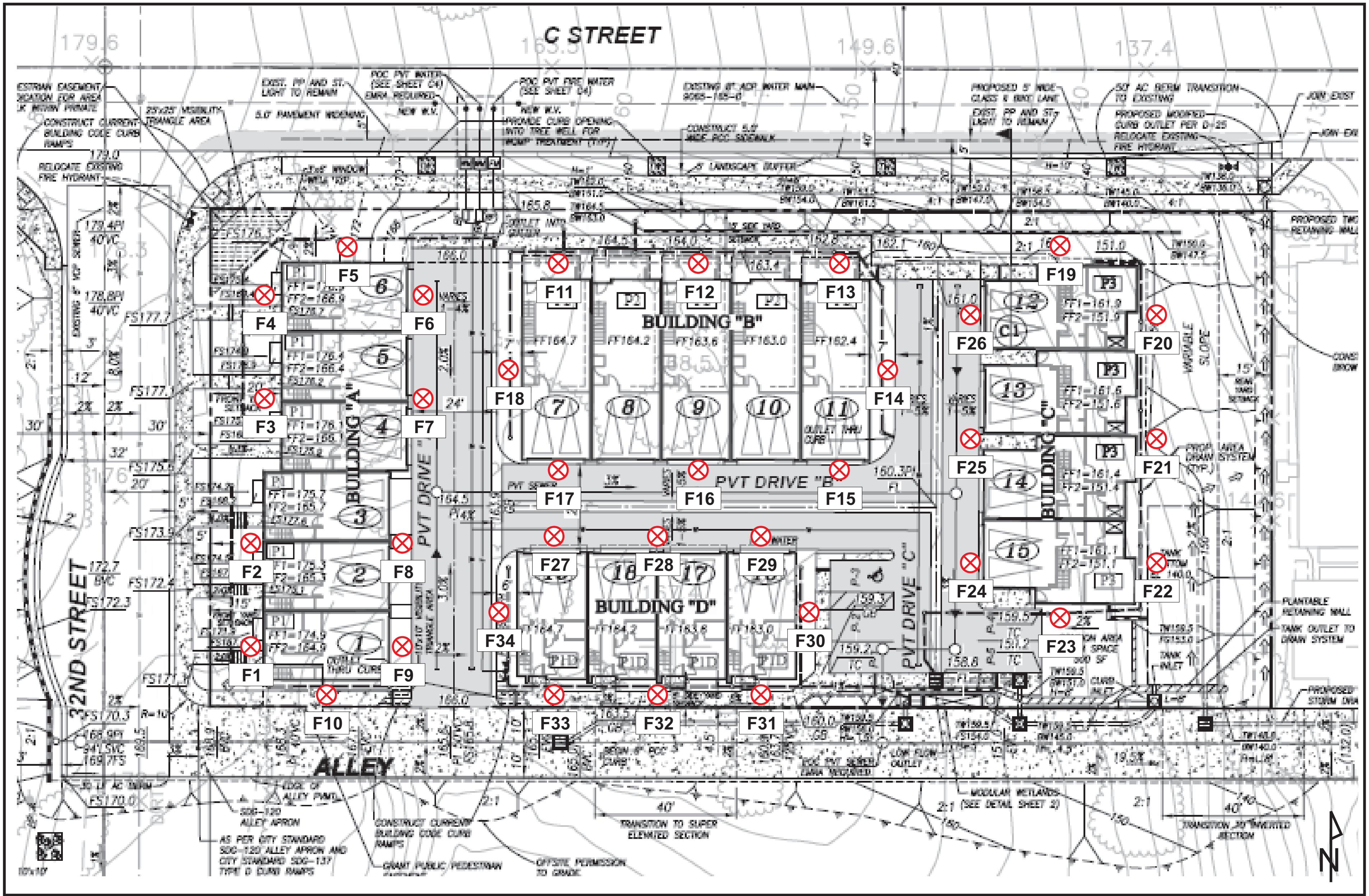
Site Plan Showing Outdoor Use Area
Receiver and Barrier Locations
Job # B80709N1

Figure 8



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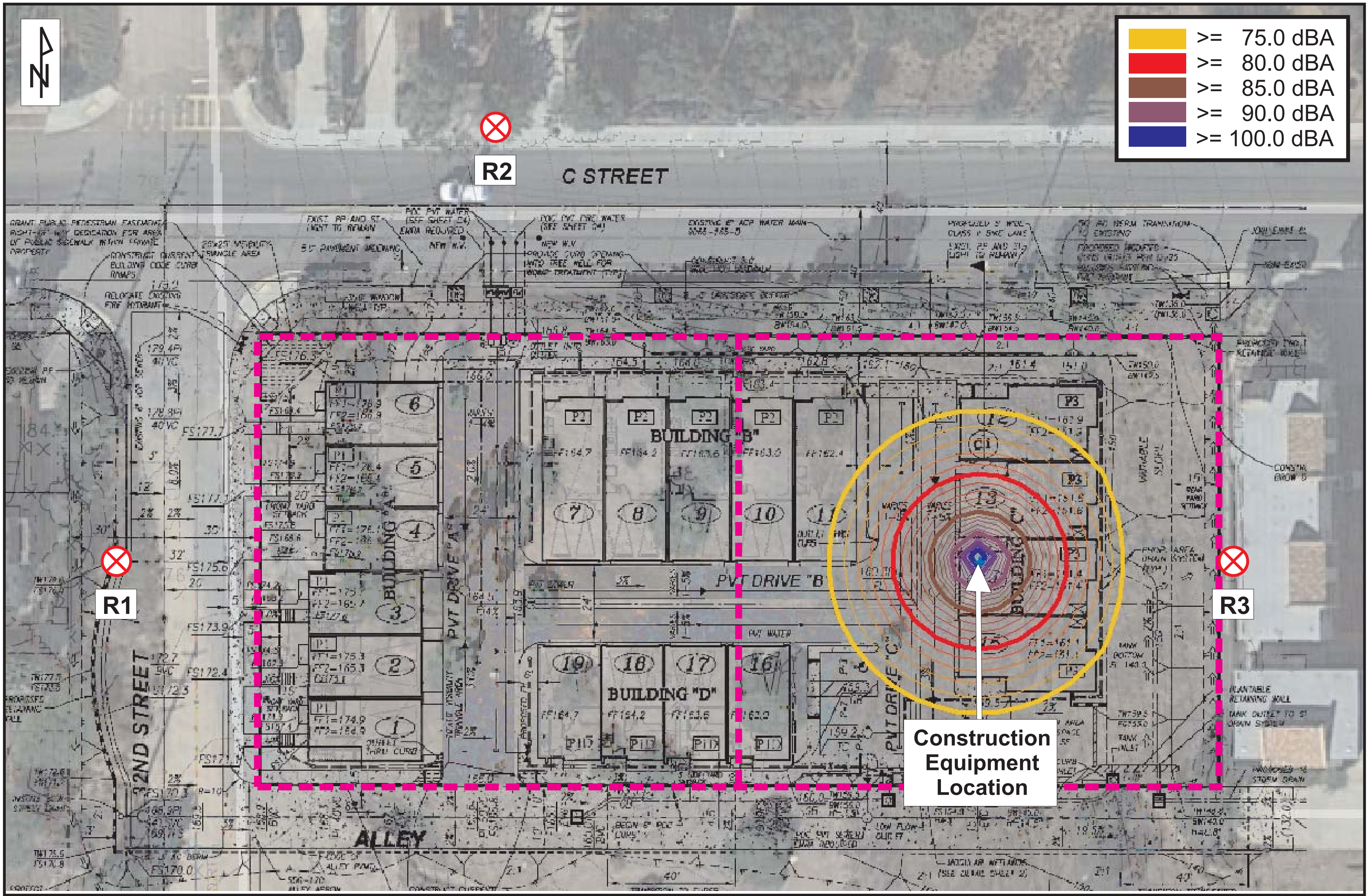
Escondido, California 92025
760-738-5570

Site Plan Showing
Facade Receiver Locations
Job # B80709N1

Figure 9



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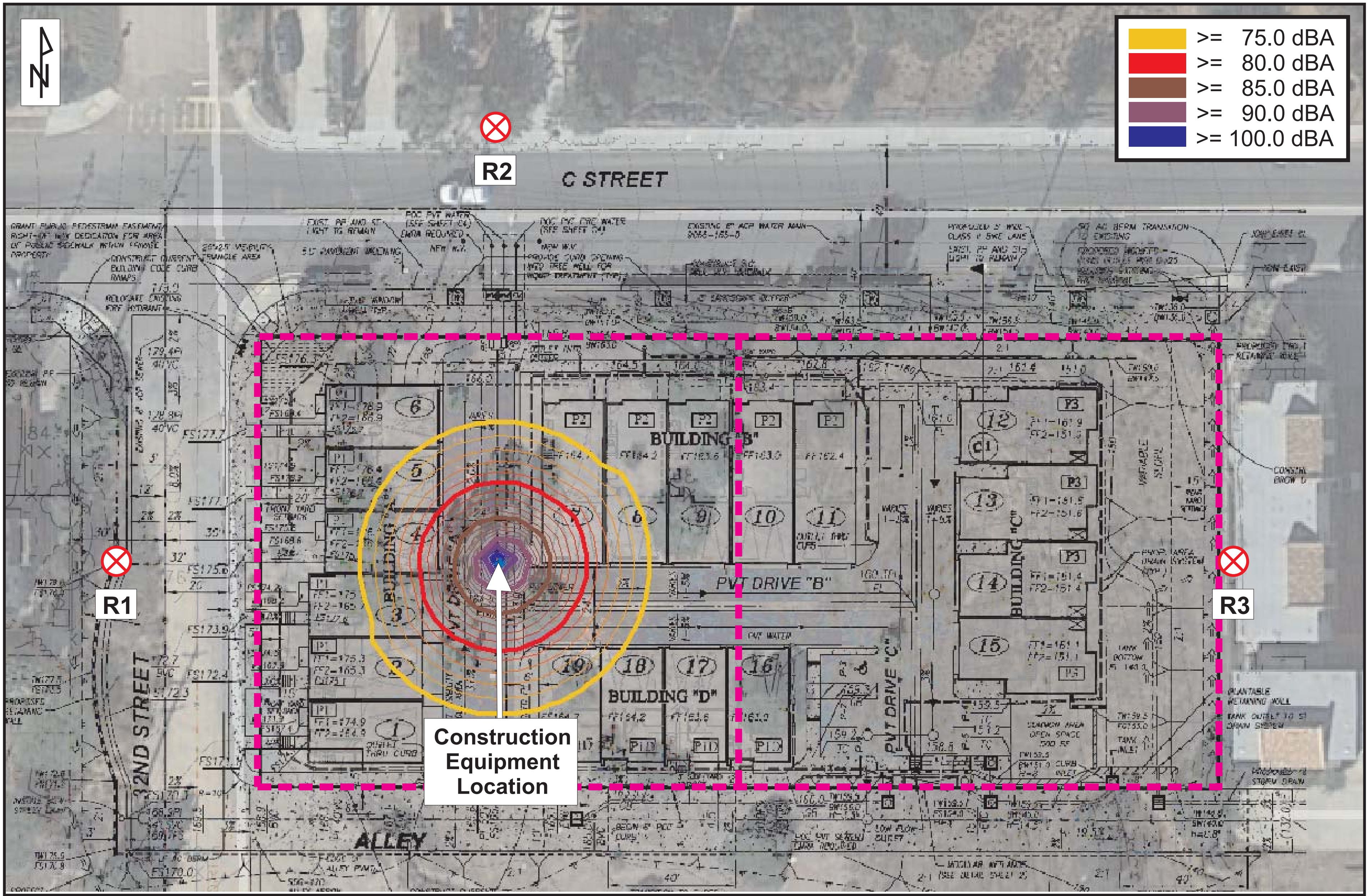
210 South Juniper Street, Suite 100
Escondido, California 92025
760-738-5570

Satellite Aerial Photograph Showing Site Plan, Construction Noise Contours, and Source and Receiver Locations - Phase 1, East
Job # B80709N1

Figure 10



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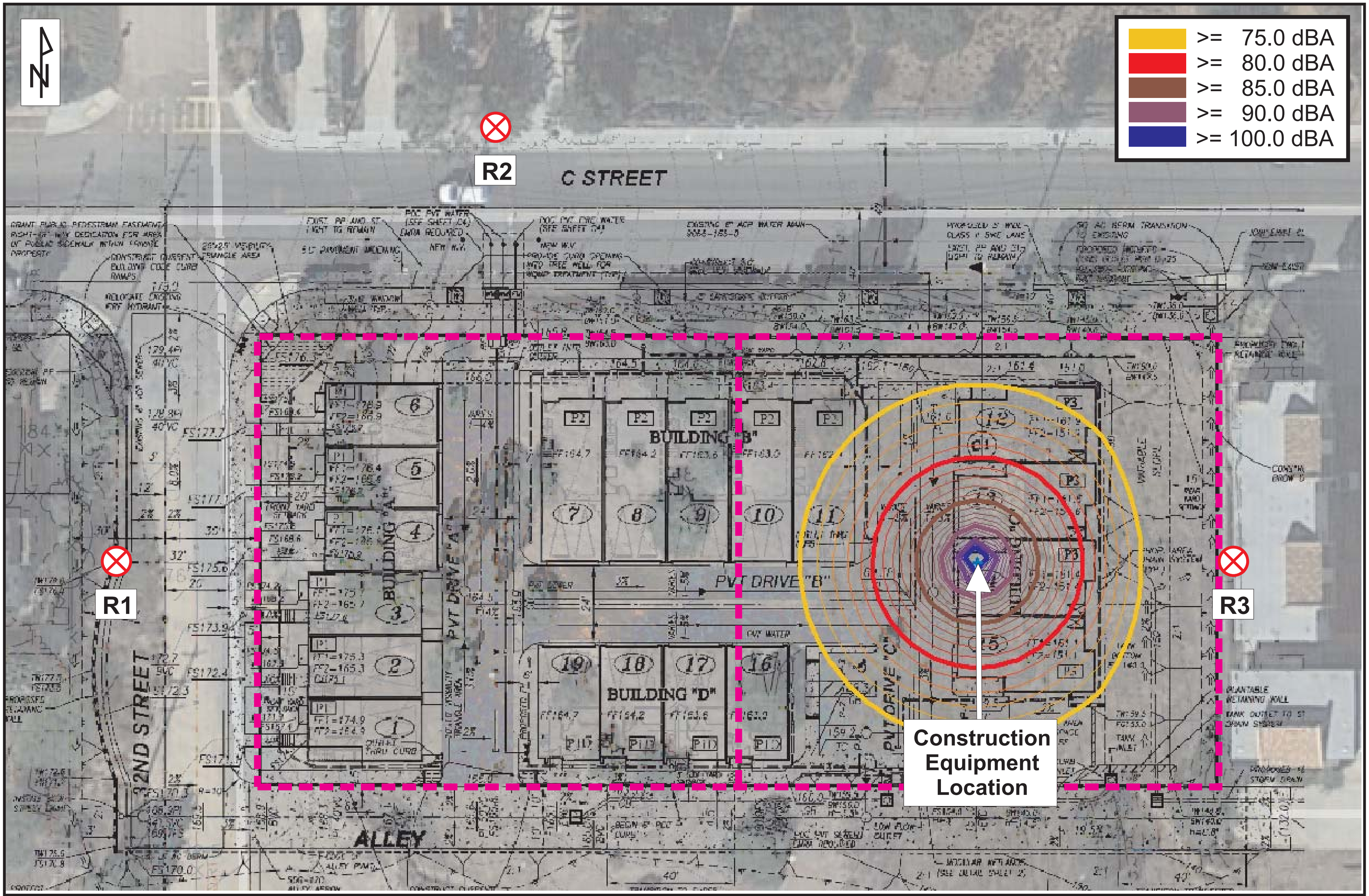
760-738-5570

Satellite Aerial Photograph Showing Site Plan, Construction Noise Contours, and Source and Receiver Locations - Phase 1, West
Job # B80709N1

Figure 11



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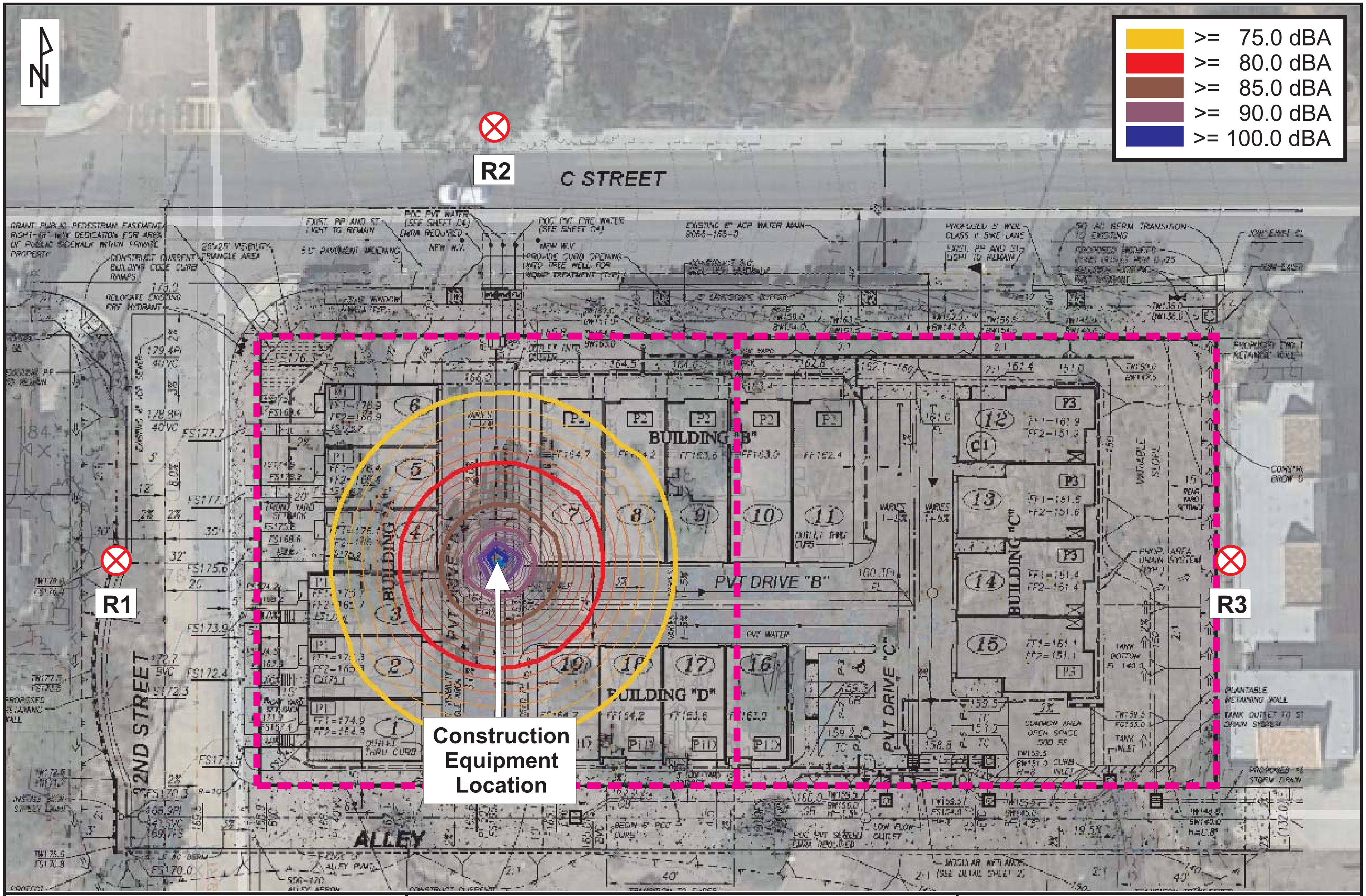
760-738-5570

Satellite Aerial Photograph Showing Site Plan, Construction Noise Contours, and Source and Receiver Locations - Phase 2, East
Job # B80709N1

Figure 12



Eilar Associates, Inc.
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Escondido, California 92025
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Satellite Aerial Photograph Showing Site Plan, Construction Noise Contours, and Source and Receiver Locations - Phase 2, West
Job # B80709N1

Figure 13

APPENDIX A

Project Plans

32nd & 'C'

CityMark

Architectural Submittal Package

SCALE: 1/4" = 1'-0"

THE McKINLEY ASSOC., INC.
ARCHITECTURE & PLANNING
JANUARY 18, 2018

Prepared By:
Name: The McKinley Associates, Inc.
Address: 1818 First Avenue
San Diego, California 92101
Phone #: (619) 238-1134

Project Address:
San Diego, CA

Project Name:
32nd and C Street

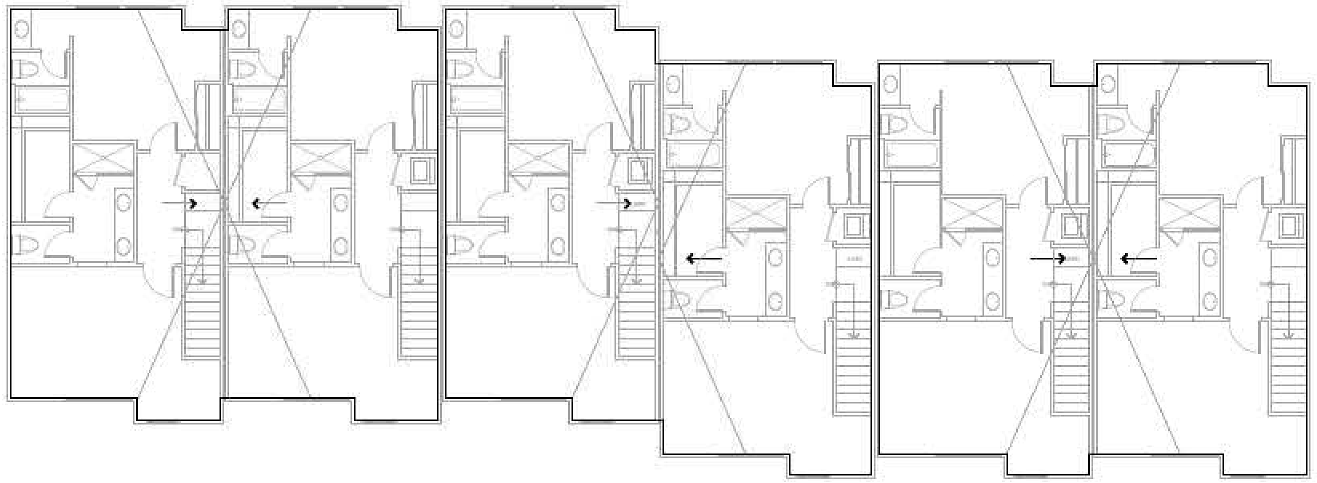
Sheet Title:
COVER SHEET

Revision 14:
Revision 13:
Revision 12:
Revision 11:
Revision 10:
Revision 9:
Revision 8:
Revision 7:
Revision 6:
Revision 5:
Revision 4:
Revision 3:
Revision 2:
Revision 1: June 6, 2018

Original Date: January 18, 2018

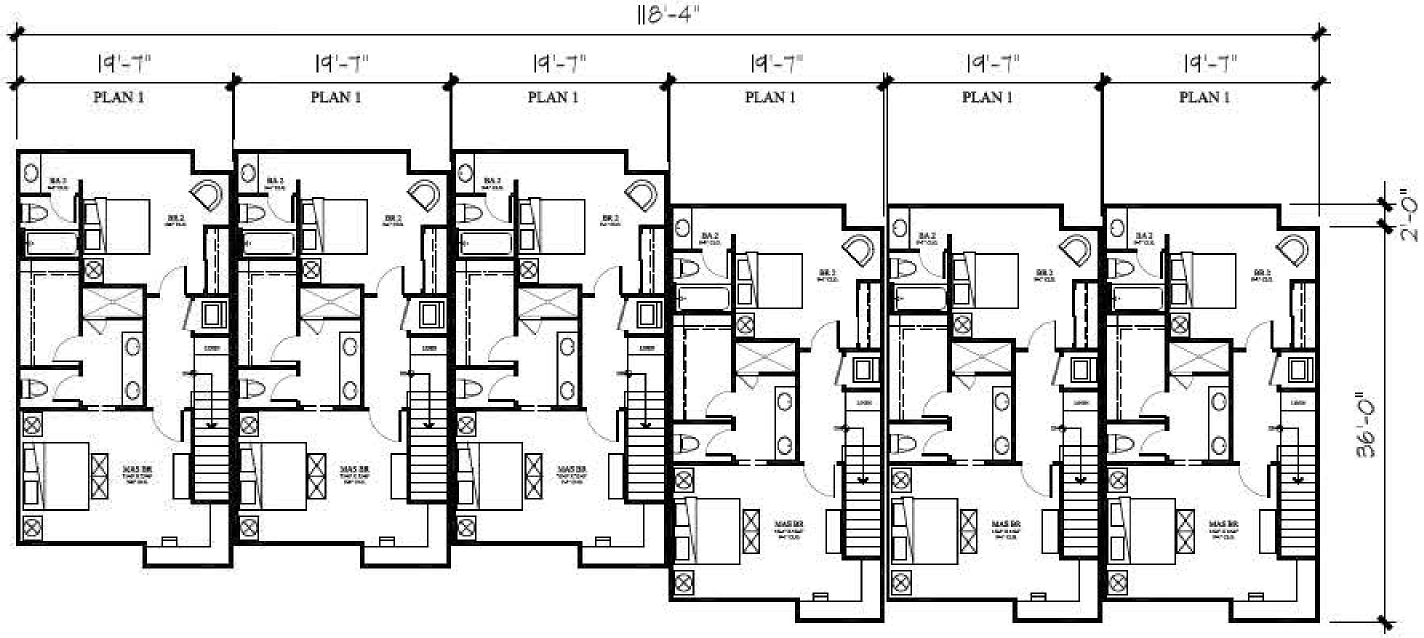
Sheet 1 of 9

DEP#:



BUILDING 'A' ROOF PLAN

SCALE: 1/4" = 1'-0"



BUILDING 'A' THIRD FLOOR PLAN

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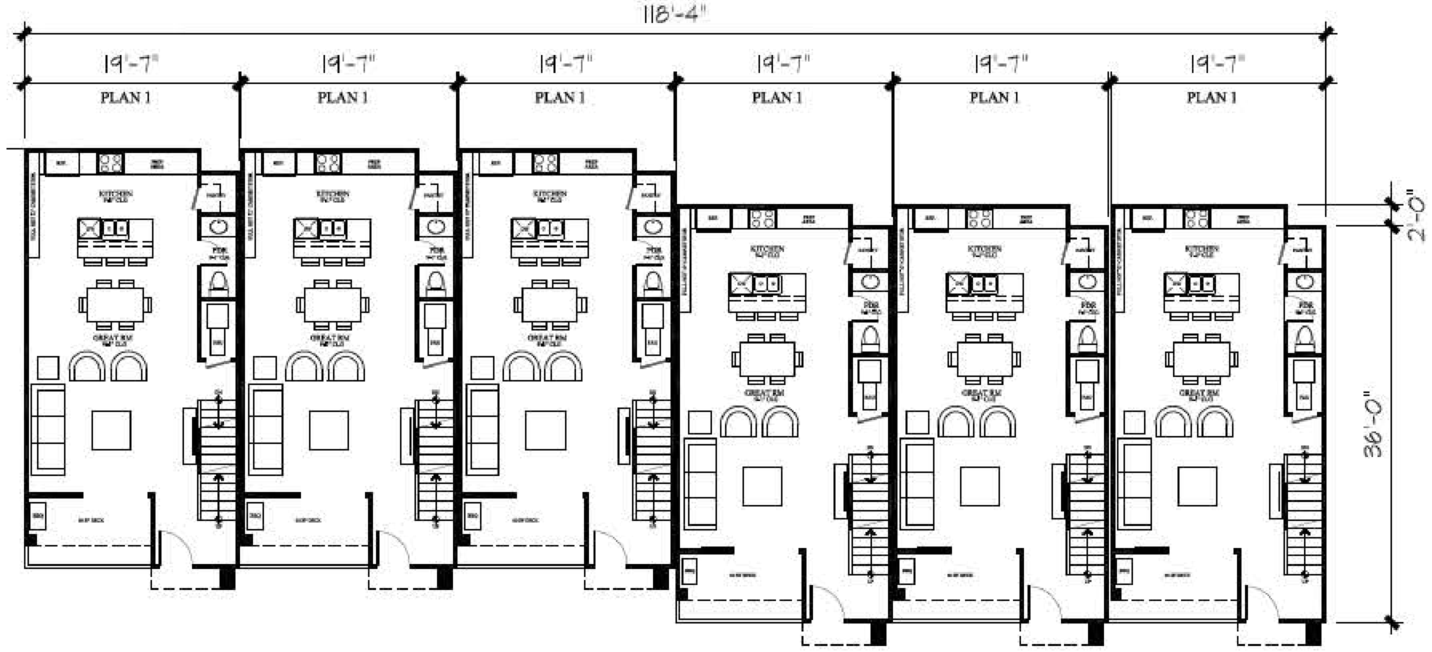

BUILDING 'A' SECOND FLOOR PLAN

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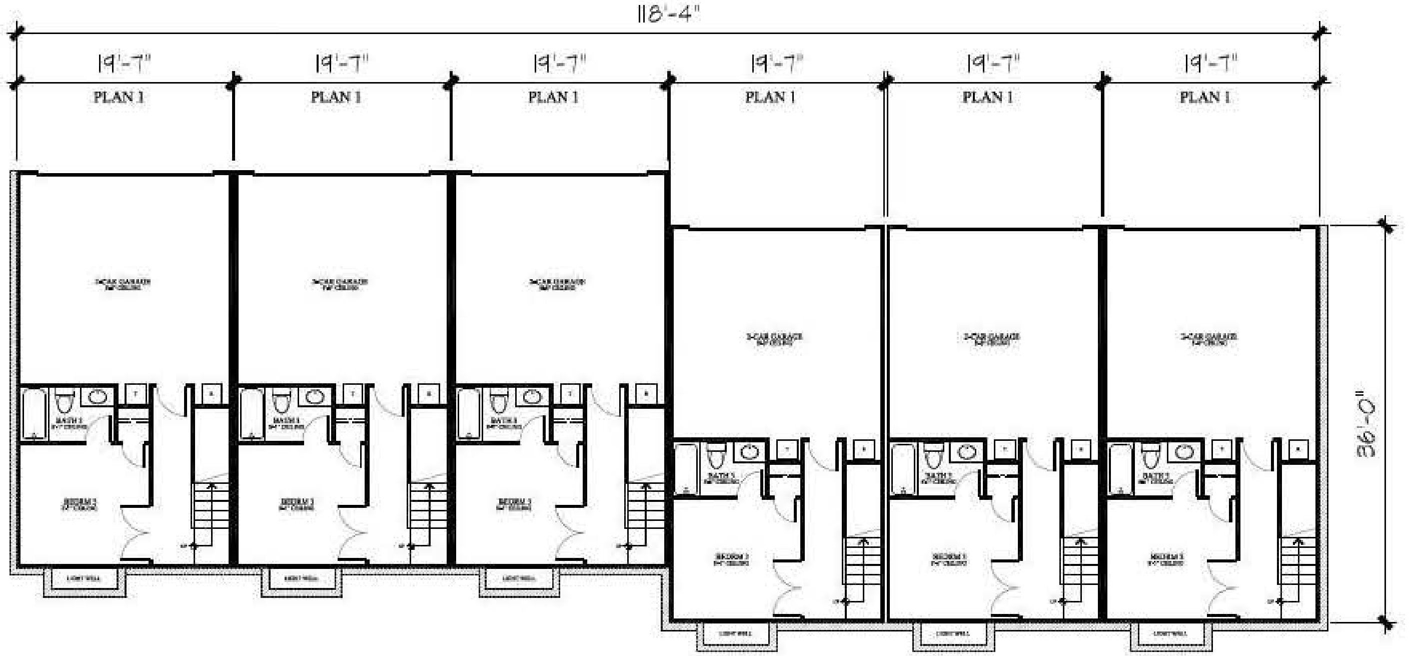

BUILDING 'A' FIRST FLOOR PLAN

SCALE: 1/4" = 1'-0"

32nd & 'C'

CityMark

SCALE: 1/4" = 1'-0"

THE McKINLEY ASSOC., INC.
ARCHITECTURE & PLANNING
JANUARY 18, 2018

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Project Address:
San Diego, CA

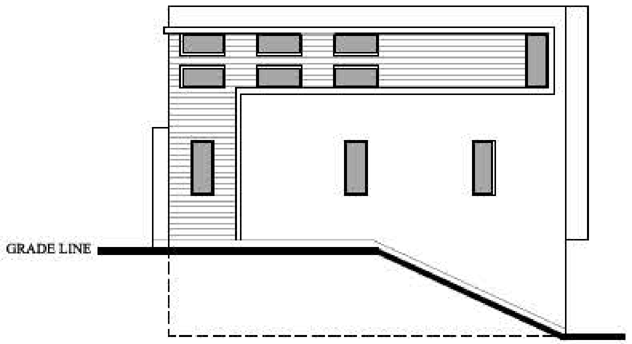
Project Name:
32nd and C Street

Sheet Title:
1/8" Building Plans

Revision 14: ______
Revision 13: ______
Revision 12: ______
Revision 11: ______
Revision 10: ______
Revision 9: ______
Revision 8: ______
Revision 7: ______
Revision 6: ______
Revision 5: ______
Revision 4: ______
Revision 3: ______
Revision 2: ______
Revision 1: June 6, 2018
Original Date: January 18, 2018
Sheet 2 of 9
DEP#: ______

BUILDING 'A' WEST ELEVATION

SCALE: 1/4" = 1'-0"



BUILDING 'A' SOUTH ELEVATION

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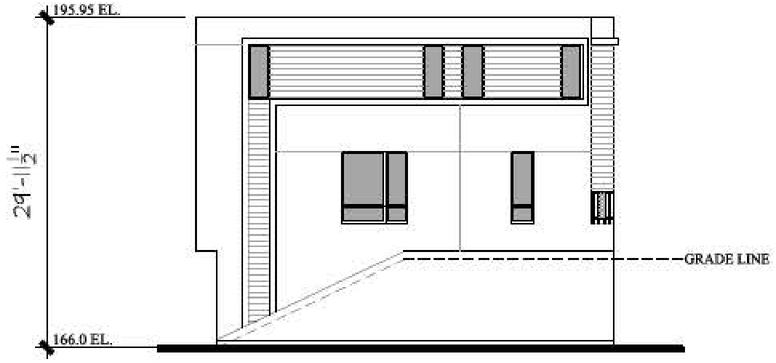

BUILDING 'A' NORTH ELEVATION

SCALE: 1/4" = 1'-0"

BUILDING 'A' WEST ELEVATION

SCALE: 1/4" = 1'-0"

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CityMark

SCALE: 1/4" = 1'-0"

THE McKINLEY ASSOC., INC.
ARCHITECTURE & PLANNING
JANUARY 18, 2018

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Address: 1818 First Avenue
San Diego, Californina 92101
Phone #: (619) 238-1134

Project Address:
San Diego, CA

Project Name:
32nd and C Street

Sheet Title:
1/8" Building Elevations

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Revision 13:
Revision 12:
Revision 11:
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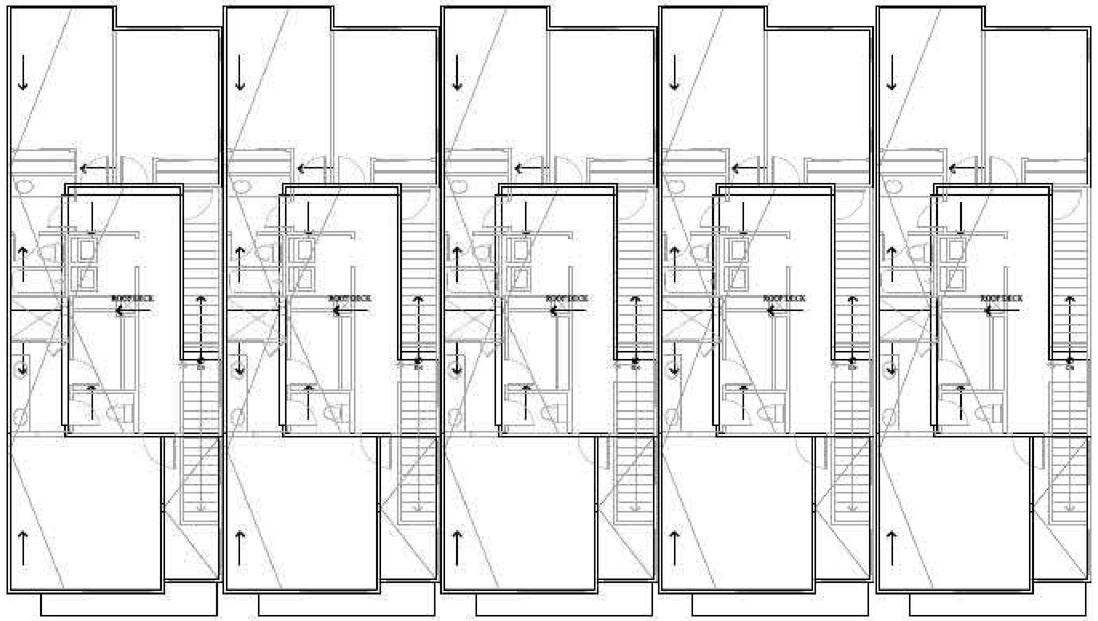
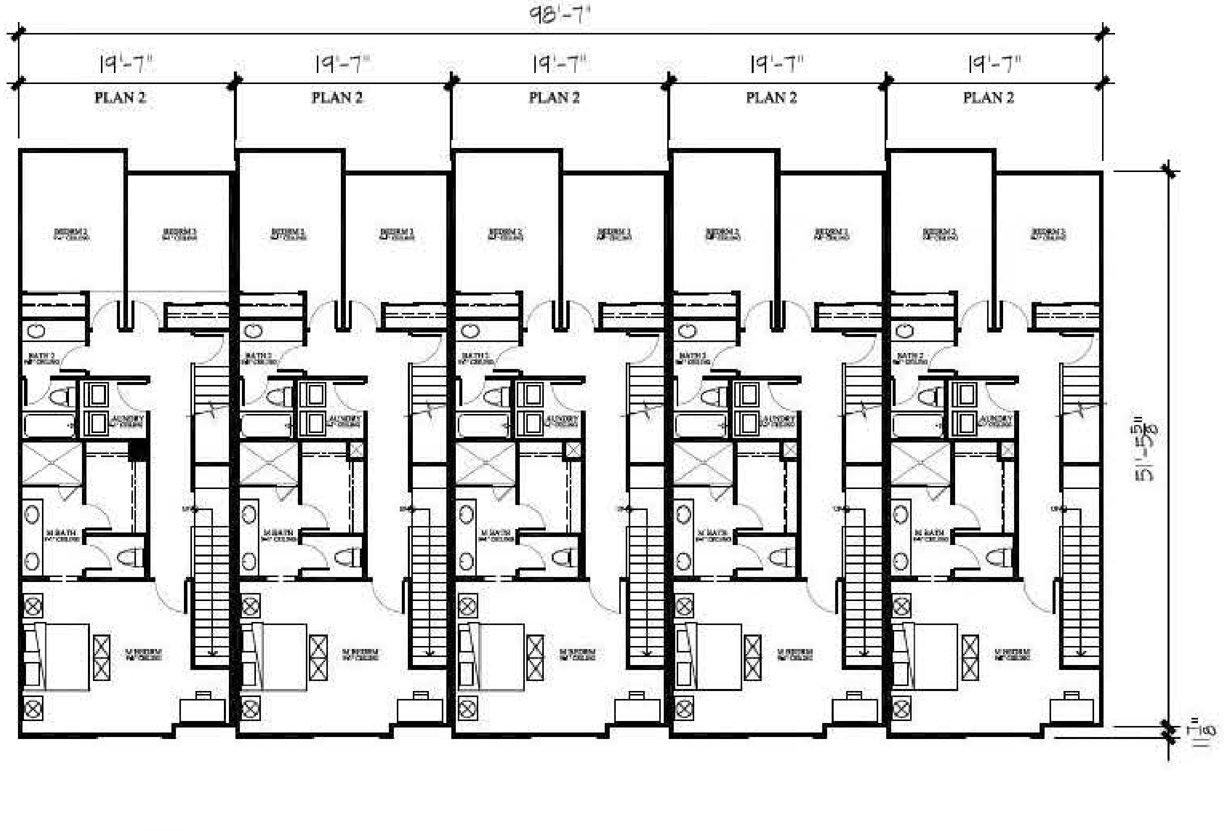


BUILDING 'B' ROOF PLAN

SCALE: 1/4" = 1'-0"

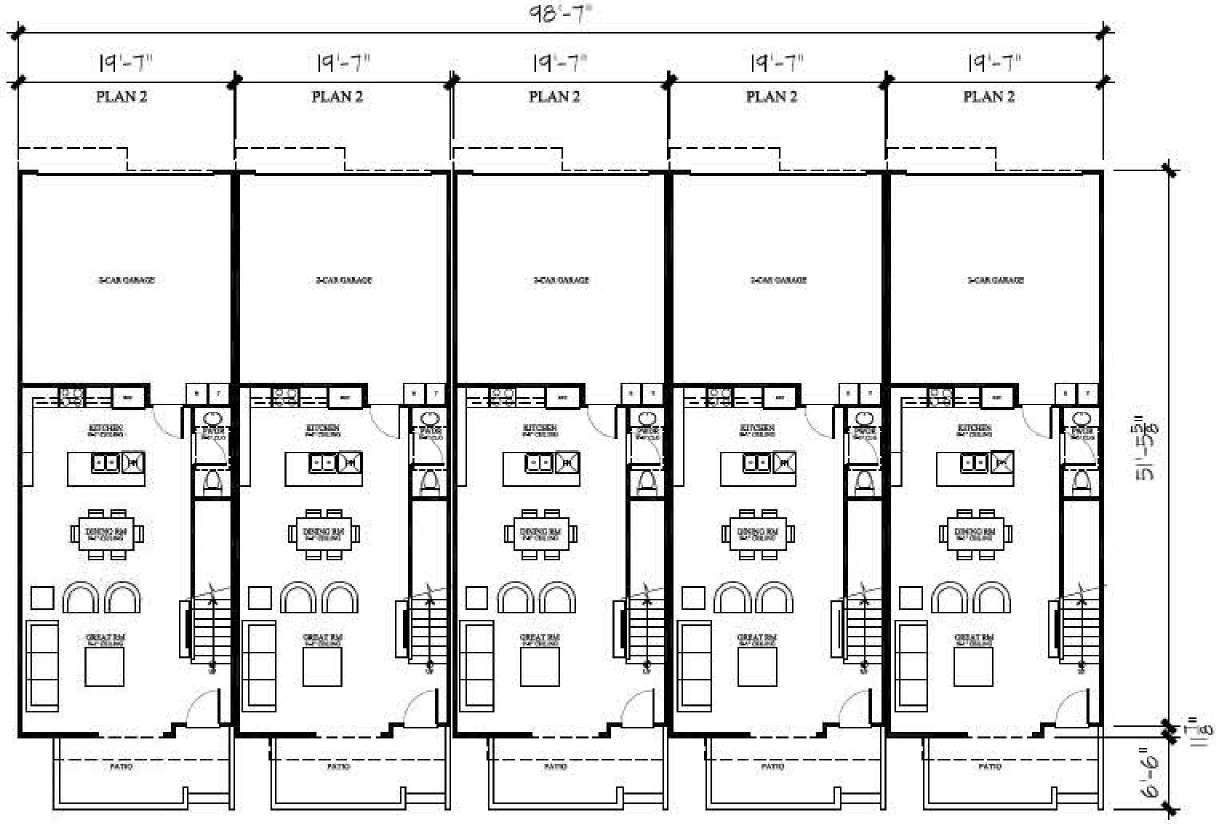
N



BUILDING 'B' SECOND FLOOR PLAN

SCALE: 1/4" = 1'-0"

N



BUILDING 'B' FIRST FLOOR PLAN

SCALE: 1/4" = 1'-0"

N

32nd & 'C'
CityMark

SCALE: 1/4" = 1'-0"

THE McKINLEY ASSOC., INC.
ARCHITECTURE & PLANNING
JANUARY 18, 2018

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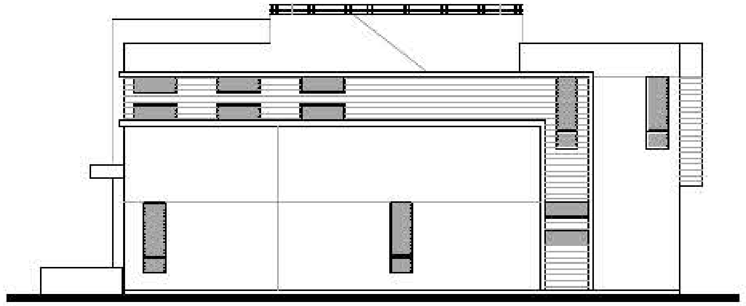
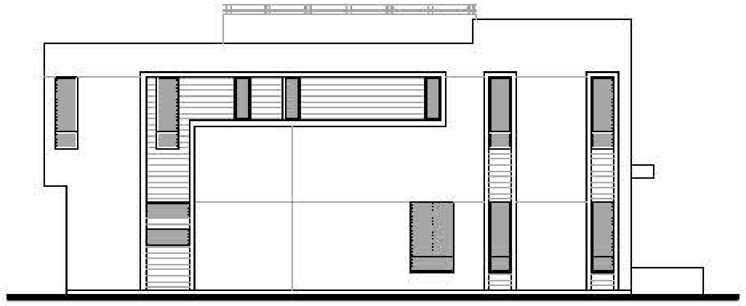
BUILDING 'B' NORTH ELEVATION

SCALE: 1/4" = 1'-0"



BUILDING 'B' WEST ELEVATION

SCALE: 1/4" = 1'-0"



BUILDING 'B' EAST ELEVATION

SCALE: 1/4" = 1'-0"

BUILDING 'B' SOUTH ELEVATION

SCALE: 1/4" = 1'-0"

32nd & 'C'
CityMark

SCALE: 1/4" = 1'-0"

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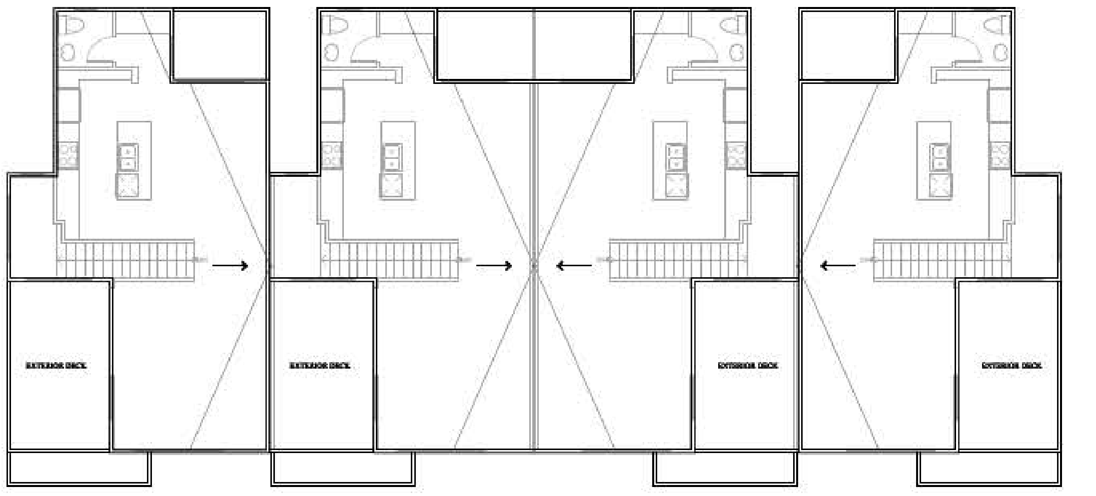
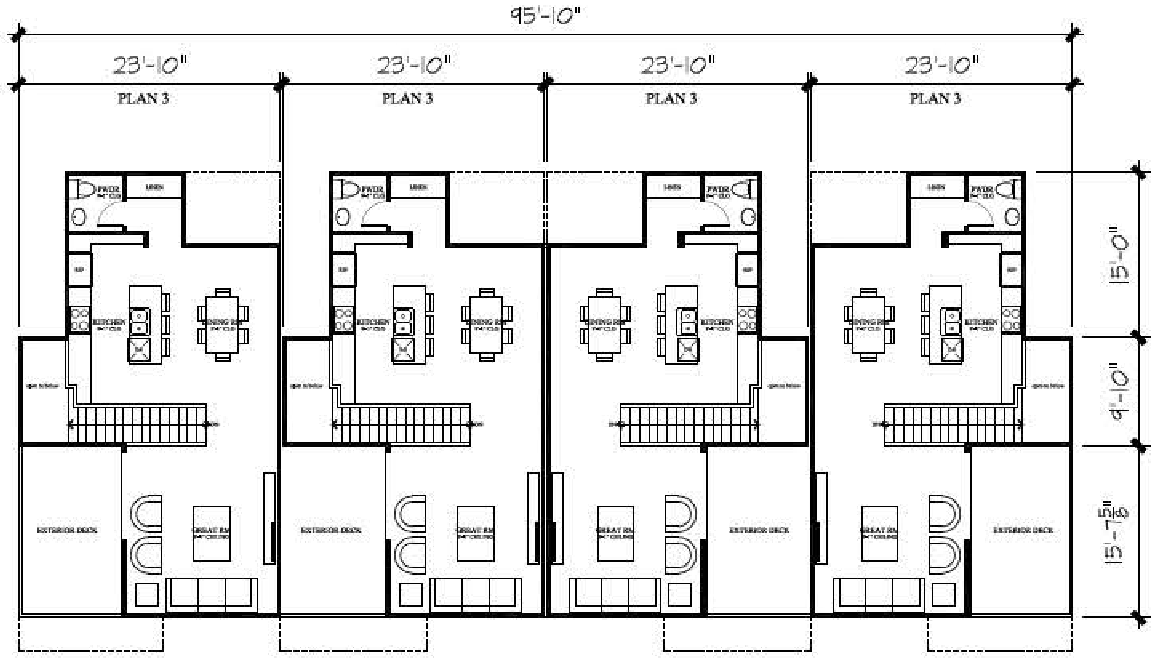


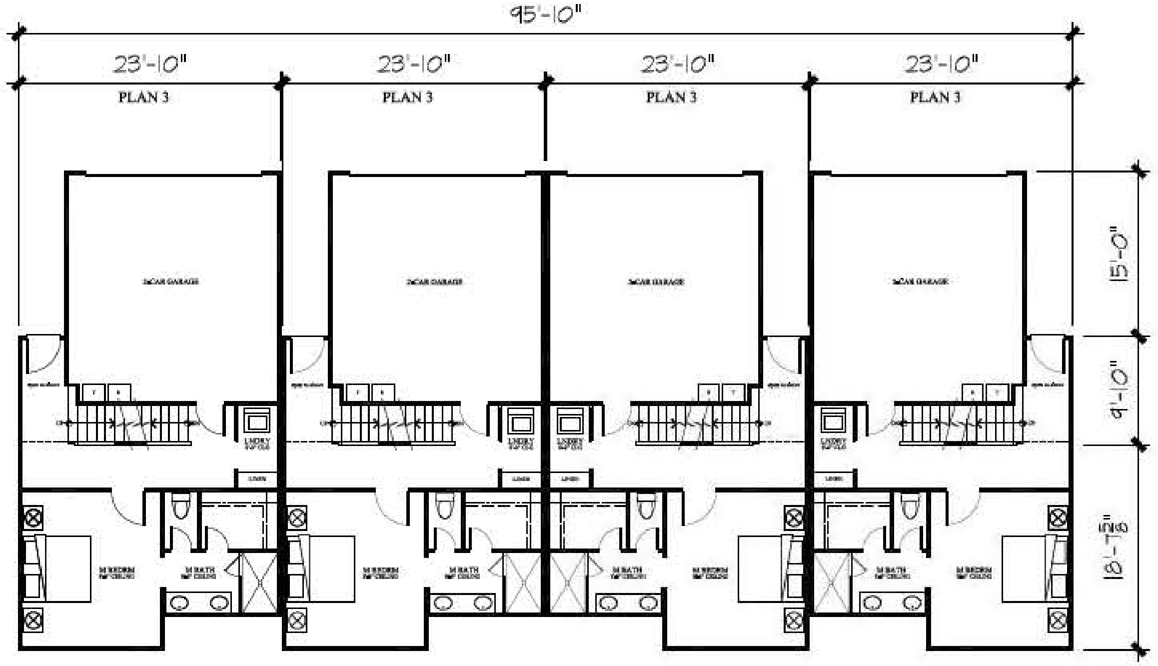
BUILDING 'C' ROOF PLAN

SCALE: 1/4" = 1'-0"



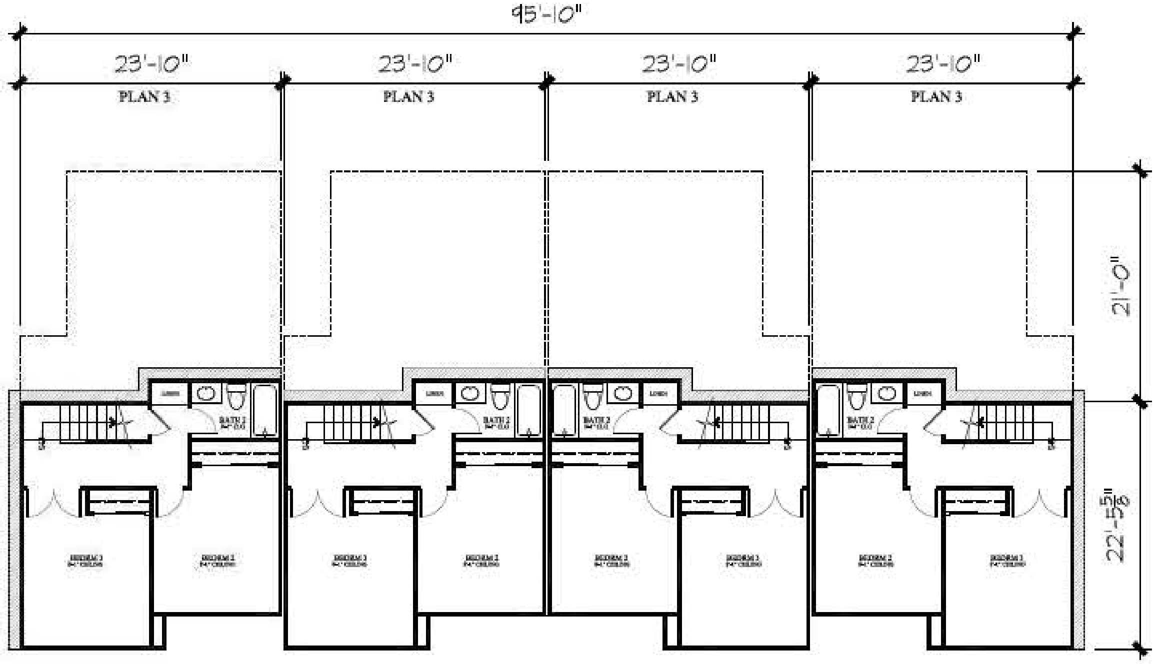
BUILDING 'C' THIRD FLOOR PLAN

SCALE: 1/4" = 1'-0"



BUILDING 'C' SECOND FLOOR PLAN

SCALE: 1/4" = 1'-0"



BUILDING 'C' FIRST FLOOR PLAN

SCALE: 1/4" = 1'-0"

3 2nd & 'C'

CityMark

SCALE: 1/4" = 1'-0"

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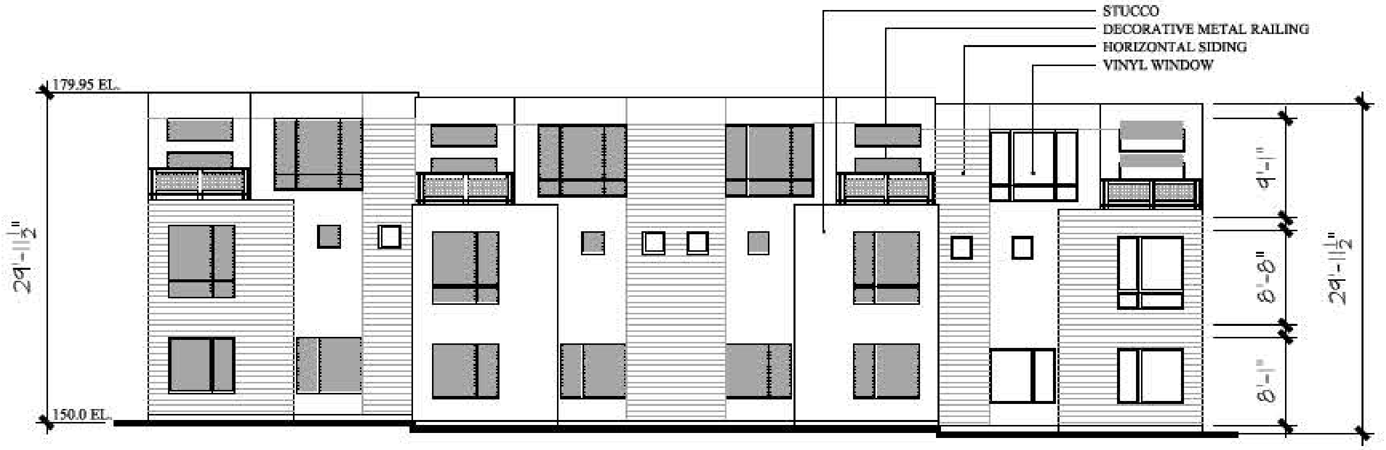
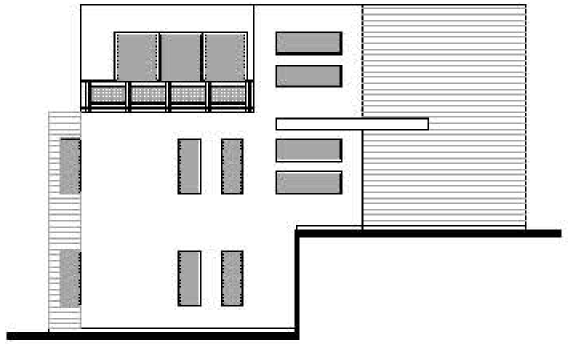


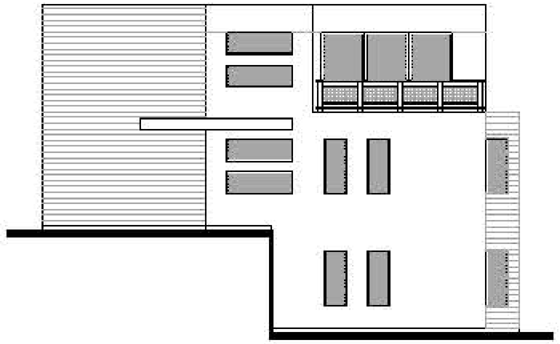
BUILDING 'C' EAST ELEVATION

SCALE: 1/4" = 1'-0"



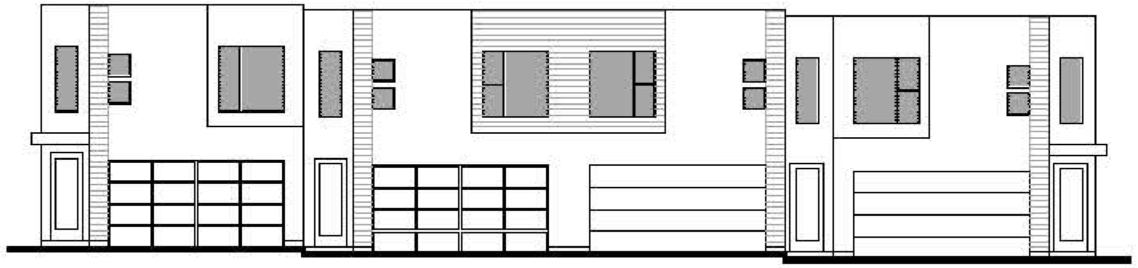
BUILDING 'C' NORTH ELEVATION

SCALE: 1/4" = 1'-0"



BUILDING 'C' SOUTH ELEVATION

SCALE: 1/4" = 1'-0"



BUILDING 'C' WEST ELEVATION

SCALE: 1/4" = 1'-0"

32nd & 'C'

CityMark

SCALE: 1/4" = 1'-0"

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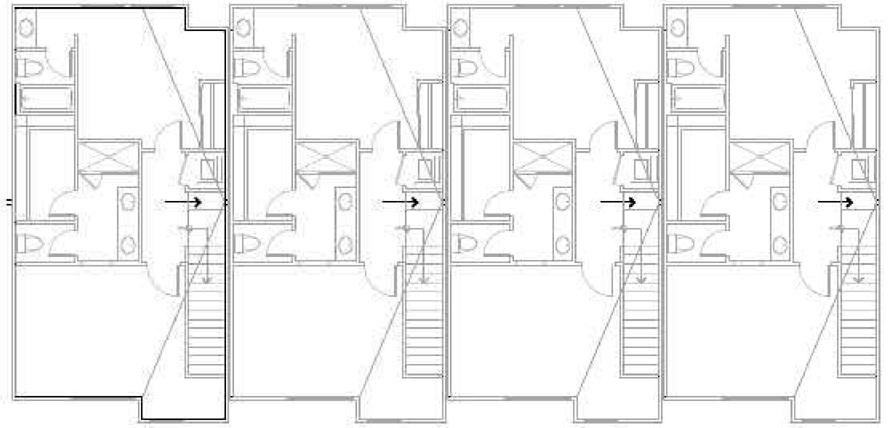
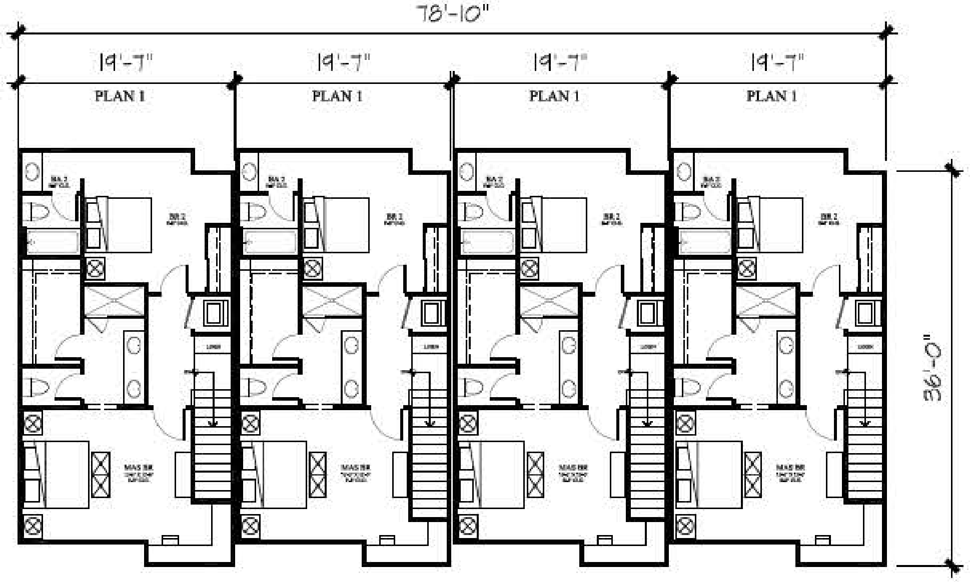


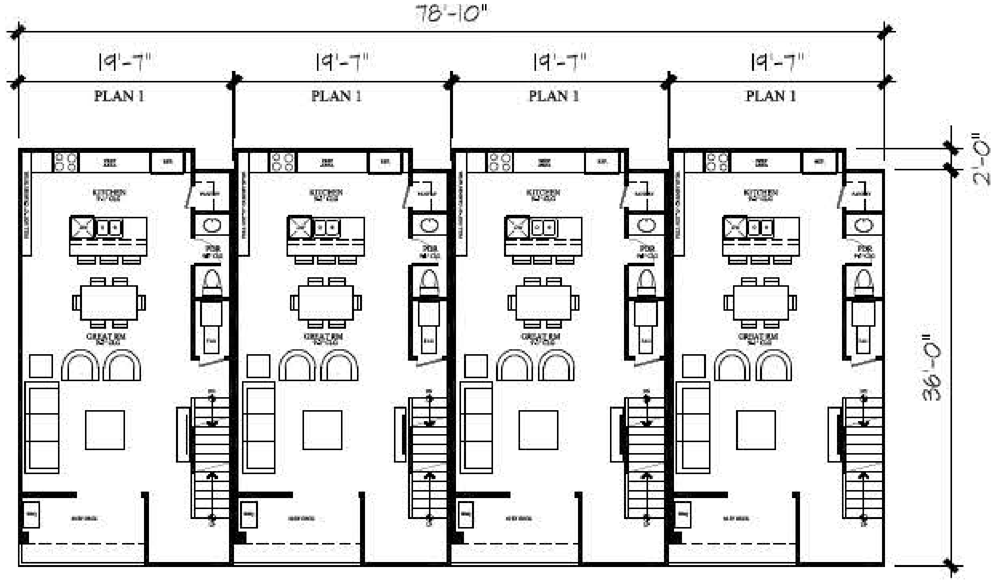
BUILDING 'D' ROOF PLAN

SCALE: 1/4" = 1'-0"



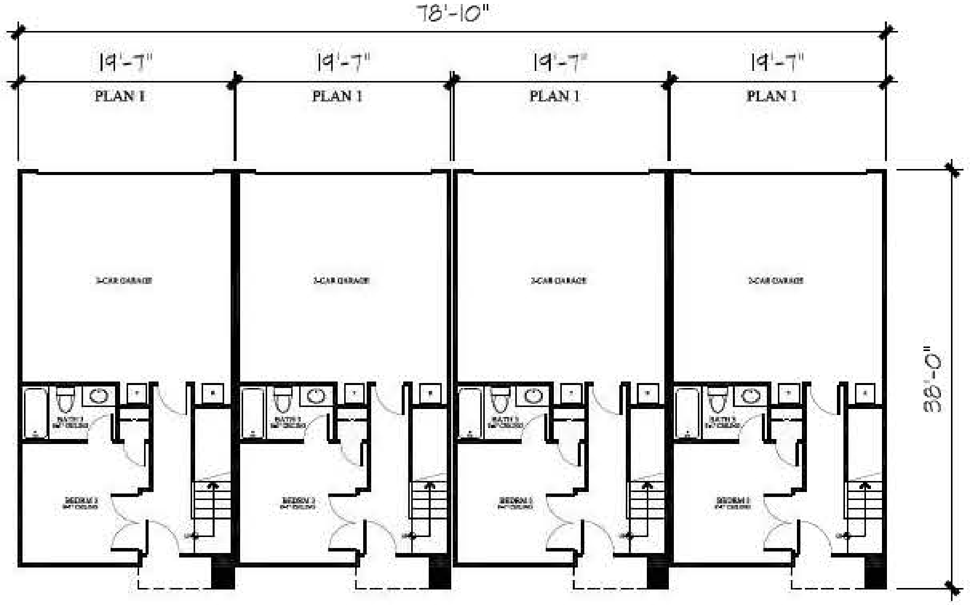
BUILDING 'D' THIRD FLOOR PLAN

SCALE: 1/4" = 1'-0"



BUILDING 'D' SECOND FLOOR PLAN

SCALE: 1/4" = 1'-0"



BUILDING 'D' FIRST FLOOR PLAN

SCALE: 1/4" = 1'-0"

32nd & 'C'

CityMark

SCALE: 1/4" = 1'-0"

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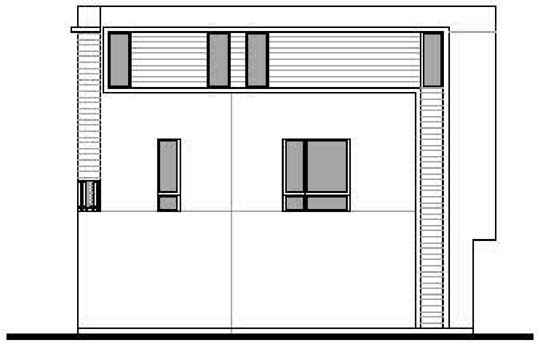
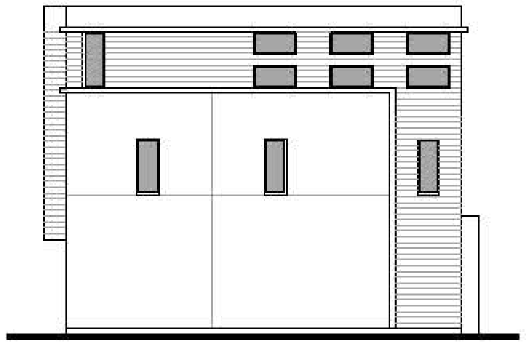
BUILDING 'D' SOUTH ELEVATION

SCALE: 1/4" = 1'-0"



BUILDING 'D' EAST ELEVATION

SCALE: 1/4" = 1'-0"



BUILDING 'D' WEST ELEVATION

SCALE: 1/4" = 1'-0"

BUILDING 'D' NORTH ELEVATION

SCALE: 1/4" = 1'-0"

32nd & 'C'

CityMark

SCALE: 1/4" = 1'-0"

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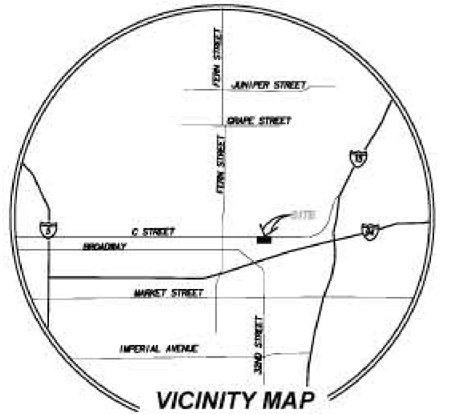
VESTING TENTATIVE MAP/ NEIGHBORHOOD DEVELOPMENT PERMIT

32nd & C STREET

CITY OF SAN DIEGO, CALIFORNIA



VICINITY MAP

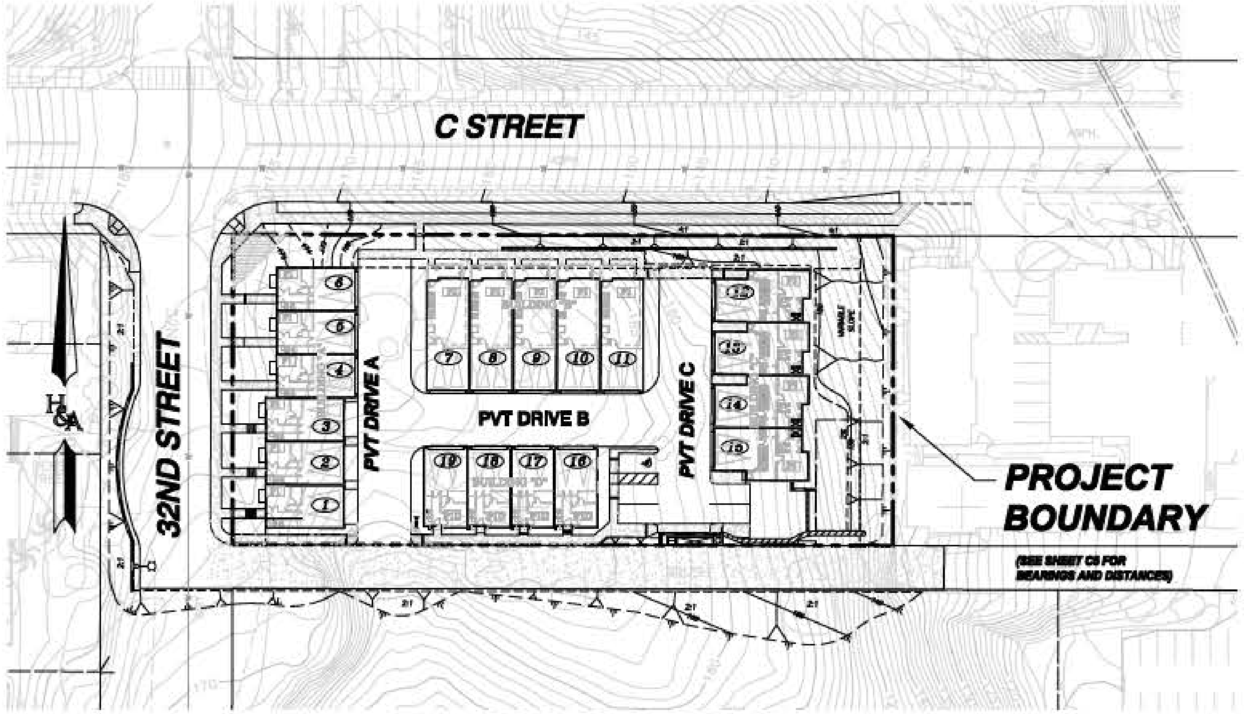
NOT TO SCALE

LEGEND

PROPERTY LINE/ TM BOUNDARY	
PROPOSED BUILDING NUMBER WITH PAD ELEVATION	24 547.4
ARCHITECTURAL FLOORPLAN TYPE	P2
PROPOSED EASEMENT LINE	
PROPOSED PRIVATE SEWER MAIN WITH MANHOLE A. SEWER FLOW DIRECTION (8" PVC UNLESS OTHERWISE NOTED)	S A
EXISTING PUBLIC SEWER MAIN WITH MANHOLE	
PROPOSED PRIVATE WATER MAIN (8" UNLESS OTHERWISE NOTED)	
PROPOSED PRIVATE FIRE MAIN W/ FIRE HYDRANT (8" UNLESS OTHERWISE NOTED)	F
EXISTING PUBLIC WATER MAIN W/ FIRE HYDRANT	
PROPOSED WATER LATERAL	W
PROPOSED SEWER LATERAL	S
PROPOSED CENTERLINE STREET ELEVATION	518.2
PROPOSED SPOT ELEVATION	237.7
EXISTING CONTOURS	
PROPOSED CONTOURS	182
PROPOSED SLOPE BANK (2:1 MAX)	
LIMITS OF PROPOSED GRADING	
SWALE	
PROPOSED CONCRETE BROW DITCH	⇒ ⇒ ⇒ ⇒ ⇒
PROPOSED % OF STREET CENTERLINE GRADE	2%
EXISTING STREET LIGHT	
EXISTING BROW DITCH	
PROPOSED PRIVATE STORM DRAIN	HEADWALL PRIVATE STORM DRAIN CLEANOUT (TYPE A-4 OR EQ.) CATCH BASIN (TYPE F OR EQ.) OR CURB INLET (TYPE A OR EQ.)
PROPOSED TREE WELL	▨
PROPOSED AREA DRAIN SYSTEM	
EXISTING PUBLIC STORM DRAIN SYSTEM	
PROPOSED RETAINING WALL	
PROPOSED PLANTABLE RETAINING WALL	
PROPOSED CONCRETE CROSS GUTTER	
EXISTING PROPERTY DATA	LOT 270
10' or 25' VISIBILITY TRIANGLE	◢
PROPOSED SURVEY MONUMENTS AS NOTED	○
EXISTING SURVEY MONUMENTS AS NOTED	●

CONDOMINIUM NOTE

THIS IS A MAP OF A CONDOMINIUM PROJECT AS DEFINED IN SECTION 4125 OF THE CIVIL CODE OF THE STATE OF CALIFORNIA AND IS FILED PURSUANT TO THE SUBDIVISION MAP ACT. THE MAXIMUM NUMBER OF UNITS PROPOSED IS 19 RESIDENTIAL CONDOMINIUM UNITS.



PROJECT MAP

SCALE: 1" = 100'

LEGAL DESCRIPTION

PARCEL A: (PORTION OF APN: 539-563-01-00)

LOTS 13 THROUGH 24, IN BLOCK 124, OF CHOATE'S ADDITION, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA ACCORDING TO MAP THEREOF NO. 167. FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 20, 1886.

PARCEL B: (PORTION OF APN: 539-563-01-00

FRACTIONAL LOT 24, IN BLOCK 124 OF E. W. MORSE'S SUBDIVISION, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 547, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, DECEMBER 30, 1871.

TOPOGRAPHY SOURCE

BY R.J. LUNG AND ASSOCIATES DATED: 6-23-17

BENCHMARK

CITY OF SAN DIEGO BRASS PLUG IN THE SOUTHEAST CURB RETURN OF THE INTERSECTION OF C STREET AND 32ND.

ELEV. 176.099'
DATUM: NGVD 29'

BASIS OF BEARINGS

THE BASIS OF BEARINGS: THE CCS '83, ZONE 6, EPOCH 1991.35 GRID BEARING BETWEEN STATION "10" OF ROS 16575 AND STATION "224" OF ROS 14492, BOTH PER THE COUNTY OF SAN DIEGO HORIZONTAL CONTROL LIST, BOTH HAVING A CALIFORNIA COORDINATE VALUE OF FIRST ORDER OR BETTER.

I.E. N27°47'24"W

QUOTED BEARINGS FROM REFERENCE MAPS, BOOKS AND DEEDS MAY OR MAY NOT BE IN TERMS OF SAID SYSTEM.

THE COMBINED SCALE FACTOR AT STATION 244 IS 1.0000055.
GRID DISTANCE = GROUND DISTANCE X COMBINED SCALE FACTOR

MAPPING & MONUMENTATION

ALL PROPERTY CORNERS WILL BE SET AND A 1 LOT FINAL MAP FOR 19 RESIDENTIAL UNITS WILL BE FILED UPON APPROVAL OF THE TENTATIVE MAP. A DETAILED PROCEDURE OF SURVEY WILL BE SHOWN ON THE FINAL MAP.

EXISTING EASEMENTS

THERE ARE NO EXISTING EASEMENTS ONSITE

EARTHWORK NOTES

TOTAL GRADING VOLUME

AMOUNT OF CUT: APPROX. 4,800 CUBIC YARDS.

AMOUNT OF FILL: APPROX. 4,800 CUBIC YARDS.
TOTAL GRADED AREA: APPROXIMATELY 1.4 ACRES

EARTHWORK NOTES:

1. MAXIMUM DEPTH OF CUT AREAS = APPROX. 9 FEET
   MAXIMUM DEPTH OF FILL AREAS = APPROX. 4 FEET
2. QUANTITIES SHOWN ABOVE ARE RAW AND DO NOT INCLUDE THE EFFECT OF REMEDIAL GRADING THAT MAY BE NECESSARY FOR THE PROJECT.

UTILITIES & SERVICES

ONSITE WATER ....PRIVATE
OFFSITE WATER ......CITY OF SAN DIEGO (PUBLIC)
ONSITE SEWER........PRIVATE
OFFSITE SEWER.......CITY OF SAN DIEGO (PUBLIC)
FIRE AND POLICE.....CITY OF SAN DIEGO
GAS & ELECTRICITY...SDG&E
SCHOOL DISTRICT.....SAN DIEGO UNIFIED SCHOOL DIST.

PARKING SUMMARY

PARKING REQUIRED				
RESIDENT SPACES REQUIRED				TOTAL
BLDGS A-D	NO. OF BDRMS/UNIT	# UNITS	SPACES REQ'D/UNIT	SPACES REQ'D
4	3	19	2.25/UNIT	43
TOTAL		19	2.25/UNIT	43.0
PARKING PROVIDED				
RESIDENT SPACES				
(BLDGS A-D)				
19 UNITS x 2 COVERED SPACES/UNIT = 38				
			SUBTOTAL	38
COMMON/GUEST SPACES				
STANDARD			4	
ACCESSIBLE			1	
			SUBTOTAL	43
TOTAL PARKING PROVIDED				43.0

GENERAL DESIGN NOTES

1. CUT/FILL SLOPES ARE 2 : 1 OR FLATTER UNLESS OTHERWISE SPECIFIED.
2. GRADING SHOWN HEREON IS PRELIMINARY AND MAY BE SUBJECT TO MINOR REFINEMENTS IN FINAL DESIGN. FINAL GRADING PLANS WILL CONFORM TO THE APPROVED PERMIT AND EXHIBITS.
3. DRAINAGE FACILITIES TO BE CONSTRUCTED PER CITY OF SAN DIEGO STANDARDS.
4. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT THE SUBDIVIDER SHALL ENTER INTO A MAINTENANCE AGREEMENT FOR THE ONGOING PERMANENT BMP MAINTENANCE SATISFACTORY TO THE CITY ENGINEER.
5. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT THE SUBDIVIDER SHALL INCORPORATE ANY CONSTRUCTION BEST MANAGEMENT PRACTICES NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS OR SPECIFICATIONS.
6. DRAINAGE EASEMENTS SHALL BE PROVIDED AS REQUIRED.
7. ALL LENGTHS, DISTANCES, LOT DIMENSIONS AND CURVE RADII ARE APPROXIMATE.
8. AERIAL TOPOGRAPHY BY R.J. LUNG AND ASSOCIATES DATED: 6-23-17
   BENCHMARK: CITY OF SAN DIEGO BRASS PLUG IN THE SOUTHEAST CURB RETURN OF THE INTERSECTION OF C STREET AND 32ND.
   ELEV. 176.099' DATUM: NGVD 29'
9. ALL UTILITIES SHALL BE UNDERGROUND AND EASEMENTS PROVIDED AS NECESSARY.
10. ALL PROPOSED WATER (INCLUDING SERVICES AND METERS) AND SEWER FACILITIES (PUBLIC & PRIVATE, WITHIN THE PUBLIC ROW OR PUBLIC EASEMENT MUST BE DESIGNED, CONSTRUCTED, OR ABANDONED IN ACCORDANCE WITH ESTABLISHED CRITERIA WITHIN THE CITY OF SAN DIEGO'S CURRENT WATER & SEWER FACILITY DESIGN GUIDELINES, REGULATIONS, STANDARDS AND PRACTICES PERTAINING THERETO.
11. ALL PROPOSED PRIVATE SEWER FACILITIES SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH ESTABLISHED CRITERIA IN THE MOST CURRENT CITY OF SAN DIEGO SEWER DESIGN GUIDE.
12. WATER AND SEWER FACILITIES, AS SHOWN, WILL BE MODIFIED IN ACCORDANCE WITH ACCEPTED WATER AND SEWER STUDIES AND ESTABLISHED CRITERIA IN THE CITY OF SAN DIEGO.
13. SANITARY SEWER SYSTEM TO BE PROVIDED AND CONNECTED TO CITY OF SAN DIEGO SEWER SYSTEM.
14. THERE ARE NO PROPOSED OR EXISTING BUS/TRANSIT STATIONS OR STOPS.
15. INDIVIDUAL TRASH PICKUP IS PROPOSED AS PART OF THIS SUBDIVISION.
16. AN ILLUMINATED DIRECTORY IN ACCORDANCE WITH FHPS POLICY 1-00-6, SHALL BE PROVIDED.
17. BUILDING ADDRESS NUMBERS SHALL BE VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY. (PER UFC 901.4.4).
18. IMPROVEMENTS SUCH AS DRIVEWAYS, UTILITIES, DRAINS AND WATER AND SEWER LATERALS SHALL BE DESIGNED SO AS TO NOT PROHIBIT THE PLACEMENT OF STREET TREES, ALL TO THE SATISFACTION OF THE CITY MANAGER.
19. CALIFORNIA BUILDING CODE CONSTRUCTION TYPE: V-B
    FIRE SPRINKLERS: FULL NFPA-13 FIRE SPRINKLER SYSTEM.
    NUMBER OF STORIES: 3-STORY.
20. CALIFORNIA BUILDING CODE OCCUPANCY GROUP: R-3
21. MINIMUM 24 INCH OR 36 INCH BOX SIZE TREES SHALL BE INSTALLED WITHIN 10' OF THE FACE OF CURB AND IN OPENINGS BEING A MINIMUM 40 SQUARE FEET OF AIR AND WATER - PERMEABLE AREA AS INDICATED ON THE LANDSCAPE PLAN (SEE LANDSCAPE PLANS FOR DETAILS).
22. IMPROVEMENT PLANS SHALL SHOW, LABEL, AND DIMENSION A 40 SQUARE FOOT AREA FOR EACH STREET TREE WHICH IS UNENCUMBERED BY HARDSCAPE AND UTILITIES.
23. NO TREES OR SHRUBS EXCEEDING THREE FEET IN HEIGHT AT MATURITY SHALL BE INSTALLED WITHIN TEN FEET OF ANY SEWER FACILITY AND FIVE FEET OF ANY WATER
24. ALL RESIDENTIAL BUILDINGS REQUIRE A FIRE SPRINKLER SYSTEM.
25. FIRE ACCESS ROADWAY SIGNS OR RED CURBS WILL BE PROVIDED IN ACCORDANCE WITH BFLS POLICY A-96-1. TEMPORARY STREET SIGNS WILL BE PROVIDED IN ACCORDANCE WITH UFC 901.4.5
26. ALL DRAIN SYSTEMS NOT LOCATED IN A PUBLIC STREET SHALL BE PRIVATE.
27. WATER EASEMENTS WILL BE PROVIDED ADJACENT TO ALL ONSITE PUBLIC FIRE HYDRANTS, WATER METERS, BLOWOFFS AND VALVES, UPON FINAL LOCATION REVIEW BY THE CITY OF SAN DIEGO ENGINEERING AND FIRE DEPARTMENTS.
28. THIS PROJECT IS A MULTIPLE "UNIT" SUBDIVISION. IT IS THE INTENT THAT MULTIPLE FINAL MAPS BE FILED PURSUANT TO SECTION 66456.1 OF THE SUBDIVISION MAP ACT. THE FINAL MAP MAY CONSIST OF ONE OR MORE MULTIPLE LOTS AS SHOWN ON THIS TENTATIVE MAP.
29. ADEQUATE NOISE ATTENUATION WILL BE PROVIDED TO ENSURE AN INTERIOR NOISE LEVEL OF 45 dB CNEL FOR ALL SLEEPING ROOMS AND AN INTERIOR NOISE LEVEL OF 50dB FOR ALL OTHER INDOOR AREAS.
30. NO OBSTRUCTION INCLUDING SOLID WALLS IN THE VISIBILITY AREA SHALL EXCEED 3 FEET IN HEIGHT. PLANT MATERIAL, OTHER THAN TREES, WITHIN THE PUBLIC RIGHT-OF-WAY THAT IS LOCATED WITHIN VISIBILITY AREAS SHALL NO EXCEED 24 INCHES IN HEIGHT
31. PRIOR TO THE ISSUANCE OF ANY BUILDING PERMITS, THE SUBDIVIDER SHALL OBTAIN A LETTER OF PERMISSION FROM THE ADJACENT PROPERTY OWNER, FOR THE PROPOSED OFFSITE GRADING, TO THE SATISFACTION OF THE CITY ENGINEER.
32. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERITTEE SHALL ENTER INTO A MAINTENANCE AGREEMENT FOR THE ONGOING PERMANENT B,P MAINTENANCE SATISFACTORY TO THE CITY ENGINEER.
33. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE SUBDIVIDER SHALL INCORPORATE ANY CONSTRUCTION BEST MANAGEMENT PRACTICES NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS OR SPECIFICATIONS.
34. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE APPLICANT SHALL SUBMIT A TECHNICAL REPORT THAT WILL BE SUBJECT TO FINAL REVIEW AND APPROVAL BY THE CITY ENGINEER, BASED ON THE STORM WATER STANDARDS IN EFFECT AT THE TIME OF THE CONSTRUCTION PERMIT ISSUANCE
35. DEVELOPMENT OF THIS PROJECT SHALL COMPLY WITH ALL STORM WATER CONSTRUCTION REQUIREMENTS OF THE STATE CONSTRUCTION GENERAL PERMIT, ORDER NO. 2009-0090WQ, OR SUBSEQUENT ORDER, AND THE MUNICIPAL STORM WATER PERMIT, ORDER NO. R9-2013-0001, OR SUBSEQUENT ORDER. IN ACCORDANCE WITH ORDER NO. 2009-0090WQ, OR SUBSEQUENT ORDER, A RISK LEVEL DETERMINATION SHALL BE CALCULATED FOR THE SITE AND A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) SHALL BE IMPLEMENTED CONCURRENTLY WITH THE COMMENCEMENT OF GRADING ACTIVITIES.
36. PRIOR TO THE ISSUANCE OF A GRADING OR A CONSTRUCTION PERMIT, A COPY OF THE NOTICE OF INTENT (NOI) WITH A VALID WASTE DISCHARGE ID NUMBER (WDID#) SHALL BE SUBMITTED TO THE CITY OF SAN DIEGO AS A PROOF OF THE ENROLLMENT UNDER THE CONSTRUCTION GENERAL PERMIT. WHEN OWNERSHIP OF THE ENTIRE SITE OR PORTIONS OF THE SITE CHANGES PRIOR TO FILING OF THE NOTICE OF TERMINATION (NOT) A REVISED NOI SHALL BE SUBMITTED ELECTRONICALLY TO THE STATE WATER RESOURCES BOARD IN ACCORDANCE WITH THE PROVISIONS AS SET FORTH IN SECTION II.C OF ORDER NO 2009-0009-DWQ AND A COPY SHALL BE SUBMITTED TO THE CITY.
37. ALL BEARINGS AND DISTANCES ARE LOCATED AND SHOWN ON C5.
38. NO PRIVATE IMPROVEMENTS (INCLUDING LANDSCAPING, ENHANCED PAVING, PRIVATE UTILITIES, OR STRUCTURES OF ANY KIND) THAT COULD INHIBIT THE MAINTENANCE, REPAIR, OR REPLACEMENT OF PUBLIC UTILITIES, MAY BE INSTALLED, CONSTRUCTED, OR LOCATED WITHIN THE LIMITS OF A PUBLIC WATER, SEWER OR GENERAL UTILITY EASEMENT WITHOUT A CITY APPROVED AND COUNTY RECORDED ENCROACHMENT AND MAINTENANCE REMOVAL AGREEMENT (EMRA).
39. ALL WATER LINES SERVING THIS DEVELOPMENT (INCLUDING DOMESTIC, IRRIGATION, AND FIRE) MUST PASS THROUGH A PERMITTED, PRIVATE, ABOVE GROUND, BACKFLOW PREVENTION DEVICE (BFPD).
40. THE OWNER/PERMITEE SHALL BE RESPONSIBLE FOR ANY DAMAGE CAUSED TO CITY OF SAN DIEGO WATER AND SEWER FACILITIES IN THE VICINITY OF THE PROJECT SITE, DUE TO THE CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS PROJECT, IN ACCORDANCE WITH MUNICIPAL CODE SECTION 142.0607. IN THE EVENT ANY SUCH FACILITY LOSES INTEGRITY THEN, THE OWNER/PERMITTEE SHALL REPAIR OR RECONSTRUCT ANY DAMAGED PUBLIC WATER AND SEWER FACILITY IN A MANNER SATISFACTORY TO THE PUBLIC UTILITIES DIRECTOR AND CITY ENGINEER.
41. CDFG CODE 3503 STATES; "IT IS UNLAWFUL TO TAKE, POSSESS OR NEEDLESSLY DESTROY THE NEST OR EGGS OF ANY BIRD, EXCEPT AS OTHERWISE PROVIDED BY THIS CODE OR ANY REVELATION MADE PURSUANT THERETO."
42. PROJECT SHALL COMPLY WITH RECOMMENDATIONS IN ACOUSTICAL ANALYSIS REPORT PREPARED BY EILAR ASSOCIATED, INC. DATED AUGUST 7, 2018 AND REVISED SEPTEMBER 26, 2018.

DEV. SUMMARY/ PROJ. SCOPE

THE PROPOSED DEVELOPMENT SITE IS CURRENTLY A VACANT PROPERTY OF APPROXIMATELY 0.97 GROSS ACRES, LOCATED JUST EASTERLY OF 32ND STREET, SOUTHERLY OF C STREET AND NORTH OF HWY 94 WITHIN THE GREATER GOLDEN HILLS COMMUNITY PLANNING AREA IN THE CITY OF SAN DIEGO. THE PROJECT PROPOSES A VESTING TENTATIVE MAP TO CREATE ONE (1) CONDOMINIUM LOT AND THE DEVELOPMENT OF 19 RESIDENTIAL (3-BEDROOM) MULTI-FAMILY CONDOMINIUM DWELLING UNITS IN A MIX OF 2 AND 3 STORY BUILDINGS. ADDITIONALLY, 43 ONSITE PARKING SPACES WILL BE PROVIDED. PROJECT ENTITLEMENTS REQUESTED INCLUDE:

1) A VESTING TENTATIVE MAP FOR CONDOMINIUM PURPOSES; AND
2) A NEIGHBORHOOD DEVELOPMENT PERMIT (AS AN INFILL PROJECT EXEMPTION FROM A PLANNED DEVELOPMENT PERMIT PER MUNICIPAL CODE SECTION 126.0603) TO ALLOW AN INCREASE IN RESIDENTIAL DENSITY FROM 10-15 TO 16-29 DU'S/AC IN THE LOW-MEDIUM RESIDENTIAL LAND USE CATEGORY OF THE COMMUNITY PLAN AND FOR WALLS WITHIN PUBLIC RIGHT OF WAYS EXCEEDING 3 FEET IN HEIGHT. THE PROPOSED ONSITE IMPROVEMENTS INCLUDE GRADING, THE INSTALLATION OF PRIVATE SEWER, WATER AND STORM DRAIN UTILITIES AND CONSTRUCTION OF PRIVATE SIDEWALKS AND DRIVEWAYS. OFFSITE IMPROVEMENTS INCLUDE THE CONSTRUCTION OF PUBLIC STREET AND ALLEY IMPROVEMENTS, WHICH INCLUDE GRADING, PAVING AND CURB GUTTER, SIDEWALKS AND WALLS.

GENERAL NOTES

1. SITE AREA DATA:
   GROSS SITE AREA: .97 ACRE
   NET SITE AREA: .97 ACRE
2. TOTAL NUMBER OF EXISTING/PROPOSED LOTS:
   EXISTING LOTS: 13
   PROPOSED LOTS: 1
3. TOTAL NUMBER OF PROPOSED UNITS: 19
4. COMMUNITY PLAN: GREATER GOLDEN HILLS
   EXIST. COMMUNITY/ GENERAL PLAN LAND USE:
   RESIDENTIAL: LOW MEDIUM
   SITE IS ALSO WITHIN DEVELOPMENT INCREASE AREA:
   C STREET (EAST) TO 16-29 DU/AC
   COMMUNITY PLAN AMENDMENT NOT REQUIRED
5. ZONING: EXISTING: RM 1-1
   PROPOSED: SAME
   SITE IS ALSO WITHIN THE AIRPORT ENVIRONS OVERLAY AND THE VERY HIGH FIRE HAZARD SEVERITY ZONE
6. DENSITY PROPOSED:
   GROSS SITE DENSITY: 19.6 DU'S/AC (19 UNITS/.97 AC)
7. APN #: 539-563-01-00
8. THOMAS BROS. COORDINATES: 1289-D3 & F3
9. AVERAGE DAILY TRIPS: 152 (19 UNITS X 8 TRIPS)
10. GEO HAZARD ZONES: 52
11. TOTAL FLOOR AREA: 31,688 FLOOR AREA RATIO: .75 MAX
12. NO TRANSIT STOPS ARE PROPOSED WITH THIS PROJECT.
13. LAMBERT COORDINATES: 201-1730 CCS 83 COORDS: 1841-6290

PROJECT TEAM

ENGINEER

HUNSAKER & ASSOCIATES SD, INC.
9707 WAPLES STREET
SAN DIEGO, CA 92121
(858) 558-4500

ARCHITECT

McKINLEY & ASSOCIATES, INC.
1818 FIRST AVE
SAN DIEGO, CA 92101
(619) 606-8320

LANDSCAPE ARCHITECT

McCULLOUGH LANDSCAPE ARCHITECTS, INC.
703 16TH ST, SUITE 100
SAN DIEGO, CA 92101
(619) 300-8830

NOISE

EILAR ASSOCIATES
210 SOUTH JUNIPER STREET
SUITE 100
ESCONDIDO, CA 92025
(760) 738-5570

SOILS ENGINEER

NOVA SERVICES, INC.
4373 VIEWRIDGE AVENUE, STE B
SAN DIEGO, CA 92123
(858) 292-7375

BIO/CULTURAL

DUDEK & ASSOCIATES
605 THIRD STREET
ENCINITAS, CA 92024
(760) 942-5147

OWNER

CITYMARK GOLDEN HILL, LLC.
3818 PARK BOULEVARD
SAN DIEGO, CA 92103
(619) 231-1161

REPRESENTATIVE

APPLICANT

CITYMARK COMMUNITIES, LLC.
3818 PARK BOULEVARD
SAN DIEGO, CA 92103
(619) 231-1161

REPRESENTATIVE

ENGINEER

NO. 48670
Exp. 6/30/20

Raymond L Martin 11/7/18
RAYMOND L. MARTIN R.C.E. 48670 DATE
MY REGISTRATION EXPIRES ON 6/30/20

SHEET INDEX

ARCHITECTURAL SHEET INDEX

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- A-2 BUILDING A FLOOR PLANS & ROOF PLAN
- A-3 BUILDING A ELEVATIONS
- A-4 BUILDING B FLOOR PLANS & ROOF PLANS
- A-5 BUILDING B ELEVATIONS
- A-6 BUILDING C FOOR PLANS & ROOF PLANS
- A-7 BUILDING C ELEVATIONS
- A-8 BUILDING D FLOOR PLANS & ROOF PLANS
- A-9 BUILDING D ELEVATIONS
- A-10 SITE SECTION FRONTING C STREET
- A-11 BUILDING A COLOR SCHEME
- A-12 BUIDLING B COLOR SCHEME
- A-13 BUILDING C COLOR SCHEME
- A-14 BUIDLING D COLOR SCHEME

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- C1 TITLE SHEET
- C2 PROJECT DETAILS & STREET SECTIONS
- C3 PROJECT DESIGN
- C4 DETAILS
- C5 EXISTING AERIAL TOPOGRAPHY & BOUNDARY
- C6 200' HOSE PULL EXHIBIT

LANDSCAPE SHEET INDEX

- L-0 LANDSCAPE PLAN - OVERALL SITE PLAN
- L-1 LANDSCAPE PLAN - CALCULATIONS PLAN
- L-2 LANDSCAPE PLAN - CONCEPTUAL CONSTRUCTION PLAN
- L-3 LANDSCAPE PLAN - LANDSCAPE CALCULATIONS & LEGEND
- L-4 LANDSCAPE PLAN - CONCEPTUAL PLANTING PLAN
- L-5 LANDSCAPE PLAN - CONCEPTUAL PLANT IMAGES
- L-6 LANDSCAPE PLAN - NOTES & WATER CALCULATIONS

PREPARED BY:

HUNSAKER & ASSOCIATES
SAN DIEGO, INC
PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING

PROJECT ADDRESS: 32nd & "C" STREET

PROJECT #: 595288

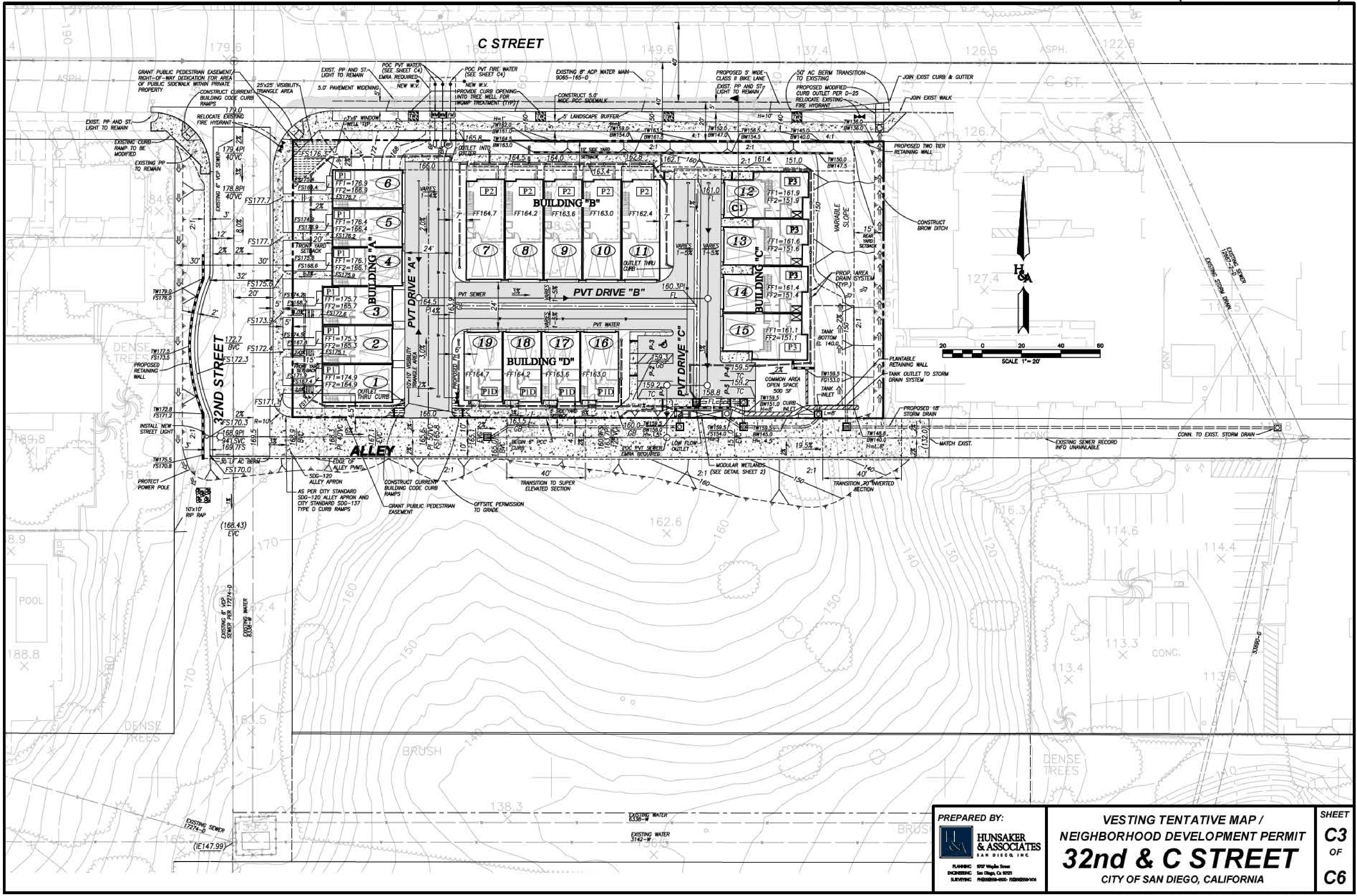
#	REVISIONS	DATE	BY
1.	PRELIM REVIEW	01/22/18	H&A
2.	FULL SUBMITTAL	02/23/18	H&A
3.	RESUBMITTAL	06/07/18	H&A
4.	RESUBMITTAL	08/15/18	H&A
5.	FINAL SUBMITTAL FOR PC HEARING	11/07/18	H&A
6.			
7.			
8.			
9.			

VESTING TENTATIVE MAP /
NEIGHBORHOOD DEVELOPMENT PERMIT
32nd & C STREET
CITY OF SAN DIEGO, CALIFORNIA

SHEET C1 OF C6

W.O. 3471-0001

VTM # 2111897 / NDP # 2179898 (PROJECT # 595288)



PREPARED BY:

HUNSAKER & ASSOCIATES
SAN DIEGO, INC

PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 · FX(858)558-1414

VESTING TENTATIVE MAP /
NEIGHBORHOOD DEVELOPMENT PERMIT

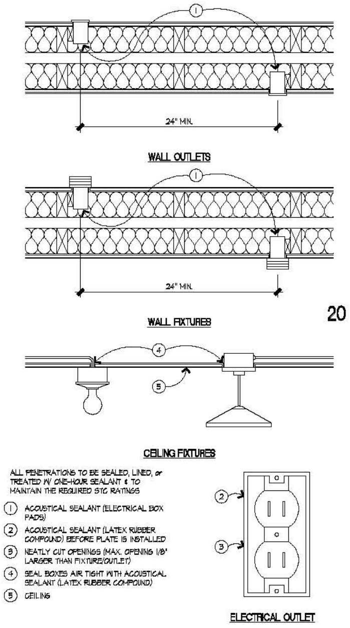
32nd & C STREET

CITY OF SAN DIEGO, CALIFORNIA

SHEET C3 OF C6

W.O. 3471-0001

R:\1452\&Pln\32nd & C TM-NPD – Sht 03.dwg[]Nov-06-2018:12:56

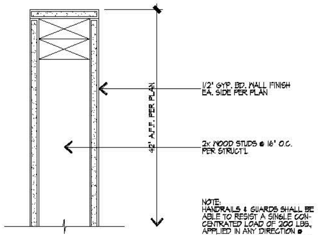


ALL PENETRATIONS TO BE SEALED, LINED, or TREATED W/ ONE-HOUR SEALANT & TO MAINTAIN THE REQUIRED STC RATINGS

① ACOUSTICAL SEALANT (ELECTRICAL BOX PADS)
② ACOUSTICAL SEALANT (LATEX RUBBER COMPOUND) BEFORE PLATE IS INSTALLED
③ NEATLY CUT OPENINGS (MAX. OPENING 1/8" LARGER THAN FIXTURE/OUTLET)
④ SEAL BOXES AIR TIGHT WITH ACOUSTICAL SEALANT (LATEX RUBBER COMPOUND)
⑤ CEILING

20

ELECTRICAL PENETRATIONS
NO SCALE MS-047 (19)



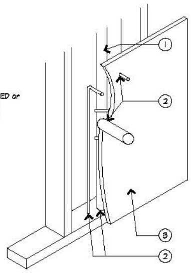
NOTE:
HANDRAILS & GUARDS SHALL BE ABLE TO RESIST A SINGLE CONCENTRATED LOAD OF 200 LBS., APPLIED IN ANY DIRECTION @ ANY POINT ALONG THE THE TOP, AND TO TRANSFER THIS LOAD THROUGH THE SUPPORTS OF THE STRUCTURE.

PONY WALL
3" = 1'-0" ST-013A (15)

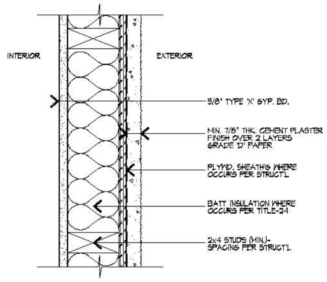
16

① VENT, TYP.
② ACOUSTICAL SEALANT
③ SCHEDULED GYP. BD.

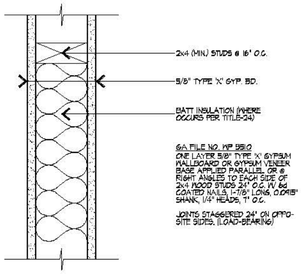
ALL PENETRATIONS TO BE SEALED, LINED or TREATED W/ ONE-HOUR SEALANT & TO MAINTAIN THE REQUIRED STC RATINGS



PIPING PENETRATION
NO SCALE PL-004 (12)



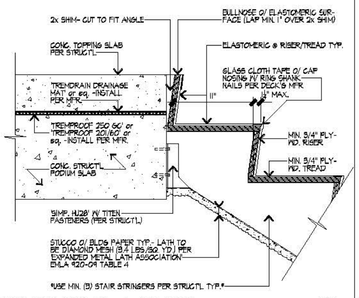
ONE-HOUR RATED EXTERIOR WALL
3"=1'-0" WW-036 (8)



GA FILE NO. WP 3510
ONE LAYER 5/8" TYPE 'X' GYPSUM WALLBOARD OR GYPSUM VENEER BASE APPLIED PARALLEL OR @ RIGHT ANGLES TO EACH SIDE OF 2x4 WOOD STUDS 24" O.C. W/ 6d COATED NAILS, 1-7/8" LONG, 0.0915" SHANK, 1/4" HEADS, 7" O.C.

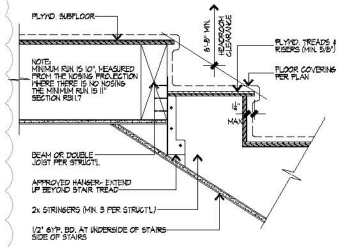
JOINTS STAGGERED 24" ON OPPOSITE SIDES. (LOAD-BEARING)

ONE-HOUR RATED INTERIOR WALL
3"=1'-0" WW-036E (4)



11

TOP OF STAIR @ LANDING
1-1/2"=1'-0" ST-001Fb (7)

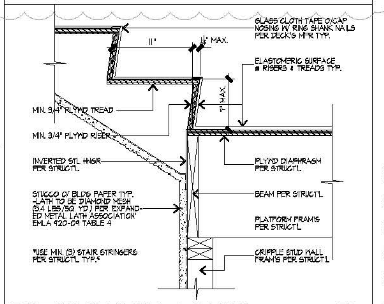


NOTE:
MINIMUM RUN IS 10", MEASURED FROM THE NOSING PROJECTION WHERE THERE IS NO NOSING THE MINIMUM RUN IS 11" SECTION R311.7

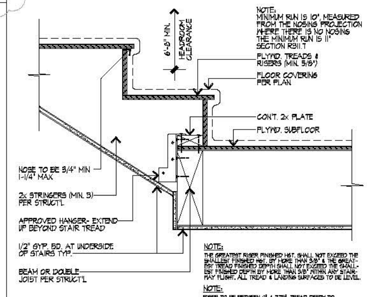
NOTE:
THE GREATEST RISER FINISHED HGT. SHALL NOT EXCEED THE SMALLEST FINISHED HGT. BY MORE THAN 3/8" & THE GREATEST TREAD FINISHED DEPTH SHALL NOT EXCEED THE SMALLEST FINISHED DEPTH BY MORE THAN 3/8" WITHIN ANY STAIRWAY FLIGHT. ALL TREAD & LANDING SURFACES TO BE LEVEL.

NOTE:
RISER TO BE BETWEEN 4" & 7.75". TREAD DEPTH TO BE MIN. 10" (FOR WINDING STAIRS, 6" MIN. @ NARROWEST POINT & 10" MIN. @ 12" FROM INSIDE RADIUS).

TOP OF STAIR @ LANDING
1-1/2"=1'-0" ST-001L (3)



BOTTOM OF STAIR @ LANDING
1-1/2"=1'-0" ST-002Ea (6)

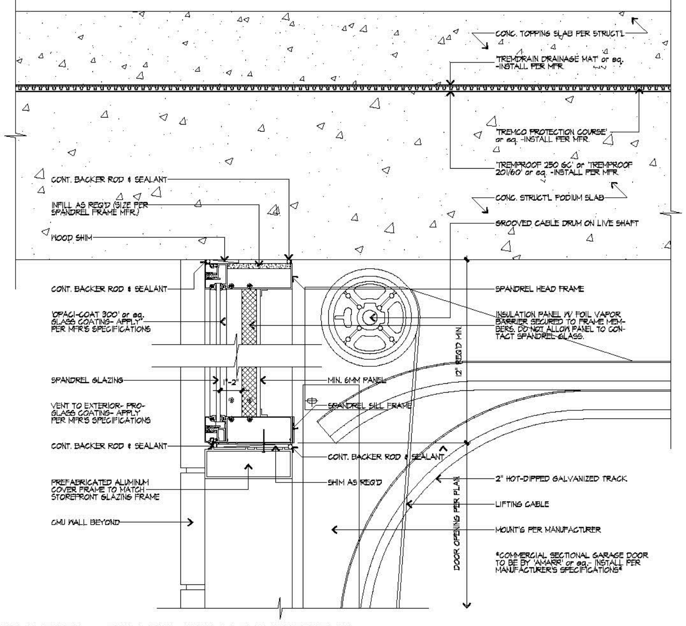


NOTE:
MINIMUM RUN IS 10", MEASURED FROM THE NOSING PROJECTION WHERE THERE IS NO NOSING THE MINIMUM RUN IS 11" SECTION R311.7

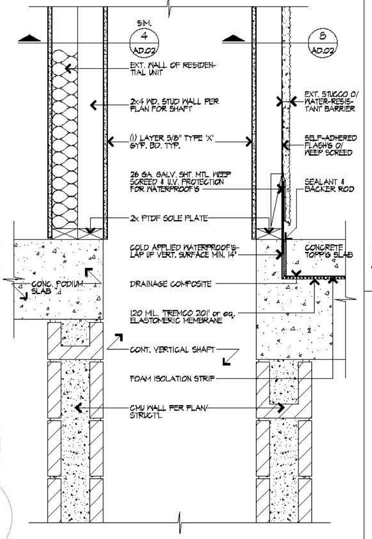
NOTE:
THE GREATEST RISER FINISHED HGT. SHALL NOT EXCEED THE SMALLEST FINISHED HGT. BY MORE THAN 3/8" & THE GREATEST TREAD FINISHED DEPTH SHALL NOT EXCEED THE SMALLEST FINISHED DEPTH BY MORE THAN 3/8" WITHIN ANY STAIRWAY FLIGHT. ALL TREAD & LANDING SURFACES TO BE LEVEL.

NOTE:
RISER TO BE BETWEEN 4" & 7.75". TREAD DEPTH TO BE MIN. 10" (FOR WINDING STAIRS, 6" MIN. @ NARROWEST POINT & 10" MIN. @ 12" FROM INSIDE RADIUS).

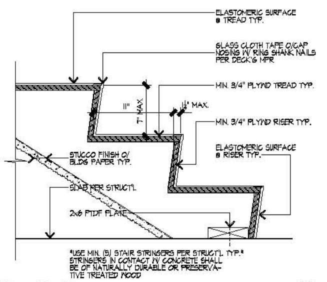
STAIR @ LANDING
1-1/2"=1'-0" ST-002M (2)



SPANDREL @ ROLLING GARAGE DOOR HEAD
3"=1'-0" FC-037A (13)

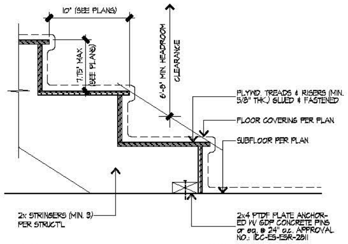


VERTICAL SHAFT @ CONC. PODIUM
1-1/2"=1'-0" M-016 (9)



USE MIN. (3) STAIR STRINGERS PER STRUCT'L TYP. STRINGERS IN CONTACT W/ CONCRETE SHALL BE OF NATURALLY DURABLE OR PRESERVATIVE TREATED WOOD

STAIR @ SLAB
1-1/2"=1'-0" ST-003Ea (5)



NOTE:
THE GREATEST RISER FINISHED HGT. SHALL NOT EXCEED THE SMALLEST FINISHED HGT. BY MORE THAN 3/8" & THE GREATEST TREAD FINISHED DEPTH SHALL NOT EXCEED THE SMALLEST FINISHED DEPTH BY MORE THAN 3/8" WITHIN ANY STAIRWAY FLIGHT. ALL TREAD & LANDING SURFACES TO BE LEVEL.

NOTE:
RISER TO BE BETWEEN 4" & 7.75". TREAD DEPTH TO BE MIN. 10" (FOR WINDING STAIRS, 6" MIN. @ NARROWEST POINT & 10" MIN. @ 12" FROM INSIDE RADIUS).

STAIR @ SLAB
1-1/2"=1'-0" ST-003JB (1)

EVERGREEN
CITYMARK DEVELOPMENT

CITYMARK DEVELOPMENT

THE McKINLEY ASSOC., INC.
ARCHITECTURE & PLANNING
1818 FIRST AVE, SD, CA. 92101
T:619.238.1134 F: 619.238.6038

STAMP AND SIGNITURE

LICENSED ARCHITECT
D. KIRK McKINLEY
No. C 9837
REN. 6-30-15
STATE OF CALIFORNIA

Issue Dates	
B.D. SUBMITTAL	05.05.15
B.D. RESUBMITTAL	06.25.15
CONSTR. REVISION	11.04.15

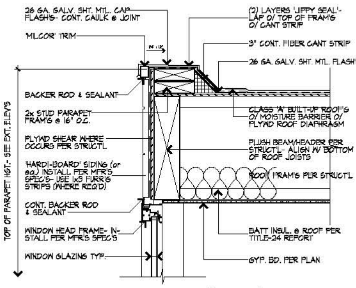
Revisions	
B.D. RESUBMITTAL	06.25.15
RFI UPDATE	10.20.15
1 CONSTR. REV.	11.04.15
2 COL. PILASTER	11.30.15
3 WDW CLARIF.	12.03.15
4 M. CLO. DOORS	12.07.15
5 P.R. REV'S	02.19.16

Job Number: 03-15
Drawn By: PCB
Checked:
Cad No.:

ARCHITECTURAL DETAILS

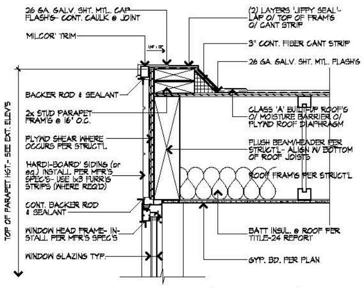
Scale:

AD.02



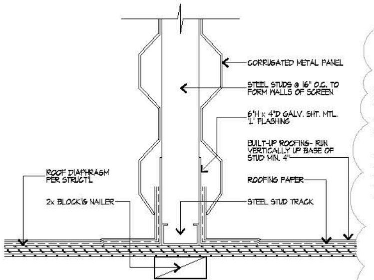
RAISED WDW @ PARAPET (PERP.) 17

1-1/2" = 1'-0" RF-164T



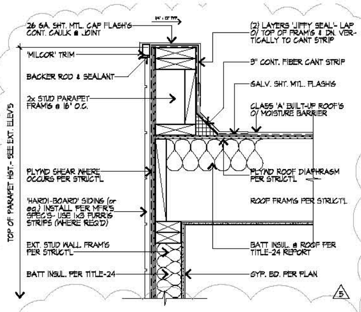
RAISED WDW @ PARAPET (PARALLEL) 13

1-1/2" = 1'-0" RF-164S



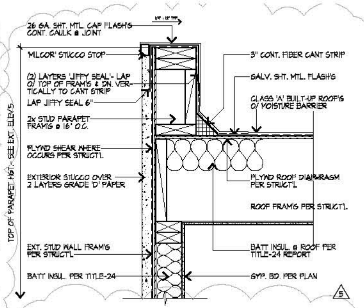
WALL SCREEN 11

3"-1'-0" WM-009



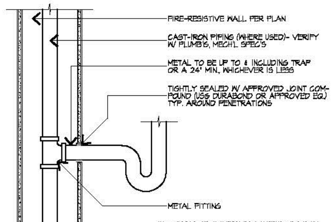
PARAPET 7

1-1/2" = 1'-0" RF-164Q



PARAPET 4

1-1/2" = 1'-0" RF-164E

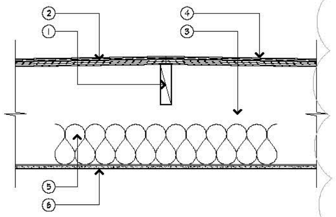


SECT. 714.3.1.2 THROUGH-PENETRATION FIRESTOP SYSTEM. (NON-METALLIC PIPE)
"THROUGH PENETRATIONS SHALL BE PROTECTED BY AN APPROVED PENETRATION FIRESTOP SYSTEM INSTALLED W/ ASTM E 814 or UL 1479, W/ A MIN. POSITIVE PRESSURE DIFFERENTIAL OF 0.01 INCH OF WATER & SHALL HAVE AN F-RATING OF NOT LESS THAN THE REQ'D FIRE-RESISTANCE RATING OF THE WALL PENETRATED."

PIPING PENETRATION 12

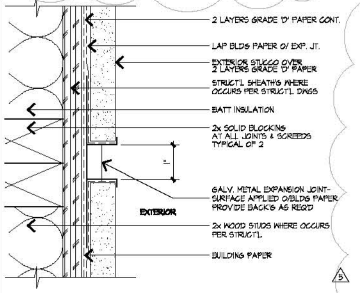
1-1/2"=1'-0" PL-002C

1. 2x RIDGE BLOCK'G PER STRUCT'L
2. T&G PLYWD DIAPHRAGM PER STRUCT'L
3. TAPERED ROOF JOISTS PER STRUCT'L
4. BUILT-UP ROOF O/ ROOF'G PAPER
5. BATT INSULATION PER TITLE-24
6. (1) LAYER 1/2" GYP. BD. @ CEIL'G



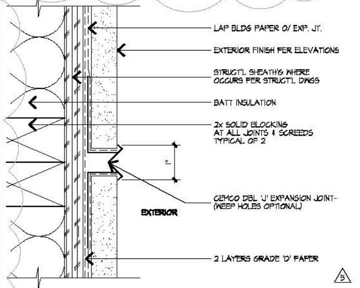
ROOF FRAMING AT RIDGE 10

1-1/2" = 1'-0" RF-244



VERT. STUCCO EXPANSION JOINT 6

6"=1'-0" WW-018A



HORIZ. STUCCO EXPANSION JOINT 3

6"=1'-0" WW-019

15

1. AIR SPACE PER PLAN
2. BATT INSULATION PER TITLE-24
3. (1) LAYER 5/8" TYPE 'X' GYP. BD. EA. SIDE OF WALL- CONTINUE TO UNDERSIDE OF ROOF SHEATH'G TYP.
4. T&G PLYWD DIAPHRAGM PER STRUCT'L
5. TAPERED ROOF JOISTS PER STRUCT'L (VERIFY DIRECTION)
6. 2x BLOCK'G NAILER
7. CLASS 'A' BUILT-UP ROOF O/ ROOF'G PAPER O/ 3/8" MIN. PLYWD CRICKET (WHERE OCCURS)

(7A) 30# ROOF'G PAPER

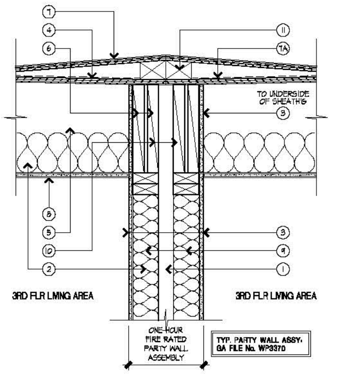
8. (1) LAYER 1/2" GYP. BD. @ CEIL'G
9. STUD WALL FRAM'G PER STRUCT'L
10. RIPPED TO FIT ROOF JOIST PER STRUCT'L
11. WOOD SLEEPERS (CUT TO FIT SLOPE)

FIRESTOPPING OR DRAFTSTOPPING IS NOT REQUIRED AT THE PARTITION LINE IN BUILDINGS EQUIPPED WITH AN AUTOMATIC SPRINKLER SYSTEM INSTALLED THROUGHOUT IN ACCORDANCE WITH SECTION 903.3.1.1 OR 903.3.1.2, PROVIDED THAT AUTOMATIC SPRINKLERS ARE INSTALLED IN ALL COMBUSTIBLE FLOOR/CEIL'G AND ROOF/CEIL'G SPACES.

FIREWALLS SHALL BE PERMITTED TO TERMINATE AT THE INTERIOR SURFACE OF NON-COMBUSTIBLE EXTERIOR SHEATH'G WHERE THE BUILDING ON EACH SIDE OF THE FIRE WALL IS PROTECTED BY AN AUTOMATIC SPRINKLER SYSTEM INSTALLED IN ACCORDANCE WITH SECTION 903.3.1.1 OR 903.3.1.2.

DRYWALL TO BE HELD UP FOR A BEAD OF ACOUSTICAL SEALANT

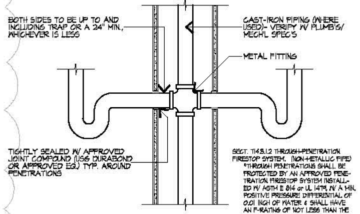
FIRESTOP AT 10'-0" O.C. VERTICAL & HORIZONTAL (CONCEALED SPACES)



ONE-HR PARTY WALL TERMINATION PERPENDICULAR TO ROOF FRAMING 14

1-1/2" = 1'-0" WW-132G

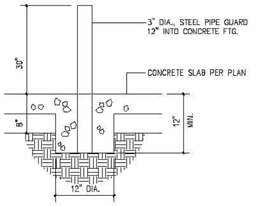
SECT. 714.3.1 THROUGH PENETRATIONS.
"WHEN THE PENETRATING ITEMS ARE STEEL, FERROUS OR COPPER PIPES, TUBES or CONDUITS, THE ANNULAR SPACE BETW. THE PENETRATING ITEM & THE FIRE-RATED WALL TO BE PROTECTED AS FOLLOWS:
THE MATERIAL USED TO FILL THE ANNULAR SPACE SHALL PREVENT THE PASSAGE OF FLAME & HOT GASES SUFFICIENT TO IGNITE COTTON WASTE WHEN SUBJECTED TO ASTM E 119 or UL 263 TIME-TEMPERATURE FIRE CONDITIONS UNDER A MIN. POSITIVE PRESSURE DIFFERENTIAL OF 0.01 INCH OF WATER AT THE LOCATION OF PENETRATION FOR THE TIME PERIOD EQUIVALENT TO THE FIRE-RESISTANCE RATING OF THE CONSTRUCTION PENETRATED."



SECT. 714.3.1.2 THROUGH-PENETRATION FIRESTOP SYSTEM. (NON-METALLIC PIPE)
"THROUGH PENETRATIONS SHALL BE PROTECTED BY AN APPROVED PENETRATION FIRESTOP SYSTEM INSTALLED W/ ASTM E 814 or UL 1479, W/ A MIN. POSITIVE PRESSURE DIFFERENTIAL OF 0.01 INCH OF WATER & SHALL HAVE AN F-RATING OF NOT LESS THAN THE REQ'D FIRE-RESISTANCE RATING OF THE WALL PENETRATED."

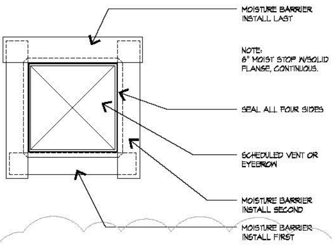
PIPING PENETRATION 11

1-1/2"=1'-0" PL-001D



VEHICLE BARRIER 10

1"=1'-0" MCM-2-10



VENT FLASHING 9

3/4"=1'-0" RF-018

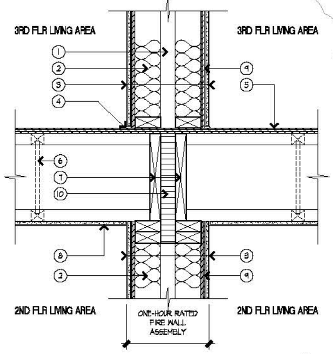
1. AIR SPACE PER PLAN
2. BATT INSULATION PER TITLE-24
3. (1) LAYER 5/8" TYPE 'X' GYP. BD. EA. SIDE OF WALL
4. ACOUSTICAL SEALANT AT ALL EDGES, TYP.
5. T&G PLYWD DIAPHRAGM PER STRUCT'L
6. TJI FLOOR JOISTS PER STRUCT'L (VERIFY DIRECTION)
7. CONT. MEMBER PER STRUCT'L
8. (1) LAYER 1/2" GYP. BD. @ CEIL'G
9. PLYWD. SHEAR (WHERE OCCURS) PER STRUCT'L
10. FIREBLOCK: (USE 2x LUMBER, GYPSUM BD., CEMENT ASBESTOS BD., MINERAL FIBER, GLASS FIBER OR OTHER APPROVED MATERIALS SECURELY FASTENED IN PLACE)

TYP. PARTY WALL ASSY: GA FILE No. WP3370

NOTES:
FIRESTOPPING OR DRAFTSTOPPING IS NOT REQUIRED AT THE PARTITION LINE IN BUILDINGS EQUIPPED WITH AN AUTOMATIC SPRINKLER SYSTEM INSTALLED THROUGHOUT IN ACCORDANCE WITH SECTION 903.3.1.1 OR 903.3.1.2 PROVIDED THAT AUTOMATIC SPRINKLERS ARE INSTALLED IN ALL COMBUSTIBLE FLOOR/CEILING AND ROOF/CEILING SPACES.

DRYWALL TO BE HELD UP FOR A BEAD OF ACOUSTICAL SEALANT

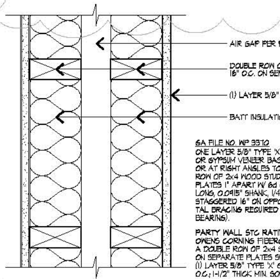
FIRESTOP AT 10'-0" O.C. VERTICAL & HORIZONTAL (CONCEALED SPACES)



8

ONE-HOUR RATED FIRE WALL @ NON-RATED FLR/CLG. ASSEMBLY 5

1-1/2" = 1'-0" WW-132E

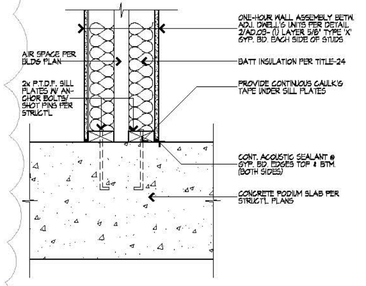


GA FILE NO. WP 3370
ONE LAYER 5/8" TYPE 'X' GYPSUM WALLBOARD OR GYPSUM VENEER BASE APPLIED PARALLEL OR AT RIGHT ANGLES TO EACH SIDE OF DOUBLE ROW OF 2x4 WOOD STUDS 16" o.c. ON SEPARATE PLATES 1" APART W/ 6d COATED NAILS, 1-7/8" LONG, 0.0915" SHANK, 1/4" HEADS, 7" o.c. JOINTS STAGGERED 16" ON OPPOSITE SIDES. HORIZONTAL BRACING REQUIRED AT MID-HEIGHT (LOAD BEARING).

PARTY WALL STC RATING: 53
OWENS CORNING FIBERGLAS OCF W-38-69
A DOUBLE ROW OF 2x4 STUDS SPACED 16" O.C. ON SEPARATE PLATES SPACED MIN. 1" APART; (1) LAYER 5/8" TYPE 'X' GYP. BD. SCREWED 12" O.C.; 1-1/2" THICK MIN. SOUND ATTENUATION BLANKET.

ONE-HOUR FIRE PARTITION 2

3"-1'-0" WW-028E



FIRE WALL AT CONC. PODIUM SLAB 1

1-1/2" = 1'-0" WW-150

EVERGREEN
CITYMARK DEVELOPMENT

THE McKINLEY ASSOC., INC.
ARCHITECTURE & PLANNING
1818 FIRST AVE, SD, CA, 92101
T:619.238.1134 F: 619.238.6038

STAMP AND SIGNITURE

D. KIRK McKINLEY
No. C 9837
REN 6-30-15

Issue Dates	
B.D. SUBMITTAL	05.05.15
B.D. RESUBMITTAL	06.25.15
CONSTR. REVISION	11.04.15

Revisions	
B.D. RESUBMITTAL	06.25.15
RFI UPDATE	10.20.15
1 CONSTR. REV.	11.04.15
2 COL. PILASTER	11.30.15
3 WDW CLARIF.	12.03.15
4 M. CLO. DOORS	12.07.15
5 P.R. REV'S	02.19.16

Job Number: 03-15
Drawn By: PCB
Checked:
Cad No.:

ARCHITECTURAL DETAILS

Scale:

AD.03

APPENDIX B

Pertinent Sections of the City of San Diego Noise Element to the General Plan, City of San Diego Municipal Code, and California Building Code

NE-A.2. Assure the appropriateness of proposed developments relative to existing and future noise levels by consulting the guidelines for noise-compatible land use (shown on Table NE-3) to minimize the effects on noise-sensitive land uses.

NE-A.3. Limit future residential and other noise-sensitive land uses in areas exposed to high levels of noise.

NE-A.4. Require an acoustical study consistent with Acoustical Study Guidelines (Table NE-4) for proposed developments in areas where the existing or future noise level exceeds or would exceed the “compatible” noise level thresholds as indicated on the Land Use - Noise Compatibility Guidelines (Table NE-3), so that noise mitigation measures can be included in the project design to meet the noise guidelines.

NE-A.5. Prepare noise studies to address existing and future noise levels from noise sources that are specific to a community when updating community plans.

TABLE NE-3 Land Use - Noise Compatibility Guidelines

Land Use Category	**Exterior Noise Exposure (dBA CNEL)**				
	60	**65**	**70**	**75**	
Parks and Recreational					
Parks, Active and Passive Recreation	░	░	░	▒	▓
Outdoor Spectator Sports, Golf Courses; Water Recreational Facilities; Indoor Recreation Facilities	░	░	░	░	▓
Agricultural					
Crop Raising & Farming; Community Gardens, Aquaculture, Dairies; Horticulture Nurseries & Greenhouses; Animal Raising, Maintain & Keeping; Commercial Stables	░	░	░	░	▓
Residential					
Single Dwelling Units; Mobile Homes	░	▒ **45**	▓	▓	▓
Multiple Dwelling Units **For uses affected by aircraft noise, refer to Policies NE-D.2. & NE-D.3.*	░	▒ **45**	▒ **45***	▓	▓
Institutional					
Hospitals; Nursing Facilities; Intermediate Care Facilities; Kindergarten through Grade 12Educational Facilities; Libraries; Museums; Child Care Facilities	░	▒ **45**	▓	▓	▓
Other Educational Facilities including Vocational/Trade Schools and Colleges and Universities	░	▒ **45**	▒ **45**	▓	▓
Cemeteries	░	░	░	░	▓
Retail Sales					
Building Supplies/Equipment; Food, Beverages & Groceries; Pets & Pet Supplies; Sundries, Pharmaceutical, & Convenience Sales; Wearing Apparel & Accessories	░	░	▒ **50**	▒ **50**	▓

Land Use Category	**Exterior Noise Exposure (dBA CNEL)**				
	60	**65**	**70**	**75**	
Commercial Services					
Building Services; Business Support; Eating & Drinking; Financial Institutions; Maintenance & Repair; Personal Services; Assembly & Entertainment (includes public and religious assembly); Radio & Television Studios; Golf Course Support	░	░	**50**	**50**	█
Visitor Accommodations	░	**45**	**45**	**45**	█
Offices					
Business & Professional; Government; Medical, Dental & Health Practitioner; Regional & Corporate Headquarters	░	░	**50**	**50**	█
Vehicle and Vehicular Equipment Sales and Services Use					
Commercial or Personal Vehicle Repair & Maintenance; Commercial or Personal Vehicle Sales & Rentals; Vehicle Equipment & Supplies Sales & Rentals; Vehicle Parking	░	░	░	░	█
Wholesale, Distribution, Storage Use Category					
Equipment & Materials Storage Yards; Moving & Storage Facilities; Warehouse; Wholesale Distribution	░	░	░	░	█
Industrial					
Heavy Manufacturing; Light Manufacturing; Marine Industry; Trucking & Transportation Terminals; Mining & Extractive Industries	░	░	░	░	█
Research & Development	░	░	░	**50**	█

░	**Compatible**	**Indoor Uses**	Standard construction methods should attenuate exterior noise to an acceptable indoor noise level. Refer to Section I.
		Outdoor Uses	Activities associated with the land use may be carried out.
45, 50	**Conditionally Compatible**	**Indoor Uses**	Building structure must attenuate exterior noise to the indoor noise level indicated by the number (45 or 50) for occupied areas. Refer to Section I.
		Outdoor Uses	Feasible noise mitigation techniques should be analyzed and incorporated t make the outdoor activities acceptable. Refer to Section I.
█	**Incompatible**	**Indoor Uses**	New construction should not be undertaken.
		Outdoor Uses	Severe noise interference makes outdoor activities unacceptable.

§59.5.0404 Construction Noise

(a) It shall be unlawful for any person, between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with exception of Columbus Day and Washington’s Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator. In granting such permit, the Administrator shall consider whether the construction noise in the vicinity of the proposed work site would be less objectionable at night than during the daytime because of different population densities or different neighboring activities; whether obstruction and interference with traffic particularly on streets of major importance, would be less objectionable at night than during the daytime; whether the type of work to be performed emits noises at such a low level as to not cause significant disturbances in the vicinity of the work site; the character and nature of the neighborhood of the proposed work site; whether great economic hardship would occur if the work were spread over a longer time; whether proposed night work is in the general public interest; and he shall prescribe such conditions, working times, types of construction equipment to be used, and permissible noise levels as he deems to be required in the public interest.

(b) Except as provided in subsection C. hereof, it shall be unlawful for any person, including The City of San Diego, to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12–hour period from 7:00 a.m. to 7:00 p.m.

(c) The provisions of subsection B. of this section shall not apply to construction equipment used in connection with emergency work, provided the Administrator is notified within 48 hours after commencement of work.

(Amended 1–3–1984 by O–16100 N.S.)

§59.5.0406 Refuse Vehicles and Parking Lot Sweepers

No person shall operate or permit to be operated a refuse compacting, processing, or collection vehicle between the hours of 7:00 p.m. to 6:00 a.m. or a parking lot sweeper between the hours of 7:00 p.m. to 7:00 a.m. in any residential area unless a permit has been applied for and granted by the Administrator.

(“Refuse Vehicles” added 9–18–1973 by O–11122 N.S.; amended 9–22–1976 by O–11916 N.S.)

(Amended 6-9-2010 by O-19960 N.S.; effective 7-9-2010.)

1206.3 Courts. Courts shall be not less than 3 feet (914 mm) in width. Courts having windows opening on opposite sides shall be not less than 6 feet (1829 mm) in width. Courts shall be not less than 10 feet (3048 mm) in length unless bounded on one end by a public way or yard. For buildings more than two stories above grade plane, the court shall be increased 1 foot (305 mm) in width and 2 feet (610 mm) in length for each additional story. For buildings exceeding 14 stories above grade plane, the required dimensions shall be computed on the basis of 14 stories above grade plane.

1206.3.1 Court access. Access shall be provided to the bottom of courts for cleaning purposes.

1206.3.2 Air intake. Courts more than two stories in height shall be provided with a horizontal air intake at the bottom not less than 10 square feet (0.93 m^2) in area and leading to the exterior of the building unless abutting a yard or public way.

1206.3.3 Court drainage. The bottom of every court shall be properly graded and drained to a public sewer or other approved disposal system complying with the *California Plumbing Code*.

SECTION 1207
SOUND TRANSMISSION

1207.1 Scope. This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent dwelling units and sleeping units or between dwelling units and sleeping units and adjacent public areas such as halls, corridors, stairways or service areas.

1207.2 Air-borne sound. Walls, partitions and floor/ceiling assemblies separating dwelling units and sleeping units from each other or from public or service areas shall have a sound transmission class of not less than 50, or not less than 45 if field tested, for air-borne noise when tested in accordance with ASTM E90. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings. This requirement shall not apply to entrance doors; however, such doors shall be tight fitting to the frame and sill.

1207.2.1 Masonry. The sound transmission class of concrete masonry and clay masonry assemblies shall be calculated in accordance with TMS 0302 or determined through testing in accordance with ASTM E90.

1207.3 Structure-borne sound. Floor/ceiling assemblies between dwelling units and sleeping units or between a dwelling unit or sleeping unit and a public or service area within the structure shall have an impact insulation class rating of not less than 50, or not less than 45 if field tested, when tested in accordance with ASTM E492.

Exception: *Impact sound insulation is not required for floor-ceiling assemblies over nonhabitable rooms or spaces not designed to be occupied, such as garages, mechanical rooms or storage areas.*

1207.4 Allowable interior noise levels. *Interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric shall be either the day-night average sound level (Ldn) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan.*

1207.5 Acoustical control. [BSC-CG] *See California Green Building Standards Code, Chapter 5, Division 5.5 for additional sound transmission requirements.*

SECTION 1208
INTERIOR SPACE DIMENSIONS

1208.1 Minimum room widths. Habitable spaces, other than a kitchen, shall be not less than 7 feet (2134 mm) in any plan dimension. Kitchens shall have a clear passageway of not less than 3 feet (914 mm) between counter fronts and appliances or counter fronts and walls.

[HCD 1] *For limited-density owner-built rural dwellings, there shall be no requirements for room dimensions, provided there is adequate light and ventilation and adequate means of egress.*

1208.2 Minimum ceiling heights. Occupiable spaces, habitable spaces and corridors shall have a ceiling height of not less than 7 feet 6 inches (2286 mm). Bathrooms, toilet rooms, kitchens, storage rooms and laundry rooms shall have a ceiling height of not less than 7 feet (2134 mm).

Exceptions:

1. In one- and two-family dwellings, beams or girders spaced not less than 4 feet (1219 mm) on center shall be permitted to project not more than 6 inches (152 mm) below the required ceiling height.
2. If any room in a building has a sloped ceiling, the prescribed ceiling height for the room is required in one-half the area thereof. Any portion of the room measuring less than 5 feet (1524 mm) from the finished floor to the ceiling shall not be included in any computation of the minimum area thereof.
3. The height of mezzanines and spaces below mezzanines shall be in accordance with Section 505.1.
4. Corridors contained within a dwelling unit or sleeping unit in a Group R occupancy shall have a ceiling height of not less than 7 feet (2134 mm).
5. ***[OSHPD 1, 2 & 3]*** *Minimum ceiling heights shall comply with Section 1224.4.10.*
6. ***[OSHPD 4]*** *Minimum ceiling heights shall comply with Section 1227.8*

1208.2.1 Furred ceiling. Any room with a furred ceiling shall be required to have the minimum ceiling height in two-thirds of the area thereof, but in no case shall the height of the furred ceiling be less than 7 feet (2134 mm).

1208.3 Room area. Every dwelling unit shall have no fewer than one room that shall have not less than 120 square feet (13.9 m^2) of net floor area. Other habitable rooms shall have a net floor area of not less than 70 square feet (6.5 m^2).

Exception: Kitchens are not required to be of a minimum floor area.

APPENDIX C

Traffic Noise Model (TNM) Data and Results

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**

INPUT: ROADWAYS
PROJECT/CONTRACT: **B80709N1**
RUN: **Calibration**

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
C Street WB	3.0	point1	1	182.7	485.4	66.80				Average	
		point2	2	192.7	485.4	66.30				Average	
		point3	3	202.7	485.4	65.90				Average	
		point4	4	212.7	485.4	65.40				Average	
		point5	5	222.7	485.3	64.90				Average	
		point6	6	232.7	485.3	64.30				Average	
		point7	7	242.7	485.3	63.80				Average	
		point8	8	252.7	485.3	63.30				Average	
		point9	9	262.7	485.3	62.80				Average	
		point10	10	272.7	485.3	62.30				Average	
		point11	11	282.7	485.3	61.80				Average	
		point12	12	292.7	485.3	61.20				Average	
		point13	13	302.7	485.3	60.60				Average	
		point14	14	312.7	485.3	60.00				Average	
		point15	15	322.7	485.3	60.00				Average	
		point16	16	332.7	485.3	60.00				Average	
		point17	17	342.7	485.3	60.00				Average	
		point18	18	352.7	485.3	60.00				Average	
		point19	19	362.7	485.3	60.00				Average	
		point20	20	372.7	485.3	60.00				Average	
		point21	21	382.7	485.3	60.20				Average	
		point22	22	392.7	485.3	61.00				Average	
		point23	23	402.7	485.3	61.30				Average	
		point24	24	412.7	485.3	61.80				Average	
		point25	25	422.7	485.3	62.20				Average	

		point26	26	432.7	485.2	62.70				Average	
		point27	27	442.7	485.2	63.10				Average	
		point28	28	452.7	485.2	63.00				Average	
		point29	29	462.7	485.2	62.60				Average	
		point30	30	472.7	485.2	62.20				Average	
		point31	31	482.7	485.2	61.80				Average	
		point32	32	492.7	485.2	61.40				Average	
		point33	33	502.7	485.2	61.00				Average	
		point34	34	512.7	485.2	61.00				Average	
		point35	35	522.7	485.2	60.20				Average	
		point36	36	532.7	485.2	58.70				Average	
		point37	37	542.7	485.2	57.30				Average	
		point38	38	547.1	485.2	56.70				Average	
		point39	39	552.7	485.3	56.00				Average	
		point40	40	553.3	485.4	56.00				Average	
		point41	41	562.7	485.4	54.80				Average	
		point42	42	572.7	485.5	53.20				Average	
		point43	43	582.7	485.5	51.50				Average	
		point44	44	592.7	485.6	50.20				Average	
		point45	45	602.7	485.6	49.00				Average	
		point46	46	612.7	485.7	47.50				Average	
		point47	47	622.7	485.7	46.00				Average	
		point48	48	632.7	485.8	44.60				Average	
		point49	49	642.7	485.8	42.80				Average	
		point50	50	652.7	485.9	42.70				Average	
		point51	51	662.7	485.9	42.40				Average	
		point52	52	672.7	486.0	41.60				Average	
		point53	53	682.7	486.0	40.80				Average	
		point54	54	692.7	486.1	40.00				Average	
		point55	55	702.7	486.1	39.30				Average	
		point56	56	712.7	486.2	38.90				Average	
		point57	57	722.7	486.2	39.20				Average	
		point58	58	732.7	486.3	39.80				Average	
		point59	59	742.7	486.3	40.50				Average	
		point60	60	752.7	486.4	41.10				Average	
		point61	61	762.7	486.4	41.60				Average	
		point62	62	772.7	486.5	42.20				Average	
		point63	63	782.7	486.5	42.70				Average	
		point64	64	792.7	486.6	42.70				Average	

		point65	65	802.7	486.6	42.70				Average	
		point66	66	812.7	486.7	42.70				Average	
		point67	67	822.7	486.7	42.70				Average	
		point68	68	832.7	486.8	42.70				Average	
		point69	69	842.7	486.8	42.70				Average	
		point70	70	852.7	486.9	42.70				Average	
		point71	71	862.7	487.0	42.70				Average	
		point72	72	872.7	487.0	42.70				Average	
		point73	73	882.7	487.1	42.70				Average	
		point74	74	892.7	487.1	42.70				Average	
		point75	75	902.7	487.2	42.70				Average	
		point76	76	909.9	487.2	42.70					
C Street EB	3.0	point77	77	909.1	482.7	42.70				Average	
		point78	78	899.1	482.6	42.70				Average	
		point79	79	889.1	482.6	42.70				Average	
		point80	80	879.1	482.5	42.70				Average	
		point81	81	869.1	482.4	42.70				Average	
		point82	82	859.1	482.3	42.70				Average	
		point83	83	849.1	482.3	42.70				Average	
		point84	84	839.1	482.2	42.70				Average	
		point85	85	829.1	482.1	42.70				Average	
		point86	86	819.1	482.0	42.70				Average	
		point87	87	809.1	482.0	42.70				Average	
		point88	88	799.1	481.9	42.70				Average	
		point89	89	789.1	481.8	42.70				Average	
		point90	90	779.1	481.7	42.30				Average	
		point91	91	769.1	481.7	41.60				Average	
		point92	92	759.1	481.6	41.10				Average	
		point93	93	749.1	481.5	40.60				Average	
		point94	94	739.1	481.4	40.00				Average	
		point95	95	729.1	481.4	39.40				Average	
		point96	96	719.1	481.3	38.80				Average	
		point97	97	709.1	481.2	38.50				Average	
		point98	98	699.1	481.1	39.20				Average	
		point99	99	689.1	481.1	39.90				Average	
		point100	100	679.1	481.0	40.70				Average	
		point101	101	669.1	480.9	41.50				Average	
		point102	102	659.1	480.8	42.30				Average	
		point103	103	649.1	480.8	42.70				Average	

			point104	104	639.1	480.7	44.20				Average	
			point105	105	629.1	480.6	45.80				Average	
			point106	106	619.1	480.5	47.20				Average	
			point107	107	609.1	480.5	48.80				Average	
			point108	108	599.1	480.4	49.90				Average	
			point109	109	589.1	480.3	51.10				Average	
			point110	110	579.1	480.2	52.30				Average	
			point111	111	569.1	480.2	53.80				Average	
			point112	112	559.1	480.1	55.30				Average	
			point113	113	553.2	480.0	56.00				Average	
			point114	114	549.1	480.0	56.50				Average	
			point115	115	546.7	480.0	56.80				Average	
			point116	116	539.1	480.0	57.70				Average	
			point117	117	529.1	480.0	59.00				Average	
			point118	118	519.1	479.9	60.50				Average	
			point119	119	509.1	479.9	61.00				Average	
			point120	120	499.1	479.8	61.00				Average	
			point121	121	489.1	479.8	61.10				Average	
			point122	122	479.1	479.8	61.50				Average	
			point123	123	469.1	479.7	61.90				Average	
			point124	124	459.1	479.7	62.30				Average	
			point125	125	449.1	479.7	62.70				Average	
			point126	126	439.1	479.6	62.60				Average	
			point127	127	429.1	479.6	62.10				Average	
			point128	128	419.1	479.5	61.70				Average	
			point129	129	409.1	479.5	61.20				Average	
			point130	130	399.1	479.5	61.00				Average	
			point131	131	389.1	479.4	61.00				Average	
			point132	132	379.1	479.4	59.80				Average	
			point133	133	369.1	479.4	58.90				Average	
			point134	134	359.1	479.3	58.90				Average	
			point135	135	349.1	479.3	58.90				Average	
			point136	136	339.1	479.3	58.90				Average	
			point137	137	329.1	479.2	58.90				Average	
			point138	138	319.1	479.2	58.90				Average	
			point139	139	309.1	479.1	59.40				Average	
			point140	140	299.1	479.1	61.00				Average	
			point141	141	289.1	479.1	61.20				Average	
			point142	142	279.1	479.0	61.80				Average	

		point143	143	269.1	479.0	62.30				Average	
		point144	144	259.1	479.0	62.80				Average	
		point145	145	249.1	478.9	63.30				Average	
		point146	146	239.1	478.9	63.80				Average	
		point147	147	229.1	478.9	64.30				Average	
		point148	148	219.1	478.8	64.90				Average	
		point149	149	209.1	478.8	65.40				Average	
		point150	150	199.1	478.7	65.80				Average	
		point151	151	189.1	478.7	66.30				Average	
		point152	152	182.3	478.7	66.60					
32nd Street NB	2.4	point153	153	557.7	377.3	50.20				Average	
		point154	154	557.2	387.3	50.70				Average	
		point155	155	556.8	397.3	51.40				Average	
		point156	156	556.4	407.3	52.00				Average	
		point157	157	555.9	417.3	52.70				Average	
		point158	158	555.5	427.3	53.70				Average	
		point159	159	555.1	437.2	54.90				Average	
		point160	160	554.6	447.2	54.90				Average	
		point161	161	554.2	457.2	55.30				Average	
		point162	162	553.8	467.2	55.80				Average	
		point163	163	553.3	477.2	56.00				Average	
		point164	164	553.2	480.0	56.00					
32nd Street SB	2.4	point179	179	549.5	594.5	57.90				Average	
		point180	180	549.3	584.5	58.30				Average	
		point181	181	549.1	574.5	57.40				Average	
		point182	182	548.8	564.5	56.60				Average	
		point183	183	548.6	554.5	57.00				Average	
		point184	184	548.4	544.5	57.10				Average	
		point185	185	548.2	534.5	57.10				Average	
		point186	186	547.9	524.5	57.20				Average	
		point187	187	547.7	514.5	57.30				Average	
		point188	188	547.5	504.5	57.30				Average	
		point189	189	547.3	494.5	57.00				Average	
		point190	190	547.2	492.4	56.90				Average	
		point191	191	547.1	485.2	56.70					
94 EB	20.6	point205	205	143.4	110.5	50.10				Average	
		point206	206	167.5	117.2	50.80				Average	
		point207	207	191.6	123.9	51.50				Average	
		point208	208	202.2	126.9	51.80				Average	

		point209	209	215.4	131.5	51.40				Average	
		point210	210	239.0	139.8	50.70				Average	
		point211	211	262.6	148.1	50.00				Average	
		point212	212	286.2	156.3	49.30				Average	
		point213	213	309.8	164.6	48.60				Average	
		point214	214	333.4	172.9	47.90				Average	
		point215	215	356.9	181.2	47.20				Average	
		point216	216	380.5	189.5	46.50				Average	
		point217	217	404.1	197.8	45.80				Average	
		point218	218	427.7	206.1	45.10				Average	
		point219	219	451.3	214.3	44.40				Average	
		point220	220	474.9	222.6	43.70				Average	
		point221	221	498.5	230.9	43.00				Average	
		point222	222	522.0	239.2	42.30				Average	
		point223	223	545.6	247.5	41.60				Average	
		point224	224	569.2	255.8	41.00				Average	
		point225	225	592.8	264.0	40.30				Average	
		point226	226	616.4	272.3	39.60				Average	
		point227	227	640.0	280.6	38.90				Average	
		point228	228	663.6	288.9	38.20				Average	
		point229	229	687.2	297.2	37.50				Average	
		point230	230	710.7	305.5	36.80				Average	
		point231	231	717.6	307.9	36.60				Average	
		point232	232	734.7	312.7	36.10				Average	
		point233	233	758.8	319.4	35.50				Average	
		point234	234	782.8	326.1	34.90				Average	
		point235	235	806.9	332.8	34.30				Average	
		point236	236	815.5	335.2	34.10				Average	
		point237	237	831.3	338.2	33.30				Average	
		point238	238	855.9	342.9	32.10				Average	
		point239	239	880.4	347.6	31.00				Average	
		point240	240	905.0	352.3	29.80				Average	
		point241	241	929.5	357.0	28.60				Average	
		point242	242	954.1	361.7	27.40				Average	
		point243	243	978.6	366.4	26.30				Average	
		point244	244	1,003.2	371.1	25.10				Average	
		point245	245	1,027.7	375.8	23.90				Average	
		point246	246	1,052.3	380.5	22.70				Average	
		point247	247	1,076.9	385.2	21.60				Average	

		point248	248	1,101.4	389.9	20.40				Average	
		point249	249	1,126.0	394.6	19.20				Average	
		point250	250	1,150.5	399.3	18.00				Average	
		point251	251	1,175.1	404.0	16.90				Average	
		point252	252	1,195.6	407.9	15.90					
94 WB	15.9	point253	253	1,154.6	491.3	21.70				Average	
		point254	254	1,130.9	483.4	23.80				Average	
		point255	255	1,107.2	475.5	26.00				Average	
		point256	256	1,083.5	467.5	28.10				Average	
		point257	257	1,059.8	459.6	30.20				Average	
		point258	258	1,036.1	451.7	32.30				Average	
		point259	259	1,026.6	448.6	33.10				Average	
		point260	260	1,012.5	443.4	33.50				Average	
		point261	261	989.1	434.7	34.10				Average	
		point262	262	965.6	426.0	34.70				Average	
		point263	263	942.2	417.3	35.30				Average	
		point264	264	918.7	408.7	36.00				Average	
		point265	265	895.3	400.0	36.60				Average	
		point266	266	871.8	391.3	37.20				Average	
		point267	267	848.4	382.6	37.80				Average	
		point268	268	824.9	374.0	38.40				Average	
		point269	269	801.5	365.3	39.00				Average	
		point270	270	778.0	356.6	39.60				Average	
		point271	271	754.6	348.0	40.30				Average	
		point272	272	731.1	339.3	40.90				Average	
		point273	273	707.7	330.6	41.50				Average	
		point274	274	684.2	321.9	42.10				Average	
		point275	275	660.8	313.3	42.70				Average	
		point276	276	637.4	304.6	43.30				Average	
		point277	277	613.9	295.9	43.90				Average	
		point278	278	590.5	287.2	44.60				Average	
		point279	279	567.0	278.6	45.20				Average	
		point280	280	543.6	269.9	45.80				Average	
		point281	281	520.1	261.2	46.40				Average	
		point282	282	496.7	252.5	47.00				Average	
		point283	283	473.2	243.9	47.60				Average	
		point284	284	449.8	235.2	48.20				Average	
		point285	285	426.3	226.5	48.90				Average	
		point286	286	402.9	217.8	49.50				Average	

		point287	287	379.4	209.2	50.10				Average	
		point288	288	356.0	200.5	50.70				Average	
		point289	289	332.5	191.8	51.30				Average	
		point290	290	309.1	183.1	51.90				Average	
		point291	291	285.8	174.5	52.50				Average	
		point292	292	285.6	174.5	52.50				Average	
		point293	293	261.9	166.8	52.60				Average	
		point294	294	238.1	159.1	52.60				Average	
		point295	295	214.3	151.4	52.70				Average	
		point296	296	190.5	143.7	52.70				Average	
		point297	297	168.4	136.5	52.80				Average	
		point298	298	166.7	136.1	52.60				Average	
		point299	299	143.8	131.1	50.60					
94 WB Ramp Off	7.3	point300	300	696.8	329.8	36.60				Average	
		point301	301	673.5	327.1	36.60				Average	
		point302	302	601.8	307.4	42.00				Average	
		point303	303	580.3	308.3	42.70				Average	
		point304	304	556.8	308.6	43.40				Average	
		point305	305	529.1	316.3	47.70				Average	
		point306	306	490.9	331.3	48.10				Average	
		point307	307	471.3	337.8	48.20				Average	
		point308	308	453.7	336.6	48.20				Average	
		point309	309	415.5	318.1	48.80				Average	
		point310	310	401.7	311.2	48.80				Average	
		point311	311	373.1	311.6	48.80					
94 WB Ramp On	4.3	point312	312	413.1	285.4	48.80				Average	
		point313	313	453.4	325.1	47.60				Average	
		point314	314	476.4	326.9	47.70				Average	
		point315	315	497.0	313.8	47.20				Average	
		point316	316	504.3	289.1	46.00				Average	
		point317	317	494.3	269.8	44.80				Average	
		point318	318	476.6	251.5	43.80					
32nd Street NB-2	2.4	point327	327	553.2	480.0	56.00	Stop	0.00	100	Average	
		point165	165	553.3	485.4	56.00				Average	
		point166	166	552.9	487.2	56.00				Average	
		point167	167	551.6	492.7	56.30				Average	
		point168	168	551.7	497.0	56.50				Average	
		point169	169	551.7	507.0	56.60				Average	
		point170	170	551.7	517.0	56.50				Average	

		point171	171	551.8	527.0	56.50				Average	
		point172	172	551.8	537.0	56.50				Average	
		point173	173	551.9	547.0	56.40				Average	
		point174	174	551.9	557.0	56.40				Average	
		point175	175	551.9	567.0	56.10				Average	
		point176	176	552.0	577.0	57.10				Average	
		point177	177	552.0	587.0	57.90				Average	
		point178	178	552.1	595.2	57.60					
32nd Street SB-2	2.4	point328	328	547.1	485.2	56.70	Stop	0.00	100	Average	
		point192	192	547.0	484.5	56.70				Average	
		point193	193	546.7	480.0	56.80				Average	
		point194	194	547.0	474.5	56.80				Average	
		point195	195	547.6	464.5	56.40				Average	
		point196	196	548.2	454.5	55.90				Average	
		point197	197	548.8	444.6	55.30				Average	
		point198	198	549.3	434.6	54.90				Average	
		point199	199	549.9	424.6	54.10				Average	
		point200	200	550.5	414.6	53.40				Average	
		point201	201	551.1	404.6	52.80				Average	
		point202	202	551.6	394.6	52.10				Average	
		point203	203	552.2	384.7	51.40				Average	
		point204	204	552.6	378.4	51.00					

Eilar Associates, Inc.
MLO

7 August 2018
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B80709N1**
RUN: **Calibration**

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
C Street WB	point1	1	102	48	6	48	4	48	0	0	0	0
	point2	2	102	48	6	48	4	48	0	0	0	0
	point3	3	102	48	6	48	4	48	0	0	0	0
	point4	4	102	48	6	48	4	48	0	0	0	0
	point5	5	102	48	6	48	4	48	0	0	0	0
	point6	6	102	48	6	48	4	48	0	0	0	0
	point7	7	102	48	6	48	4	48	0	0	0	0
	point8	8	102	48	6	48	4	48	0	0	0	0
	point9	9	102	48	6	48	4	48	0	0	0	0
	point10	10	102	48	6	48	4	48	0	0	0	0
	point11	11	102	48	6	48	4	48	0	0	0	0
	point12	12	102	48	6	48	4	48	0	0	0	0
	point13	13	102	48	6	48	4	48	0	0	0	0
	point14	14	102	48	6	48	4	48	0	0	0	0
	point15	15	102	48	6	48	4	48	0	0	0	0
	point16	16	102	48	6	48	4	48	0	0	0	0
	point17	17	102	48	6	48	4	48	0	0	0	0
	point18	18	102	48	6	48	4	48	0	0	0	0
	point19	19	102	48	6	48	4	48	0	0	0	0
	point20	20	102	48	6	48	4	48	0	0	0	0
	point21	21	102	48	6	48	4	48	0	0	0	0
	point22	22	102	48	6	48	4	48	0	0	0	0
	point23	23	102	48	6	48	4	48	0	0	0	0

	point24	24	102	48	6	48	4	48	0	0	0	0
	point25	25	102	48	6	48	4	48	0	0	0	0
	point26	26	102	48	6	48	4	48	0	0	0	0
	point27	27	102	48	6	48	4	48	0	0	0	0
	point28	28	102	48	6	48	4	48	0	0	0	0
	point29	29	102	48	6	48	4	48	0	0	0	0
	point30	30	102	48	6	48	4	48	0	0	0	0
	point31	31	102	48	6	48	4	48	0	0	0	0
	point32	32	102	48	6	48	4	48	0	0	0	0
	point33	33	102	48	6	48	4	48	0	0	0	0
	point34	34	102	48	6	48	4	48	0	0	0	0
	point35	35	102	48	6	48	4	48	0	0	0	0
	point36	36	102	48	6	48	4	48	0	0	0	0
	point37	37	102	48	6	48	4	48	0	0	0	0
	point38	38	102	48	6	48	4	48	0	0	0	0
	point39	39	102	48	6	48	4	48	0	0	0	0
	point40	40	102	48	6	48	4	48	0	0	0	0
	point41	41	102	48	6	48	4	48	0	0	0	0
	point42	42	102	48	6	48	4	48	0	0	0	0
	point43	43	102	48	6	48	4	48	0	0	0	0
	point44	44	102	48	6	48	4	48	0	0	0	0
	point45	45	102	48	6	48	4	48	0	0	0	0
	point46	46	102	48	6	48	4	48	0	0	0	0
	point47	47	102	48	6	48	4	48	0	0	0	0
	point48	48	102	48	6	48	4	48	0	0	0	0
	point49	49	102	48	6	48	4	48	0	0	0	0
	point50	50	102	48	6	48	4	48	0	0	0	0
	point51	51	102	48	6	48	4	48	0	0	0	0
	point52	52	102	48	6	48	4	48	0	0	0	0
	point53	53	102	48	6	48	4	48	0	0	0	0
	point54	54	102	48	6	48	4	48	0	0	0	0
	point55	55	102	48	6	48	4	48	0	0	0	0
	point56	56	102	48	6	48	4	48	0	0	0	0
	point57	57	102	48	6	48	4	48	0	0	0	0
	point58	58	102	48	6	48	4	48	0	0	0	0
	point59	59	102	48	6	48	4	48	0	0	0	0

	point60	60	102	48	6	48	4	48	0	0	0	0
	point61	61	102	48	6	48	4	48	0	0	0	0
	point62	62	102	48	6	48	4	48	0	0	0	0
	point63	63	102	48	6	48	4	48	0	0	0	0
	point64	64	102	48	6	48	4	48	0	0	0	0
	point65	65	102	48	6	48	4	48	0	0	0	0
	point66	66	102	48	6	48	4	48	0	0	0	0
	point67	67	102	48	6	48	4	48	0	0	0	0
	point68	68	102	48	6	48	4	48	0	0	0	0
	point69	69	102	48	6	48	4	48	0	0	0	0
	point70	70	102	48	6	48	4	48	0	0	0	0
	point71	71	102	48	6	48	4	48	0	0	0	0
	point72	72	102	48	6	48	4	48	0	0	0	0
	point73	73	102	48	6	48	4	48	0	0	0	0
	point74	74	102	48	6	48	4	48	0	0	0	0
	point75	75	102	48	6	48	4	48	0	0	0	0
	point76	76										
C Street EB	point77	77	102	48	6	48	4	48	0	0	0	0
	point78	78	102	48	6	48	4	48	0	0	0	0
	point79	79	102	48	6	48	4	48	0	0	0	0
	point80	80	102	48	6	48	4	48	0	0	0	0
	point81	81	102	48	6	48	4	48	0	0	0	0
	point82	82	102	48	6	48	4	48	0	0	0	0
	point83	83	102	48	6	48	4	48	0	0	0	0
	point84	84	102	48	6	48	4	48	0	0	0	0
	point85	85	102	48	6	48	4	48	0	0	0	0
	point86	86	102	48	6	48	4	48	0	0	0	0
	point87	87	102	48	6	48	4	48	0	0	0	0
	point88	88	102	48	6	48	4	48	0	0	0	0
	point89	89	102	48	6	48	4	48	0	0	0	0
	point90	90	102	48	6	48	4	48	0	0	0	0
	point91	91	102	48	6	48	4	48	0	0	0	0
	point92	92	102	48	6	48	4	48	0	0	0	0
	point93	93	102	48	6	48	4	48	0	0	0	0
	point94	94	102	48	6	48	4	48	0	0	0	0
	point95	95	102	48	6	48	4	48	0	0	0	0

	point96	96	102	48	6	48	4	48	0	0	0	0
	point97	97	102	48	6	48	4	48	0	0	0	0
	point98	98	102	48	6	48	4	48	0	0	0	0
	point99	99	102	48	6	48	4	48	0	0	0	0
	point100	100	102	48	6	48	4	48	0	0	0	0
	point101	101	102	48	6	48	4	48	0	0	0	0
	point102	102	102	48	6	48	4	48	0	0	0	0
	point103	103	102	48	6	48	4	48	0	0	0	0
	point104	104	102	48	6	48	4	48	0	0	0	0
	point105	105	102	48	6	48	4	48	0	0	0	0
	point106	106	102	48	6	48	4	48	0	0	0	0
	point107	107	102	48	6	48	4	48	0	0	0	0
	point108	108	102	48	6	48	4	48	0	0	0	0
	point109	109	102	48	6	48	4	48	0	0	0	0
	point110	110	102	48	6	48	4	48	0	0	0	0
	point111	111	102	48	6	48	4	48	0	0	0	0
	point112	112	102	48	6	48	4	48	0	0	0	0
	point113	113	102	48	6	48	4	48	0	0	0	0
	point114	114	102	48	6	48	4	48	0	0	0	0
	point115	115	102	48	6	48	4	48	0	0	0	0
	point116	116	102	48	6	48	4	48	0	0	0	0
	point117	117	102	48	6	48	4	48	0	0	0	0
	point118	118	102	48	6	48	4	48	0	0	0	0
	point119	119	102	48	6	48	4	48	0	0	0	0
	point120	120	102	48	6	48	4	48	0	0	0	0
	point121	121	102	48	6	48	4	48	0	0	0	0
	point122	122	102	48	6	48	4	48	0	0	0	0
	point123	123	102	48	6	48	4	48	0	0	0	0
	point124	124	102	48	6	48	4	48	0	0	0	0
	point125	125	102	48	6	48	4	48	0	0	0	0
	point126	126	102	48	6	48	4	48	0	0	0	0
	point127	127	102	48	6	48	4	48	0	0	0	0
	point128	128	102	48	6	48	4	48	0	0	0	0
	point129	129	102	48	6	48	4	48	0	0	0	0
	point130	130	102	48	6	48	4	48	0	0	0	0
	point131	131	102	48	6	48	4	48	0	0	0	0

	point132	132	102	48	6	48	4	48	0	0	0	0
	point133	133	102	48	6	48	4	48	0	0	0	0
	point134	134	102	48	6	48	4	48	0	0	0	0
	point135	135	102	48	6	48	4	48	0	0	0	0
	point136	136	102	48	6	48	4	48	0	0	0	0
	point137	137	102	48	6	48	4	48	0	0	0	0
	point138	138	102	48	6	48	4	48	0	0	0	0
	point139	139	102	48	6	48	4	48	0	0	0	0
	point140	140	102	48	6	48	4	48	0	0	0	0
	point141	141	102	48	6	48	4	48	0	0	0	0
	point142	142	102	48	6	48	4	48	0	0	0	0
	point143	143	102	48	6	48	4	48	0	0	0	0
	point144	144	102	48	6	48	4	48	0	0	0	0
	point145	145	102	48	6	48	4	48	0	0	0	0
	point146	146	102	48	6	48	4	48	0	0	0	0
	point147	147	102	48	6	48	4	48	0	0	0	0
	point148	148	102	48	6	48	4	48	0	0	0	0
	point149	149	102	48	6	48	4	48	0	0	0	0
	point150	150	102	48	6	48	4	48	0	0	0	0
	point151	151	102	48	6	48	4	48	0	0	0	0
	point152	152										
32nd Street NB	point153	153	0	0	0	0	0	0	0	0	0	0
	point154	154	0	0	0	0	0	0	0	0	0	0
	point155	155	0	0	0	0	0	0	0	0	0	0
	point156	156	0	0	0	0	0	0	0	0	0	0
	point157	157	0	0	0	0	0	0	0	0	0	0
	point158	158	0	0	0	0	0	0	0	0	0	0
	point159	159	0	0	0	0	0	0	0	0	0	0
	point160	160	0	0	0	0	0	0	0	0	0	0
	point161	161	0	0	0	0	0	0	0	0	0	0
	point162	162	0	0	0	0	0	0	0	0	0	0
	point163	163	0	0	0	0	0	0	0	0	0	0
	point164	164										
32nd Street SB	point179	179	0	0	0	0	0	0	0	0	0	0
	point180	180	0	0	0	0	0	0	0	0	0	0
	point181	181	0	0	0	0	0	0	0	0	0	0

	point182	182	0	0	0	0	0	0	0	0	0	0
	point183	183	0	0	0	0	0	0	0	0	0	0
	point184	184	0	0	0	0	0	0	0	0	0	0
	point185	185	0	0	0	0	0	0	0	0	0	0
	point186	186	0	0	0	0	0	0	0	0	0	0
	point187	187	0	0	0	0	0	0	0	0	0	0
	point188	188	0	0	0	0	0	0	0	0	0	0
	point189	189	0	0	0	0	0	0	0	0	0	0
	point190	190	0	0	0	0	0	0	0	0	0	0
	point191	191										
94 EB	point205	205	4722	105	168	105	39	105	0	0	0	0
	point206	206	4722	105	168	105	39	105	0	0	0	0
	point207	207	4722	105	168	105	39	105	0	0	0	0
	point208	208	4722	105	168	105	39	105	0	0	0	0
	point209	209	4722	105	168	105	39	105	0	0	0	0
	point210	210	4722	105	168	105	39	105	0	0	0	0
	point211	211	4722	105	168	105	39	105	0	0	0	0
	point212	212	4722	105	168	105	39	105	0	0	0	0
	point213	213	4722	105	168	105	39	105	0	0	0	0
	point214	214	4722	105	168	105	39	105	0	0	0	0
	point215	215	4722	105	168	105	39	105	0	0	0	0
	point216	216	4722	105	168	105	39	105	0	0	0	0
	point217	217	4722	105	168	105	39	105	0	0	0	0
	point218	218	4722	105	168	105	39	105	0	0	0	0
	point219	219	4722	105	168	105	39	105	0	0	0	0
	point220	220	4722	105	168	105	39	105	0	0	0	0
	point221	221	4722	105	168	105	39	105	0	0	0	0
	point222	222	4722	105	168	105	39	105	0	0	0	0
	point223	223	4722	105	168	105	39	105	0	0	0	0
	point224	224	4722	105	168	105	39	105	0	0	0	0
	point225	225	4722	105	168	105	39	105	0	0	0	0
	point226	226	4722	105	168	105	39	105	0	0	0	0
	point227	227	4722	105	168	105	39	105	0	0	0	0
	point228	228	4722	105	168	105	39	105	0	0	0	0
	point229	229	4722	105	168	105	39	105	0	0	0	0
	point230	230	4722	105	168	105	39	105	0	0	0	0

	point231	231	4722	105	168	105	39	105	0	0	0	0
	point232	232	4722	105	168	105	39	105	0	0	0	0
	point233	233	4722	105	168	105	39	105	0	0	0	0
	point234	234	4722	105	168	105	39	105	0	0	0	0
	point235	235	4722	105	168	105	39	105	0	0	0	0
	point236	236	4722	105	168	105	39	105	0	0	0	0
	point237	237	4722	105	168	105	39	105	0	0	0	0
	point238	238	4722	105	168	105	39	105	0	0	0	0
	point239	239	4722	105	168	105	39	105	0	0	0	0
	point240	240	4722	105	168	105	39	105	0	0	0	0
	point241	241	4722	105	168	105	39	105	0	0	0	0
	point242	242	4722	105	168	105	39	105	0	0	0	0
	point243	243	4722	105	168	105	39	105	0	0	0	0
	point244	244	4722	105	168	105	39	105	0	0	0	0
	point245	245	4722	105	168	105	39	105	0	0	0	0
	point246	246	4722	105	168	105	39	105	0	0	0	0
	point247	247	4722	105	168	105	39	105	0	0	0	0
	point248	248	4722	105	168	105	39	105	0	0	0	0
	point249	249	4722	105	168	105	39	105	0	0	0	0
	point250	250	4722	105	168	105	39	105	0	0	0	0
	point251	251	4722	105	168	105	39	105	0	0	0	0
	point252	252										
94 WB	point253	253	4722	105	168	105	39	105	0	0	0	0
	point254	254	4722	105	168	105	39	105	0	0	0	0
	point255	255	4722	105	168	105	39	105	0	0	0	0
	point256	256	4722	105	168	105	39	105	0	0	0	0
	point257	257	4722	105	168	105	39	105	0	0	0	0
	point258	258	4722	105	168	105	39	105	0	0	0	0
	point259	259	4722	105	168	105	39	105	0	0	0	0
	point260	260	4722	105	168	105	39	105	0	0	0	0
	point261	261	4722	105	168	105	39	105	0	0	0	0
	point262	262	4722	105	168	105	39	105	0	0	0	0
	point263	263	4722	105	168	105	39	105	0	0	0	0
	point264	264	4722	105	168	105	39	105	0	0	0	0
	point265	265	4722	105	168	105	39	105	0	0	0	0
	point266	266	4722	105	168	105	39	105	0	0	0	0

	point267	267	4722	105	168	105	39	105	0	0	0	0
	point268	268	4722	105	168	105	39	105	0	0	0	0
	point269	269	4722	105	168	105	39	105	0	0	0	0
	point270	270	4722	105	168	105	39	105	0	0	0	0
	point271	271	4722	105	168	105	39	105	0	0	0	0
	point272	272	4722	105	168	105	39	105	0	0	0	0
	point273	273	4722	105	168	105	39	105	0	0	0	0
	point274	274	4722	105	168	105	39	105	0	0	0	0
	point275	275	4722	105	168	105	39	105	0	0	0	0
	point276	276	4722	105	168	105	39	105	0	0	0	0
	point277	277	4722	105	168	105	39	105	0	0	0	0
	point278	278	4722	105	168	105	39	105	0	0	0	0
	point279	279	4722	105	168	105	39	105	0	0	0	0
	point280	280	4722	105	168	105	39	105	0	0	0	0
	point281	281	4722	105	168	105	39	105	0	0	0	0
	point282	282	4722	105	168	105	39	105	0	0	0	0
	point283	283	4722	105	168	105	39	105	0	0	0	0
	point284	284	4722	105	168	105	39	105	0	0	0	0
	point285	285	4722	105	168	105	39	105	0	0	0	0
	point286	286	4722	105	168	105	39	105	0	0	0	0
	point287	287	4722	105	168	105	39	105	0	0	0	0
	point288	288	4722	105	168	105	39	105	0	0	0	0
	point289	289	4722	105	168	105	39	105	0	0	0	0
	point290	290	4722	105	168	105	39	105	0	0	0	0
	point291	291	4722	105	168	105	39	105	0	0	0	0
	point292	292	4722	105	168	105	39	105	0	0	0	0
	point293	293	4722	105	168	105	39	105	0	0	0	0
	point294	294	4722	105	168	105	39	105	0	0	0	0
	point295	295	4722	105	168	105	39	105	0	0	0	0
	point296	296	4722	105	168	105	39	105	0	0	0	0
	point297	297	4722	105	168	105	39	105	0	0	0	0
	point298	298	4722	105	168	105	39	105	0	0	0	0
	point299	299										
94 WB Ramp Off	point300	300	535	89	19	89	4	89	0	0	0	0
	point301	301	535	89	19	89	4	89	0	0	0	0
	point302	302	535	89	19	89	4	89	0	0	0	0

	point303	303	535	89	19	89	4	89	0	0	0	0
	point304	304	535	89	19	89	4	89	0	0	0	0
	point305	305	535	89	19	89	4	89	0	0	0	0
	point306	306	535	89	19	89	4	89	0	0	0	0
	point307	307	535	89	19	89	4	89	0	0	0	0
	point308	308	535	89	19	89	4	89	0	0	0	0
	point309	309	535	89	19	89	4	89	0	0	0	0
	point310	310	535	89	19	89	4	89	0	0	0	0
	point311	311										
94 WB Ramp On	point312	312	113	48	4	48	1	48	0	0	0	0
	point313	313	113	48	4	48	1	48	0	0	0	0
	point314	314	113	48	4	48	1	48	0	0	0	0
	point315	315	113	48	4	48	1	48	0	0	0	0
	point316	316	113	48	4	48	1	48	0	0	0	0
	point317	317	113	48	4	48	1	48	0	0	0	0
	point318	318										
32nd Street NB-2	point327	327	0	0	0	0	0	0	0	0	0	0
	point165	165	0	0	0	0	0	0	0	0	0	0
	point166	166	0	0	0	0	0	0	0	0	0	0
	point167	167	0	0	0	0	0	0	0	0	0	0
	point168	168	0	0	0	0	0	0	0	0	0	0
	point169	169	0	0	0	0	0	0	0	0	0	0
	point170	170	0	0	0	0	0	0	0	0	0	0
	point171	171	0	0	0	0	0	0	0	0	0	0
	point172	172	0	0	0	0	0	0	0	0	0	0
	point173	173	0	0	0	0	0	0	0	0	0	0
	point174	174	0	0	0	0	0	0	0	0	0	0
	point175	175	0	0	0	0	0	0	0	0	0	0
	point176	176	0	0	0	0	0	0	0	0	0	0
	point177	177	0	0	0	0	0	0	0	0	0	0
	point178	178										
32nd Street SB-2	point328	328	0	0	0	0	0	0	0	0	0	0
	point192	192	0	0	0	0	0	0	0	0	0	0
	point193	193	0	0	0	0	0	0	0	0	0	0
	point194	194	0	0	0	0	0	0	0	0	0	0
	point195	195	0	0	0	0	0	0	0	0	0	0

		point196	196	0	0	0	0	0	0	0	0	0	0
		point197	197	0	0	0	0	0	0	0	0	0	0
		point198	198	0	0	0	0	0	0	0	0	0	0
		point199	199	0	0	0	0	0	0	0	0	0	0
		point200	200	0	0	0	0	0	0	0	0	0	0
		point201	201	0	0	0	0	0	0	0	0	0	0
		point202	202	0	0	0	0	0	0	0	0	0	0
		point203	203	0	0	0	0	0	0	0	0	0	0
		point204	204										

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **B80709N1**
RUN: **Calibration**

Receiver											
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height above Ground**	**Input Sound Levels and Criteria**				**Active in Calc.**
			X	**Y**	**Z**		**Existing LAeq1h**	**Impact Criteria LAeq1h**	**Sub'l**	**NR Goal**	
			m	m	m	m	dBA	dBA	dB	dB	
NML	3	0	558.8	474.1	55.38	1.52	0.00	66	10.0	8.0	Y

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**

INPUT: TERRAIN LINES
PROJECT/CONTRACT: **B80709N1**
RUN: **Calibration**

Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		m	m	m
Terrain Line1	1	1,077.5	420.3	30.50
	2	1,039.2	433.7	30.50
	3	959.0	406.8	30.50
	4	889.3	376.2	30.50
	5	881.3	363.6	30.50
Terrain Line2	6	884.9	342.3	30.50
	7	890.4	339.1	30.50
Terrain Line3	8	1,005.8	349.9	30.50
	9	1,098.6	357.9	30.50
	10	1,099.8	339.0	30.50
	11	1,088.5	327.6	30.50
Terrain Line4	12	919.7	315.0	30.50
	13	914.2	285.2	30.50
	14	836.5	224.3	30.50
	15	820.1	197.8	30.50
	16	778.1	198.7	30.50
	17	749.5	222.2	30.50
	18	708.0	214.6	30.50
	19	686.1	220.1	30.50
	20	684.0	231.4	30.50
	21	693.7	262.9	30.50
	22	622.7	228.9	30.50
	23	610.1	192.8	30.50
Terrain Line5	24	763.7	363.2	36.60
	25	755.0	363.2	36.60
	26	700.7	342.9	36.60
	27	671.7	341.9	36.60
	28	681.0	373.2	36.60
	29	680.3	413.2	36.60
	30	695.7	427.9	36.60
	31	706.0	454.6	36.60
	32	710.7	450.3	36.60
	33	721.0	429.9	36.60
	34	755.0	423.2	36.60
	35	771.7	409.9	36.60
	36	793.7	420.9	36.60
	37	837.4	404.9	36.60

	38	1,038.7	477.6	36.60
	39	1,122.1	724.3	36.60
Terrain Line6	40	471.4	151.4	36.60
	41	486.1	206.5	36.60
	42	506.6	213.2	36.60
	43	535.2	207.7	36.60
	44	672.6	273.3	36.60
	45	718.3	295.1	36.60
Terrain Line7	46	771.3	341.3	36.60
	47	763.7	331.2	36.60
Terrain Line8	48	592.0	656.3	42.70
	49	625.1	508.4	42.70
	50	640.4	491.7	42.70
Terrain Line9	51	635.2	653.6	42.70
	52	712.8	541.5	42.70
	53	731.6	544.1	42.70
	54	745.9	527.3	42.70
	55	768.2	497.9	42.70
	56	785.8	489.1	42.70
Terrain Line10	57	648.0	474.4	42.70
	58	653.1	450.0	42.70
	59	653.5	424.8	42.70
	60	660.2	392.1	42.70
	61	645.9	374.4	42.70
	62	625.8	363.9	42.70
	63	619.1	348.8	42.70
	64	565.3	317.5	42.70
Terrain Line11	65	579.3	300.4	42.70
	66	581.4	294.4	42.70
Terrain Line12	67	567.4	239.2	42.70
	68	527.2	220.8	42.70
	69	514.4	221.7	42.70
Terrain Line13	70	487.4	231.8	42.70
	71	471.3	226.8	42.70
Terrain Line14	72	470.2	203.1	42.70
	73	439.4	145.6	42.70
Terrain Line15	74	431.3	122.7	42.70
	75	430.2	62.0	42.70
Terrain Line16	76	792.1	473.8	42.70
	77	828.6	463.2	42.70
	78	891.0	455.2	42.70
	79	932.3	477.5	42.70
Terrain Line17	80	945.5	493.9	42.70
	81	978.9	525.1	42.70
Terrain Line18	82	570.7	656.5	48.80
	83	583.9	607.5	48.80
	84	588.9	564.2	48.80
	85	574.7	543.8	48.80

	86	594.8	522.6	48.80
	87	599.0	493.5	48.80
Terrain Line19	88	614.0	473.9	48.80
	89	638.9	467.8	48.80
	90	639.9	414.1	48.80
	91	621.9	399.3	48.80
	92	590.2	409.1	48.80
	93	572.2	395.8	48.80
	94	561.1	353.2	48.80
	95	542.0	333.7	48.80
	96	465.0	349.5	48.80
	97	447.0	348.2	48.80
	98	434.6	364.4	48.80
	99	399.7	336.0	48.80
	100	356.8	352.5	48.80
Terrain Line20	101	352.6	313.7	48.80
	102	358.7	300.0	48.80
	103	394.2	275.1	48.80
	104	410.8	248.9	48.80
	105	410.3	235.9	48.80
	106	343.6	207.1	48.80
Terrain Line21	107	367.0	166.8	48.80
	108	374.3	157.2	48.80
	109	339.6	126.8	48.80
	110	337.3	75.6	48.80
	111	141.9	66.3	48.80
Terrain Line22	112	545.4	657.0	54.90
	113	559.4	613.9	54.90
	114	570.3	599.3	54.90
	115	560.0	572.1	54.90
	116	561.6	493.7	54.90
Terrain Line23	117	563.1	472.3	54.90
	118	560.7	438.5	54.90
Terrain Line24	119	548.6	434.0	54.90
	120	520.3	353.0	54.90
	121	454.9	362.8	54.90
	122	445.4	404.6	54.90
	123	392.2	360.2	54.90
	124	366.3	368.6	54.90
	125	354.4	408.0	54.90
	126	351.7	455.7	54.90
	127	333.5	458.6	54.90
	128	298.8	377.9	54.90
Terrain Line25	129	305.1	345.3	54.90
	130	334.2	297.4	54.90
	131	383.9	266.2	54.90
	132	374.6	236.6	54.90
	133	251.9	189.5	54.90

Terrain Line26		134	528.5	655.4	61.00
		135	524.5	617.7	61.00
		136	536.1	580.3	61.00
		137	523.1	563.3	61.00
		138	519.1	536.0	61.00
		139	527.1	521.7	61.00
		140	525.5	508.0	61.00
		141	510.8	488.7	61.00
Terrain Line27		142	513.5	472.7	61.00
		143	479.4	404.7	61.00
		144	466.1	407.3	61.00
		145	442.8	454.0	61.00
		146	429.4	416.3	61.00
		147	408.1	413.0	61.00
		148	384.4	397.7	61.00
		149	377.1	427.7	61.00
		150	382.4	472.0	61.00
Terrain Line28		151	387.1	490.3	61.00
		152	350.1	576.0	61.00
		153	326.4	562.3	61.00
		154	300.4	490.0	61.00
Terrain Line29		155	302.4	470.8	61.00
		156	296.0	426.1	61.00
		157	239.4	378.8	61.00
Terrain Line30		158	224.0	356.1	61.00
		159	275.4	343.8	61.00
		160	283.0	311.1	61.00
		161	263.4	265.1	61.00
		162	167.4	268.4	61.00
Terrain Line31		163	305.2	651.0	67.10
		164	328.2	620.6	67.10
		165	349.2	634.3	67.10
		166	368.5	611.3	67.10
		167	411.2	592.3	67.10
		168	395.5	583.0	67.10
		169	414.2	559.6	67.10
		170	429.5	579.3	67.10
		171	449.2	537.6	67.10
		172	484.5	574.0	67.10
		173	485.8	600.6	67.10
		174	503.5	615.6	67.10
		175	508.5	654.6	67.10
Terrain Line32		176	169.9	651.1	71.00
		177	171.5	608.2	71.00

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **B80709N1**
RUN: **Calibration**
BARRIER DESIGN: **INPUT HEIGHTS**

ATMOSPHERICS: **20 deg C, 50% RH**

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver

Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
NML	3	0	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	0	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B80709N1**
RUN: **Current**

Roadway	**Points**											
Name	**Name**	**No.**	**Segment**									
			Autos		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
C Street WB	point1	1	214	48	1	48	1	48	0	0	0	0
	point2	2	214	48	1	48	1	48	0	0	0	0
	point3	3	214	48	1	48	1	48	0	0	0	0
	point4	4	214	48	1	48	1	48	0	0	0	0
	point5	5	214	48	1	48	1	48	0	0	0	0
	point6	6	214	48	1	48	1	48	0	0	0	0
	point7	7	214	48	1	48	1	48	0	0	0	0
	point8	8	214	48	1	48	1	48	0	0	0	0
	point9	9	214	48	1	48	1	48	0	0	0	0
	point10	10	214	48	1	48	1	48	0	0	0	0
	point11	11	214	48	1	48	1	48	0	0	0	0
	point12	12	214	48	1	48	1	48	0	0	0	0
	point13	13	214	48	1	48	1	48	0	0	0	0
	point14	14	214	48	1	48	1	48	0	0	0	0
	point15	15	214	48	1	48	1	48	0	0	0	0
	point16	16	214	48	1	48	1	48	0	0	0	0
	point17	17	214	48	1	48	1	48	0	0	0	0
	point18	18	214	48	1	48	1	48	0	0	0	0
	point19	19	214	48	1	48	1	48	0	0	0	0
	point20	20	214	48	1	48	1	48	0	0	0	0
	point21	21	214	48	1	48	1	48	0	0	0	0
	point22	22	214	48	1	48	1	48	0	0	0	0
	point23	23	214	48	1	48	1	48	0	0	0	0

	point24	24	214	48	1	48	1	48	0	0	0	0
	point25	25	214	48	1	48	1	48	0	0	0	0
	point26	26	214	48	1	48	1	48	0	0	0	0
	point27	27	214	48	1	48	1	48	0	0	0	0
	point28	28	214	48	1	48	1	48	0	0	0	0
	point29	29	214	48	1	48	1	48	0	0	0	0
	point30	30	214	48	1	48	1	48	0	0	0	0
	point31	31	214	48	1	48	1	48	0	0	0	0
	point32	32	214	48	1	48	1	48	0	0	0	0
	point33	33	214	48	1	48	1	48	0	0	0	0
	point34	34	214	48	1	48	1	48	0	0	0	0
	point35	35	214	48	1	48	1	48	0	0	0	0
	point36	36	214	48	1	48	1	48	0	0	0	0
	point37	37	214	48	1	48	1	48	0	0	0	0
	point38	38	214	48	1	48	1	48	0	0	0	0
	point39	39	214	48	1	48	1	48	0	0	0	0
	point40	40	214	48	1	48	1	48	0	0	0	0
	point41	41	214	48	1	48	1	48	0	0	0	0
	point42	42	214	48	1	48	1	48	0	0	0	0
	point43	43	214	48	1	48	1	48	0	0	0	0
	point44	44	214	48	1	48	1	48	0	0	0	0
	point45	45	214	48	1	48	1	48	0	0	0	0
	point46	46	214	48	1	48	1	48	0	0	0	0
	point47	47	214	48	1	48	1	48	0	0	0	0
	point48	48	214	48	1	48	1	48	0	0	0	0
	point49	49	214	48	1	48	1	48	0	0	0	0
	point50	50	214	48	1	48	1	48	0	0	0	0
	point51	51	214	48	1	48	1	48	0	0	0	0
	point52	52	214	48	1	48	1	48	0	0	0	0
	point53	53	214	48	1	48	1	48	0	0	0	0
	point54	54	214	48	1	48	1	48	0	0	0	0
	point55	55	214	48	1	48	1	48	0	0	0	0
	point56	56	214	48	1	48	1	48	0	0	0	0
	point57	57	214	48	1	48	1	48	0	0	0	0
	point58	58	214	48	1	48	1	48	0	0	0	0
	point59	59	214	48	1	48	1	48	0	0	0	0

	point60	60	214	48	1	48	1	48	0	0	0	0
	point61	61	214	48	1	48	1	48	0	0	0	0
	point62	62	214	48	1	48	1	48	0	0	0	0
	point63	63	214	48	1	48	1	48	0	0	0	0
	point64	64	214	48	1	48	1	48	0	0	0	0
	point65	65	214	48	1	48	1	48	0	0	0	0
	point66	66	214	48	1	48	1	48	0	0	0	0
	point67	67	214	48	1	48	1	48	0	0	0	0
	point68	68	214	48	1	48	1	48	0	0	0	0
	point69	69	214	48	1	48	1	48	0	0	0	0
	point70	70	214	48	1	48	1	48	0	0	0	0
	point71	71	214	48	1	48	1	48	0	0	0	0
	point72	72	214	48	1	48	1	48	0	0	0	0
	point73	73	214	48	1	48	1	48	0	0	0	0
	point74	74	214	48	1	48	1	48	0	0	0	0
	point75	75	214	48	1	48	1	48	0	0	0	0
	point76	76										
C Street EB	point77	77	214	48	1	48	1	48	0	0	0	0
	point78	78	214	48	1	48	1	48	0	0	0	0
	point79	79	214	48	1	48	1	48	0	0	0	0
	point80	80	214	48	1	48	1	48	0	0	0	0
	point81	81	214	48	1	48	1	48	0	0	0	0
	point82	82	214	48	1	48	1	48	0	0	0	0
	point83	83	214	48	1	48	1	48	0	0	0	0
	point84	84	214	48	1	48	1	48	0	0	0	0
	point85	85	214	48	1	48	1	48	0	0	0	0
	point86	86	214	48	1	48	1	48	0	0	0	0
	point87	87	214	48	1	48	1	48	0	0	0	0
	point88	88	214	48	1	48	1	48	0	0	0	0
	point89	89	214	48	1	48	1	48	0	0	0	0
	point90	90	214	48	1	48	1	48	0	0	0	0
	point91	91	214	48	1	48	1	48	0	0	0	0
	point92	92	214	48	1	48	1	48	0	0	0	0
	point93	93	214	48	1	48	1	48	0	0	0	0
	point94	94	214	48	1	48	1	48	0	0	0	0
	point95	95	214	48	1	48	1	48	0	0	0	0

	point96	96	214	48	1	48	1	48	0	0	0	0
	point97	97	214	48	1	48	1	48	0	0	0	0
	point98	98	214	48	1	48	1	48	0	0	0	0
	point99	99	214	48	1	48	1	48	0	0	0	0
	point100	100	214	48	1	48	1	48	0	0	0	0
	point101	101	214	48	1	48	1	48	0	0	0	0
	point102	102	214	48	1	48	1	48	0	0	0	0
	point103	103	214	48	1	48	1	48	0	0	0	0
	point104	104	214	48	1	48	1	48	0	0	0	0
	point105	105	214	48	1	48	1	48	0	0	0	0
	point106	106	214	48	1	48	1	48	0	0	0	0
	point107	107	214	48	1	48	1	48	0	0	0	0
	point108	108	214	48	1	48	1	48	0	0	0	0
	point109	109	214	48	1	48	1	48	0	0	0	0
	point110	110	214	48	1	48	1	48	0	0	0	0
	point111	111	214	48	1	48	1	48	0	0	0	0
	point112	112	214	48	1	48	1	48	0	0	0	0
	point113	113	214	48	1	48	1	48	0	0	0	0
	point114	114	214	48	1	48	1	48	0	0	0	0
	point115	115	214	48	1	48	1	48	0	0	0	0
	point116	116	214	48	1	48	1	48	0	0	0	0
	point117	117	214	48	1	48	1	48	0	0	0	0
	point118	118	214	48	1	48	1	48	0	0	0	0
	point119	119	214	48	1	48	1	48	0	0	0	0
	point120	120	214	48	1	48	1	48	0	0	0	0
	point121	121	214	48	1	48	1	48	0	0	0	0
	point122	122	214	48	1	48	1	48	0	0	0	0
	point123	123	214	48	1	48	1	48	0	0	0	0
	point124	124	214	48	1	48	1	48	0	0	0	0
	point125	125	214	48	1	48	1	48	0	0	0	0
	point126	126	214	48	1	48	1	48	0	0	0	0
	point127	127	214	48	1	48	1	48	0	0	0	0
	point128	128	214	48	1	48	1	48	0	0	0	0
	point129	129	214	48	1	48	1	48	0	0	0	0
	point130	130	214	48	1	48	1	48	0	0	0	0
	point131	131	214	48	1	48	1	48	0	0	0	0

		point132	132	214	48	1	48	1	48	0	0	0	0
		point133	133	214	48	1	48	1	48	0	0	0	0
		point134	134	214	48	1	48	1	48	0	0	0	0
		point135	135	214	48	1	48	1	48	0	0	0	0
		point136	136	214	48	1	48	1	48	0	0	0	0
		point137	137	214	48	1	48	1	48	0	0	0	0
		point138	138	214	48	1	48	1	48	0	0	0	0
		point139	139	214	48	1	48	1	48	0	0	0	0
		point140	140	214	48	1	48	1	48	0	0	0	0
		point141	141	214	48	1	48	1	48	0	0	0	0
		point142	142	214	48	1	48	1	48	0	0	0	0
		point143	143	214	48	1	48	1	48	0	0	0	0
		point144	144	214	48	1	48	1	48	0	0	0	0
		point145	145	214	48	1	48	1	48	0	0	0	0
		point146	146	214	48	1	48	1	48	0	0	0	0
		point147	147	214	48	1	48	1	48	0	0	0	0
		point148	148	214	48	1	48	1	48	0	0	0	0
		point149	149	214	48	1	48	1	48	0	0	0	0
		point150	150	214	48	1	48	1	48	0	0	0	0
		point151	151	214	48	1	48	1	48	0	0	0	0
		point152	152										
32nd Street NB		point153	153	23	40	0	0	0	0	0	0	0	0
		point154	154	23	40	0	0	0	0	0	0	0	0
		point155	155	23	40	0	0	0	0	0	0	0	0
		point156	156	23	40	0	0	0	0	0	0	0	0
		point157	157	23	40	0	0	0	0	0	0	0	0
		point158	158	23	40	0	0	0	0	0	0	0	0
		point159	159	23	40	0	0	0	0	0	0	0	0
		point160	160	23	40	0	0	0	0	0	0	0	0
		point161	161	23	40	0	0	0	0	0	0	0	0
		point162	162	23	40	0	0	0	0	0	0	0	0
		point163	163	23	40	0	0	0	0	0	0	0	0
		point164	164										
32nd Street SB		point179	179	23	40	0	0	0	0	0	0	0	0
		point180	180	23	40	0	0	0	0	0	0	0	0
		point181	181	23	40	0	0	0	0	0	0	0	0

	point182	182	23	40	0	0	0	0	0	0	0	0
	point183	183	23	40	0	0	0	0	0	0	0	0
	point184	184	23	40	0	0	0	0	0	0	0	0
	point185	185	23	40	0	0	0	0	0	0	0	0
	point186	186	23	40	0	0	0	0	0	0	0	0
	point187	187	23	40	0	0	0	0	0	0	0	0
	point188	188	23	40	0	0	0	0	0	0	0	0
	point189	189	23	40	0	0	0	0	0	0	0	0
	point190	190	23	40	0	0	0	0	0	0	0	0
	point191	191										
94 EB	point205	205	7007	105	249	105	59	105	0	0	0	0
	point206	206	7007	105	249	105	59	105	0	0	0	0
	point207	207	7007	105	249	105	59	105	0	0	0	0
	point208	208	7007	105	249	105	59	105	0	0	0	0
	point209	209	7007	105	249	105	59	105	0	0	0	0
	point210	210	7007	105	249	0 5	59	105	0	0	0	0
	point211	211	7007	105	249	105	59	105	0	0	0	0
	point212	212	7007	105	249	105	59	105	0	0	0	0
	point213	213	7007	105	249	105	59	105	0	0	0	0
	point214	214	7007	105	249	105	59	105	0	0	0	0
	point215	215	7007	105	249	105	59	105	0	0	0	0
	point216	216	7007	105	249	105	59	105	0	0	0	0
	point217	217	7007	105	249	105	59	105	0	0	0	0
	point218	218	7007	105	249	105	59	105	0	0	0	0
	point219	219	7007	105	249	105	59	105	0	0	0	0
	point220	220	7007	105	249	105	59	105	0	0	0	0
	point221	221	7007	105	249	105	59	105	0	0	0	0
	point222	222	7007	105	249	105	59	105	0	0	0	0
	point223	223	7007	105	249	105	59	105	0	0	0	0
	point224	224	7007	105	249	105	59	105	0	0	0	0
	point225	225	7007	105	249	105	59	105	0	0	0	0
	point226	226	7007	105	249	105	59	105	0	0	0	0
	point227	227	7007	105	249	105	59	105	0	0	0	0
	point228	228	7007	105	249	105	59	105	0	0	0	0
	point229	229	7007	105	249	105	59	105	0	0	0	0
	point230	230	7007	105	249	105	59	105	0	0	0	0

	point231	231	7007	105	249	105	59	105	0	0	0	0
	point232	232	7007	105	249	105	59	105	0	0	0	0
	point233	233	7007	105	249	105	59	105	0	0	0	0
	point234	234	7007	105	249	105	59	105	0	0	0	0
	point235	235	7007	105	249	105	59	105	0	0	0	0
	point236	236	7007	105	249	105	59	105	0	0	0	0
	point237	237	7007	105	249	105	59	105	0	0	0	0
	point238	238	7007	105	249	105	59	105	0	0	0	0
	point239	239	7007	105	249	105	59	105	0	0	0	0
	point240	240	7007	105	249	105	59	105	0	0	0	0
	point241	241	7007	105	249	105	59	105	0	0	0	0
	point242	242	7007	105	249	105	59	105	0	0	0	0
	point243	243	7007	105	249	105	59	105	0	0	0	0
	point244	244	7007	105	249	105	59	105	0	0	0	0
	point245	245	7007	105	249	105	59	105	0	0	0	0
	point246	246	7007	105	249	105	59	105	0	0	0	0
	point247	247	7007	105	249	105	59	105	0	0	0	0
	point248	248	7007	105	249	105	59	105	0	0	0	0
	point249	249	7007	105	249	105	59	105	0	0	0	0
	point250	250	7007	105	249	105	59	105	0	0	0	0
	point251	251	7007	105	249	105	59	105	0	0	0	0
	point252	252										
94 WB	point253	253	7007	105	249	105	59	105	0	0	0	0
	point254	254	7007	105	249	105	59	105	0	0	0	0
	point255	255	7007	105	249	105	59	105	0	0	0	0
	point256	256	7007	105	249	105	59	105	0	0	0	0
	point257	257	7007	105	249	105	59	105	0	0	0	0
	point258	258	7007	105	249	105	59	105	0	0	0	0
	point259	259	7007	105	249	105	59	105	0	0	0	0
	point260	260	7007	105	249	105	59	105	0	0	0	0
	point261	261	7007	105	249	105	59	105	0	0	0	0
	point262	262	7007	105	249	105	59	105	0	0	0	0
	point263	263	7007	105	249	105	59	105	0	0	0	0
	point264	264	7007	105	249	105	59	105	0	0	0	0
	point265	265	7007	105	249	105	59	105	0	0	0	0
	point266	266	7007	105	249	105	59	105	0	0	0	0

	point267	267	7007	105	249	105	59	105	0	0	0	0
	point268	268	7007	105	249	105	59	105	0	0	0	0
	point269	269	7007	105	249	105	59	105	0	0	0	0
	point270	270	7007	105	249	105	59	105	0	0	0	0
	point271	271	7007	105	249	105	59	105	0	0	0	0
	point272	272	7007	105	249	105	59	105	0	0	0	0
	point273	273	7007	105	249	105	59	105	0	0	0	0
	point274	274	7007	105	249	105	59	105	0	0	0	0
	point275	275	7007	105	249	105	59	105	0	0	0	0
	point276	276	7007	105	249	105	59	105	0	0	0	0
	point277	277	7007	105	249	105	59	105	0	0	0	0
	point278	278	7007	105	249	105	59	105	0	0	0	0
	point279	279	7007	105	249	105	59	105	0	0	0	0
	point280	280	7007	105	249	105	59	105	0	0	0	0
	point281	281	7007	105	249	105	59	105	0	0	0	0
	point282	282	7007	105	249	105	59	105	0	0	0	0
	point283	283	7007	105	249	105	59	105	0	0	0	0
	point284	284	7007	105	249	105	59	105	0	0	0	0
	point285	285	7007	105	249	105	59	105	0	0	0	0
	point286	286	7007	105	249	105	59	105	0	0	0	0
	point287	287	7007	105	249	105	59	105	0	0	0	0
	point288	288	7007	105	249	105	59	105	0	0	0	0
	point289	289	7007	105	249	105	59	105	0	0	0	0
	point290	290	7007	105	249	105	59	105	0	0	0	0
	point291	291	7007	105	249	105	59	105	0	0	0	0
	point292	292	7007	105	249	105	59	105	0	0	0	0
	point293	293	7007	105	249	105	59	105	0	0	0	0
	point294	294	7007	105	249	105	59	105	0	0	0	0
	point295	295	7007	105	249	105	59	105	0	0	0	0
	point296	296	7007	105	249	105	59	105	0	0	0	0
	point297	297	7007	105	249	105	59	105	0	0	0	0
	point298	298	7007	105	249	105	59	105	0	0	0	0
	point299	299										
94 WB Ramp Off	point300	300	793	89	28	89	7	89	0	0	0	0
	point301	301	793	89	28	89	7	89	0	0	0	0
	point302	302	793	89	28	89	7	89	0	0	0	0

	point303	303	793	89	28	89	7	89	0	0	0	0
	point304	304	793	89	28	89	7	89	0	0	0	0
	point305	305	793	89	28	89	7	89	0	0	0	0
	point306	306	793	89	28	89	7	89	0	0	0	0
	point307	307	793	89	28	89	7	89	0	0	0	0
	point308	308	793	89	28	89	7	89	0	0	0	0
	point309	309	793	89	28	89	7	89	0	0	0	0
	point310	310	793	89	28	89	7	89	0	0	0	0
	point311	311										
94 WB Ramp On	point312	312	167	48	6	48	1	48	0	0	0	0
	point313	313	167	48	6	48	1	48	0	0	0	0
	point314	314	167	48	6	48	1	48	0	0	0	0
	point315	315	167	48	6	48	1	48	0	0	0	0
	point316	316	167	48	6	48	1	48	0	0	0	0
	point317	317	167	48	6	48	1	48	0	0	0	0
	point318	318										
32nd Street NB-2	point327	327	23	40	0	0	0	0	0	0	0	0
	point165	165	23	40	0	0	0	0	0	0	0	0
	point166	166	23	40	0	0	0	0	0	0	0	0
	point167	167	23	40	0	0	0	0	0	0	0	0
	point168	168	23	40	0	0	0	0	0	0	0	0
	point169	169	23	40	0	0	0	0	0	0	0	0
	point170	170	23	40	0	0	0	0	0	0	0	0
	point171	171	23	40	0	0	0	0	0	0	0	0
	point172	172	23	40	0	0	0	0	0	0	0	0
	point173	173	23	40	0	0	0	0	0	0	0	0
	point174	174	23	40	0	0	0	0	0	0	0	0
	point175	175	23	40	0	0	0	0	0	0	0	0
	point176	176	23	40	0	0	0	0	0	0	0	0
	point177	177	23	40	0	0	0	0	0	0	0	0
	point178	178										
32nd Street SB-2	point328	328	23	40	0	0	0	0	0	0	0	0
	point192	192	23	40	0	0	0	0	0	0	0	0
	point193	193	23	40	0	0	0	0	0	0	0	0
	point194	194	23	40	0	0	0	0	0	0	0	0
	point195	195	23	40	0	0	0	0	0	0	0	0

		point196	196	23	40	0	0	0	0	0	0	0	0
		point197	197	23	40	0	0	0	0	0	0	0	0
		point198	198	23	40	0	0	0	0	0	0	0	0
		point199	199	23	40	0	0	0	0	0	0	0	0
		point200	200	23	40	0	0	0	0	0	0	0	0
		point201	201	23	40	0	0	0	0	0	0	0	0
		point202	202	23	40	0	0	0	0	0	0	0	0
		point203	203	23	40	0	0	0	0	0	0	0	0
		point204	204										

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **B80709N1**
RUN: **Current**

Receiver											
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**				**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**	**Calc.**
			m	m	m	m	dBA	dBA	dB	dB	
1	3	1	560.0	476.0	55.21	1.52	0.00	66	10.0	8.0	Y
2	4	1	559.9	468.9	55.10	1.52	0.00	66	10.0	8.0	Y
3	5	1	560.0	461.9	54.86	1.52	0.00	66	10.0	8.0	Y
4	6	1	560.0	455.1	54.86	1.52	0.00	66	10.0	8.0	Y
5	7	1	560.1	448.0	54.86	1.52	0.00	66	10.0	8.0	Y
6	8	1	559.9	441.1	54.86	1.52	0.00	66	10.0	8.0	Y
7	9	1	559.9	434.3	54.35	1.52	0.00	66	10.0	8.0	Y
8	10	1	559.9	427.1	53.43	1.52	0.00	66	10.0	8.0	Y
9	11	1	567.0	476.2	54.18	1.52	0.00	66	10.0	8.0	Y
10	12	1	567.1	468.9	54.35	1.52	0.00	66	10.0	8.0	Y
11	13	1	567.2	462.1	54.28	1.52	0.00	66	10.0	8.0	Y
12	14	1	567.0	454.9	54.24	1.52	0.00	66	10.0	8.0	Y
13	15	1	566.9	448.0	54.20	1.52	0.00	66	10.0	8.0	Y
14	16	1	567.0	440.9	54.04	1.52	0.00	66	10.0	8.0	Y
15	17	1	566.9	434.0	53.67	1.52	0.00	66	10.0	8.0	Y
16	18	1	566.9	427.3	52.99	1.52	0.00	66	10.0	8.0	Y
17	19	1	574.0	476.0	53.27	1.52	0.00	66	10.0	8.0	Y
18	20	1	574.2	468.8	53.50	1.52	0.00	66	10.0	8.0	Y
19	21	1	574.1	462.1	53.46	1.52	0.00	66	10.0	8.0	Y
20	22	1	574.1	454.9	53.40	1.52	0.00	66	10.0	8.0	Y
21	23	1	574.1	448.2	53.34	1.52	0.00	66	10.0	8.0	Y
22	24	1	573.8	441.2	53.03	1.52	0.00	66	10.0	8.0	Y

23	25	1	574.1	434.0	52.59	1.52	0.00	66	10.0	8.0	Y
24	26	1	574.2	427.0	52.19	1.52	0.00	66	10.0	8.0	Y
25	27	1	581.0	476.0	52.44	1.52	0.00	66	10.0	8.0	Y
26	28	1	581.0	469.1	52.69	1.52	0.00	66	10.0	8.0	Y
27	29	1	581.0	462.1	52.63	1.52	0.00	66	10.0	8.0	Y
28	30	1	580.9	455.0	52.58	1.52	0.00	66	10.0	8.0	Y
29	31	1	581.2	447.8	52.28	1.52	0.00	66	10.0	8.0	Y
30	32	1	581.0	440.9	51.93	1.52	0.00	66	10.0	8.0	Y
31	33	1	581.0	433.9	51.54	1.52	0.00	66	10.0	8.0	Y
32	34	1	581.0	427.1	51.16	1.52	0.00	66	10.0	8.0	Y
33	35	1	587.9	476.0	51.63	1.52	0.00	66	10.0	8.0	Y
34	36	1	587.9	468.7	51.85	1.52	0.00	66	10.0	8.0	Y
35	37	1	587.8	462.0	51.81	1.52	0.00	66	10.0	8.0	Y
36	38	1	588.0	455.0	51.64	1.52	0.00	66	10.0	8.0	Y
37	39	1	588.0	448.0	51.26	1.52	0.00	66	10.0	8.0	Y
38	40	1	587.9	441.2	50.90	1.52	0.00	66	10.0	8.0	Y
39	41	1	587.8	434.2	50.52	1.52	0.00	66	10.0	8.0	Y
40	42	1	587.9	427.2	50.12	1.52	0.00	66	10.0	8.0	Y
41	43	1	594.8	476.0	50.83	1.52	0.00	66	10.0	8.0	Y
42	44	1	595.0	468.8	51.01	1.52	0.00	66	10.0	8.0	Y
43	45	1	595.0	462.0	50.95	1.52	0.00	66	10.0	8.0	Y
44	46	1	595.1	455.1	50.59	1.52	0.00	66	10.0	8.0	Y
45	47	1	594.8	447.8	50.23	1.52	0.00	66	10.0	8.0	Y
46	48	1	595.3	441.2	49.78	1.52	0.00	66	10.0	8.0	Y
47	49	1	594.8	434.2	49.47	1.52	0.00	66	10.0	8.0	Y
48	50	1	594.7	426.8	49.08	1.52	0.00	66	10.0	8.0	Y
49	51	1	602.2	476.0	49.95	1.52	0.00	66	10.0	8.0	Y
50	52	1	601.9	469.0	50.18	1.52	0.00	66	10.0	8.0	Y
51	53	1	602.0	462.1	49.93	1.52	0.00	66	10.0	8.0	Y
52	54	1	602.1	454.9	49.50	1.52	0.00	66	10.0	8.0	Y
53	55	1	602.1	447.9	49.13	1.52	0.00	66	10.0	8.0	Y
54	56	1	602.0	440.7	48.77	1.52	0.00	66	10.0	8.0	Y
55	57	1	602.0	433.9	48.77	1.52	0.00	66	10.0	8.0	Y
56	58	1	601.9	426.9	48.77	1.52	0.00	66	10.0	8.0	Y
57	59	1	609.0	475.8	49.19	1.52	0.00	66	10.0	8.0	Y
58	60	1	609.0	469.1	49.26	1.52	0.00	66	10.0	8.0	Y

59	61	1	609.0	462.0	48.87	1.52	0.00	66	10.0	8.0	Y
60	62	1	609.1	454.9	48.77	1.52	0.00	66	10.0	8.0	Y
61	63	1	609.0	447.9	48.77	1.52	0.00	66	10.0	8.0	Y
62	64	1	608.9	440.9	48.77	1.52	0.00	66	10.0	8.0	Y
63	65	1	609.1	433.8	48.77	1.52	0.00	66	10.0	8.0	Y
64	66	1	609.0	427.3	48.77	1.52	0.00	66	10.0	8.0	Y
65	67	1	615.9	476.0	48.22	1.52	0.00	66	10.0	8.0	Y
66	68	1	616.0	468.9	48.77	1.52	0.00	66	10.0	8.0	Y
67	69	1	616.0	461.9	48.77	1.52	0.00	66	10.0	8.0	Y
68	70	1	616.1	455.1	48.77	1.52	0.00	66	10.0	8.0	Y
69	71	1	616.2	448.0	48.77	1.52	0.00	66	10.0	8.0	Y
70	72	1	616.1	441.1	48.77	1.52	0.00	66	10.0	8.0	Y
71	73	1	616.1	433.8	48.77	1.52	0.00	66	10.0	8.0	Y
72	74	1	616.1	427.3	48.77	1.52	0.00	66	10.0	8.0	Y
73	75	1	623.1	476.0	47.68	1.52	0.00	66	10.0	8.0	Y
74	76	1	623.1	469.0	48.77	1.52	0.00	66	10.0	8.0	Y
75	77	1	622.9	461.9	48.77	1.52	0.00	66	10.0	8.0	Y
76	78	1	623.0	454.9	48.77	1.52	0.00	66	10.0	8.0	Y
77	79	1	623.0	447.8	48.77	1.52	0.00	66	10.0	8.0	Y
78	80	1	623.1	440.9	48.77	1.52	0.00	66	10.0	8.0	Y
79	81	1	623.1	433.9	48.77	1.52	0.00	66	10.0	8.0	Y
80	82	1	622.9	426.9	48.77	1.52	0.00	66	10.0	8.0	Y
81	83	1	630.1	475.9	47.29	1.52	0.00	66	10.0	8.0	Y
82	84	1	630.0	468.9	48.77	1.52	0.00	66	10.0	8.0	Y
83	85	1	630.1	461.8	48.77	1.52	0.00	66	10.0	8.0	Y
84	86	1	630.0	455.3	48.77	1.52	0.00	66	10.0	8.0	Y
85	87	1	630.0	448.2	48.77	1.52	0.00	66	10.0	8.0	Y
86	88	1	630.2	441.1	48.77	1.52	0.00	66	10.0	8.0	Y
87	89	1	630.2	434.0	48.77	1.52	0.00	66	10.0	8.0	Y
88	90	1	629.9	427.0	48.77	1.52	0.00	66	10.0	8.0	Y
89	91	1	636.9	475.9	46.84	1.52	0.00	66	10.0	8.0	Y
90	92	1	637.0	468.9	48.59	1.52	0.00	66	10.0	8.0	Y
91	93	1	637.1	461.9	48.77	1.52	0.00	66	10.0	8.0	Y
92	94	1	637.0	454.9	48.77	1.52	0.00	66	10.0	8.0	Y
93	3	1	637.1	447.9	48.77	1.52	0.00	66	10.0	8.0	Y
94	95	1	636.9	441.1	48.77	1.52	0.00	66	10.0	8.0	Y

95	96	1	637.1	433.9	48.77	1.52	0.00	66	10.0	8.0	Y
96	97	1	636.8	427.0	48.77	1.52	0.00	66	10.0	8.0	Y
97	98	1	643.9	476.1	44.40	1.52	0.00	66	10.0	8.0	Y
98	99	1	643.6	469.2	45.86	1.52	0.00	66	10.0	8.0	Y
99	100	1	644.0	461.8	46.53	1.52	0.00	66	10.0	8.0	Y
100	101	1	644.0	454.8	46.63	1.52	0.00	66	10.0	8.0	Y
101	102	1	643.6	447.9	46.86	1.52	0.00	66	10.0	8.0	Y
102	103	1	643.9	441.0	46.80	1.52	0.00	66	10.0	8.0	Y
103	104	1	644.0	434.1	46.79	1.52	0.00	66	10.0	8.0	Y
104	105	1	644.0	427.1	46.85	1.52	0.00	66	10.0	8.0	Y
105	106	1	651.0	475.9	42.55	1.52	0.00	66	10.0	8.0	Y
106	107	1	650.9	469.2	42.47	1.52	0.00	66	10.0	8.0	Y
107	108	1	650.8	462.0	42.65	1.52	0.00	66	10.0	8.0	Y
108	109	1	651.0	454.8	43.29	1.52	0.00	66	10.0	8.0	Y
109	110	1	650.9	447.8	43.65	1.52	0.00	66	10.0	8.0	Y
110	111	1	650.9	440.9	43.70	1.52	0.00	66	10.0	8.0	Y
111	112	1	650.9	434.0	43.75	1.52	0.00	66	10.0	8.0	Y
112	114	1	650.9	426.9	43.81	1.52	0.00	66	10.0	8.0	Y

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **B80709N1**
RUN: **Current**
BARRIER DESIGN: **INPUT HEIGHTS**

ATMOSPHERICS: **20 deg C, 50% RH**

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver

Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1	3	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
2	4	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
3	5	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
4	6	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
5	7	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
6	8	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
7	9	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
8	10	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
9	11	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
10	12	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
11	13	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
12	14	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
13	15	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
14	16	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
15	17	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
16	18	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
17	19	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
18	20	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
19	21	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0
20	22	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
21	23	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
22	24	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
23	25	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
24	26	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0

25	27	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
26	28	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
27	29	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
28	30	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
29	31	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
30	32	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
31	33	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
32	34	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
33	35	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
34	36	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
35	37	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
36	38	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
37	39	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
38	40	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
39	41	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
40	42	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
41	43	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
42	44	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
43	45	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
44	46	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
45	47	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
46	48	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
47	49	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
48	50	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
49	51	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
50	52	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
51	53	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
52	54	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
53	55	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
54	56	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
55	57	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
56	58	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
57	59	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
58	60	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
59	61	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
60	62	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
61	63	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
62	64	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
63	65	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
64	66	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
65	67	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0

66	68	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
67	69	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
68	70	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
69	71	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
70	72	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
71	73	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
72	74	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
73	75	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
74	76	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
75	77	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
76	78	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
77	79	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
78	80	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
79	81	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
80	82	1	0.0	69.7	66	69.7	10	Snd Lvl	69.7	0.0	8	-8.0
81	83	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
82	84	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0
83	85	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
84	86	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
85	87	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
86	88	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
87	89	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
88	90	1	0.0	70.1	66	70.1	10	Snd Lvl	70.1	0.0	8	-8.0
89	91	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
90	92	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
91	93	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
92	94	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
93	3	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
94	95	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
95	96	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
96	97	1	0.0	70.4	66	70.4	10	Snd Lvl	70.4	0.0	8	-8.0
97	98	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
98	99	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
99	100	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
100	101	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
101	102	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
102	103	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
103	104	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
104	105	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
105	106	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
106	107	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0

107	108	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
108	109	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
109	110	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
110	111	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
111	112	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
112	114	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	112	0.0	0.0	0.0
All Impacted	87	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B80709N1**
RUN: **Future**

Roadway	**Points**											
Name	**Name**	**No.**	**Segment**									
			Autos		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
C Street WB	point1	1	387	48	2	48	2	48	0	0	0	0
	point2	2	387	48	2	48	2	48	0	0	0	0
	point3	3	387	48	2	48	2	48	0	0	0	0
	point4	4	387	48	2	48	2	48	0	0	0	0
	point5	5	387	48	2	48	2	48	0	0	0	0
	point6	6	387	48	2	48	2	48	0	0	0	0
	point7	7	387	48	2	48	2	48	0	0	0	0
	point8	8	387	48	2	48	2	48	0	0	0	0
	point9	9	387	48	2	48	2	48	0	0	0	0
	point10	10	387	48	2	48	2	48	0	0	0	0
	point11	11	387	48	2	48	2	48	0	0	0	0
	point12	12	387	48	2	48	2	48	0	0	0	0
	point13	13	387	48	2	48	2	48	0	0	0	0
	point14	14	387	48	2	48	2	48	0	0	0	0
	point15	15	387	48	2	48	2	48	0	0	0	0
	point16	16	387	48	2	48	2	48	0	0	0	0
	point17	17	387	48	2	48	2	48	0	0	0	0
	point18	18	387	48	2	48	2	48	0	0	0	0
	point19	19	387	48	2	48	2	48	0	0	0	0
	point20	20	387	48	2	48	2	48	0	0	0	0
	point21	21	387	48	2	48	2	48	0	0	0	0
	point22	22	387	48	2	48	2	48	0	0	0	0
	point23	23	387	48	2	48	2	48	0	0	0	0

		point24	24	387	48	2	48	2	48	0	0	0	0
		point25	25	387	48	2	48	2	48	0	0	0	0
		point26	26	387	48	2	48	2	48	0	0	0	0
		point27	27	387	48	2	48	2	48	0	0	0	0
		point28	28	387	48	2	48	2	48	0	0	0	0
		point29	29	387	48	2	48	2	48	0	0	0	0
		point30	30	387	48	2	48	2	48	0	0	0	0
		point31	31	387	48	2	48	2	48	0	0	0	0
		point32	32	387	48	2	48	2	48	0	0	0	0
		point33	33	387	48	2	48	2	48	0	0	0	0
		point34	34	387	48	2	48	2	48	0	0	0	0
		point35	35	387	48	2	48	2	48	0	0	0	0
		point36	36	387	48	2	48	2	48	0	0	0	0
		point37	37	387	48	2	48	2	48	0	0	0	0
		point38	38	387	48	2	48	2	48	0	0	0	0
		point39	39	387	48	2	48	2	48	0	0	0	0
		point40	40	387	48	2	48	2	48	0	0	0	0
		point41	41	387	48	2	48	2	48	0	0	0	0
		point42	42	387	48	2	48	2	48	0	0	0	0
		point43	43	387	48	2	48	2	48	0	0	0	0
		point44	44	387	48	2	48	2	48	0	0	0	0
		point45	45	387	48	2	48	2	48	0	0	0	0
		point46	46	387	48	2	48	2	48	0	0	0	0
		point47	47	387	48	2	48	2	48	0	0	0	0
		point48	48	387	48	2	48	2	48	0	0	0	0
		point49	49	387	48	2	48	2	48	0	0	0	0
		point50	50	387	48	2	48	2	48	0	0	0	0
		point51	51	387	48	2	48	2	48	0	0	0	0
		point52	52	387	48	2	48	2	48	0	0	0	0
		point53	53	387	48	2	48	2	48	0	0	0	0
		point54	54	387	48	2	48	2	48	0	0	0	0
		point55	55	387	48	2	48	2	48	0	0	0	0
		point56	56	387	48	2	48	2	48	0	0	0	0
		point57	57	387	48	2	48	2	48	0	0	0	0
		point58	58	387	48	2	48	2	48	0	0	0	0
		point59	59	387	48	2	48	2	48	0	0	0	0

	point60	60	387	48	2	48	2	48	0	0	0	0
	point61	61	387	48	2	48	2	48	0	0	0	0
	point62	62	387	48	2	48	2	48	0	0	0	0
	point63	63	387	48	2	48	2	48	0	0	0	0
	point64	64	387	48	2	48	2	48	0	0	0	0
	point65	65	387	48	2	48	2	48	0	0	0	0
	point66	66	387	48	2	48	2	48	0	0	0	0
	point67	67	387	48	2	48	2	48	0	0	0	0
	point68	68	387	48	2	48	2	48	0	0	0	0
	point69	69	387	48	2	48	2	48	0	0	0	0
	point70	70	387	48	2	48	2	48	0	0	0	0
	point71	71	387	48	2	48	2	48	0	0	0	0
	point72	72	387	48	2	48	2	48	0	0	0	0
	point73	73	387	48	2	48	2	48	0	0	0	0
	point74	74	387	48	2	48	2	48	0	0	0	0
	point75	75	387	48	2	48	2	48	0	0	0	0
	point76	76										
C Street EB	point77	77	387	48	2	48	2	48	0	0	0	0
	point78	78	387	48	2	48	2	48	0	0	0	0
	point79	79	387	48	2	48	2	48	0	0	0	0
	point80	80	387	48	2	48	2	48	0	0	0	0
	point81	81	387	48	2	48	2	48	0	0	0	0
	point82	82	387	48	2	48	2	48	0	0	0	0
	point83	83	387	48	2	48	2	48	0	0	0	0
	point84	84	387	48	2	48	2	48	0	0	0	0
	point85	85	387	48	2	48	2	48	0	0	0	0
	point86	86	387	48	2	48	2	48	0	0	0	0
	point87	87	387	48	2	48	2	48	0	0	0	0
	point88	88	387	48	2	48	2	48	0	0	0	0
	point89	89	387	48	2	48	2	48	0	0	0	0
	point90	90	387	48	2	48	2	48	0	0	0	0
	point91	91	387	48	2	48	2	48	0	0	0	0
	point92	92	387	48	2	48	2	48	0	0	0	0
	point93	93	387	48	2	48	2	48	0	0	0	0
	point94	94	387	48	2	48	2	48	0	0	0	0
	point95	95	387	48	2	48	2	48	0	0	0	0

	point96	96	387	48	2	48	2	48	0	0	0	0
	point97	97	387	48	2	48	2	48	0	0	0	0
	point98	98	387	48	2	48	2	48	0	0	0	0
	point99	99	387	48	2	48	2	48	0	0	0	0
	point100	100	387	48	2	48	2	48	0	0	0	0
	point101	101	387	48	2	48	2	48	0	0	0	0
	point102	102	387	48	2	48	2	48	0	0	0	0
	point103	103	387	48	2	48	2	48	0	0	0	0
	point104	104	387	48	2	48	2	48	0	0	0	0
	point105	105	387	48	2	48	2	48	0	0	0	0
	point106	106	387	48	2	48	2	48	0	0	0	0
	point107	107	387	48	2	48	2	48	0	0	0	0
	point108	108	387	48	2	48	2	48	0	0	0	0
	point109	109	387	48	2	48	2	48	0	0	0	0
	point110	110	387	48	2	48	2	48	0	0	0	0
	point111	111	387	48	2	48	2	48	0	0	0	0
	point112	112	387	48	2	48	2	48	0	0	0	0
	point113	113	387	48	2	48	2	48	0	0	0	0
	point114	114	387	48	2	48	2	48	0	0	0	0
	point115	115	387	48	2	48	2	48	0	0	0	0
	point116	116	387	48	2	48	2	48	0	0	0	0
	point117	117	387	48	2	48	2	48	0	0	0	0
	point118	118	387	48	2	48	2	48	0	0	0	0
	point119	119	387	48	2	48	2	48	0	0	0	0
	point120	120	387	48	2	48	2	48	0	0	0	0
	point121	121	387	48	2	48	2	48	0	0	0	0
	point122	122	387	48	2	48	2	48	0	0	0	0
	point123	123	387	48	2	48	2	48	0	0	0	0
	point124	124	387	48	2	48	2	48	0	0	0	0
	point125	125	387	48	2	48	2	48	0	0	0	0
	point126	126	387	48	2	48	2	48	0	0	0	0
	point127	127	387	48	2	48	2	48	0	0	0	0
	point128	128	387	48	2	48	2	48	0	0	0	0
	point129	129	387	48	2	48	2	48	0	0	0	0
	point130	130	387	48	2	48	2	48	0	0	0	0
	point131	131	387	48	2	48	2	48	0	0	0	0

	point132	132	387	48	2	48	2	48	0	0	0	0
	point133	133	387	48	2	48	2	48	0	0	0	0
	point134	134	387	48	2	48	2	48	0	0	0	0
	point135	135	387	48	2	48	2	48	0	0	0	0
	point136	136	387	48	2	48	2	48	0	0	0	0
	point137	137	387	48	2	48	2	48	0	0	0	0
	point138	138	387	48	2	48	2	48	0	0	0	0
	point139	139	387	48	2	48	2	48	0	0	0	0
	point140	140	387	48	2	48	2	48	0	0	0	0
	point141	141	387	48	2	48	2	48	0	0	0	0
	point142	142	387	48	2	48	2	48	0	0	0	0
	point143	143	387	48	2	48	2	48	0	0	0	0
	point144	144	387	48	2	48	2	48	0	0	0	0
	point145	145	387	48	2	48	2	48	0	0	0	0
	point146	146	387	48	2	48	2	48	0	0	0	0
	point147	147	387	48	2	48	2	48	0	0	0	0
	point148	148	387	48	2	48	2	48	0	0	0	0
	point149	149	387	48	2	48	2	48	0	0	0	0
	point150	150	387	48	2	48	2	48	0	0	0	0
	point151	151	387	48	2	48	2	48	0	0	0	0
	point152	152										
32nd Street NB	point153	153	46	40	0	0	0	0	0	0	0	0
	point154	154	46	40	0	0	0	0	0	0	0	0
	point155	155	46	40	0	0	0	0	0	0	0	0
	point156	156	46	40	0	0	0	0	0	0	0	0
	point157	157	46	40	0	0	0	0	0	0	0	0
	point158	158	46	40	0	0	0	0	0	0	0	0
	point159	159	46	40	0	0	0	0	0	0	0	0
	point160	160	46	40	0	0	0	0	0	0	0	0
	point161	161	46	40	0	0	0	0	0	0	0	0
	point162	162	46	40	0	0	0	0	0	0	0	0
	point163	163	46	40	0	0	0	0	0	0	0	0
	point164	164										
32nd Street SB	point179	179	46	40	0	0	0	0	0	0	0	0
	point180	180	46	40	0	0	0	0	0	0	0	0
	point181	181	46	40	0	0	0	0	0	0	0	0

	point182	182	46	40	0	0	0	0	0	0	0	0
	point183	183	46	40	0	0	0	0	0	0	0	0
	point184	184	46	40	0	0	0	0	0	0	0	0
	point185	185	46	40	0	0	0	0	0	0	0	0
	point186	186	46	40	0	0	0	0	0	0	0	0
	point187	187	46	40	0	0	0	0	0	0	0	0
	point188	188	46	40	0	0	0	0	0	0	0	0
	point189	189	46	40	0	0	0	0	0	0	0	0
	point190	190	46	40	0	0	0	0	0	0	0	0
	point191	191										
94 EB	point205	205	8346	105	296	105	70	105	0	0	0	0
	point206	206	8346	105	296	105	70	105	0	0	0	0
	point207	207	8346	105	0 5	105	70	105	0	0	0	0
	point208	208	8346	105	296	105	70	105	0	0	0	0
	point209	209	8346	105	296	105	70	105	0	0	0	0
	point210	210	8346	105	296	105	70	105	0	0	0	0
	point211	211	8346	105	296	105	70	105	0	0	0	0
	point212	212	8346	105	296	105	70	105	0	0	0	0
	point213	213	8346	105	296	105	70	105	0	0	0	0
	point214	214	8346	105	296	105	70	105	0	0	0	0
	point215	215	8346	105	296	105	70	105	0	0	0	0
	point216	216	8346	105	296	105	70	105	0	0	0	0
	point217	217	8346	105	296	105	70	105	0	0	0	0
	point218	218	8346	105	296	105	70	105	0	0	0	0
	point219	219	8346	105	296	105	70	105	0	0	0	0
	point220	220	8346	105	296	105	70	105	0	0	0	0
	point221	221	8346	105	296	105	70	105	0	0	0	0
	point222	222	8346	105	296	105	70	105	0	0	0	0
	point223	223	8346	105	296	105	70	105	0	0	0	0
	point224	224	8346	105	296	105	70	105	0	0	0	0
	point225	225	8346	105	296	105	70	105	0	0	0	0
	point226	226	8346	105	296	105	70	105	0	0	0	0
	point227	227	8346	105	296	105	70	105	0	0	0	0
	point228	228	8346	105	296	105	70	105	0	0	0	0
	point229	229	8346	105	296	105	70	105	0	0	0	0
	point230	230	8346	105	296	105	70	105	0	0	0	0

	point231	231	8346	105	296	105	70	105	0	0	0	0
	point232	232	8346	105	296	105	70	105	0	0	0	0
	point233	233	8346	105	296	105	70	105	0	0	0	0
	point234	234	8346	105	296	105	70	105	0	0	0	0
	point235	235	8346	105	296	105	70	105	0	0	0	0
	point236	236	8346	105	296	105	70	105	0	0	0	0
	point237	237	8346	105	296	105	70	105	0	0	0	0
	point238	238	8346	105	296	105	70	105	0	0	0	0
	point239	239	8346	105	296	105	70	105	0	0	0	0
	point240	240	8346	105	296	105	70	105	0	0	0	0
	point241	241	8346	105	296	105	70	105	0	0	0	0
	point242	242	8346	105	296	105	70	105	0	0	0	0
	point243	243	8346	105	296	105	70	105	0	0	0	0
	point244	244	8346	105	296	105	70	105	0	0	0	0
	point245	245	8346	105	296	105	70	105	0	0	0	0
	point246	246	8346	105	296	105	70	105	0	0	0	0
	point247	247	8346	105	296	105	70	105	0	0	0	0
	point248	248	8346	105	296	105	70	105	0	0	0	0
	point249	249	8346	105	296	105	70	105	0	0	0	0
	point250	250	8346	105	296	105	70	105	0	0	0	0
	point251	251	8346	105	296	105	70	105	0	0	0	0
	point252	252										
94 WB	point253	253	7192	105	255	105	60	105	0	0	0	0
	point254	254	7192	105	255	105	60	105	0	0	0	0
	point255	255	7192	105	255	105	60	105	0	0	0	0
	point256	256	7192	105	255	105	60	105	0	0	0	0
	point257	257	7192	105	255	105	60	105	0	0	0	0
	point258	258	7192	105	255	105	60	105	0	0	0	0
	point259	259	7192	105	255	105	60	105	0	0	0	0
	point260	260	7192	105	255	105	60	105	0	0	0	0
	point261	261	7192	105	255	105	60	105	0	0	0	0
	point262	262	7192	105	255	105	60	105	0	0	0	0
	point263	263	7192	105	255	105	60	105	0	0	0	0
	point264	264	7192	105	255	105	60	105	0	0	0	0
	point265	265	7192	105	255	105	60	105	0	0	0	0
	point266	266	7192	105	255	105	60	105	0	0	0	0

	point267	267	7192	105	255	105	60	105	0	0	0	0
	point268	268	7192	105	255	105	60	105	0	0	0	0
	point269	269	7192	105	255	105	60	105	0	0	0	0
	point270	270	7192	105	255	105	60	105	0	0	0	0
	point271	271	7192	105	255	105	60	105	0	0	0	0
	point272	272	7192	105	255	105	60	105	0	0	0	0
	point273	273	7192	105	255	105	60	105	0	0	0	0
	point274	274	7192	105	255	105	60	105	0	0	0	0
	point275	275	7192	105	255	105	60	105	0	0	0	0
	point276	276	7192	105	255	105	60	105	0	0	0	0
	point277	277	7192	105	255	105	60	105	0	0	0	0
	point278	278	7192	105	255	105	60	105	0	0	0	0
	point279	279	7192	105	255	105	60	105	0	0	0	0
	point280	280	7192	105	255	105	60	105	0	0	0	0
	point281	281	7192	105	255	105	60	105	0	0	0	0
	point282	282	7192	105	255	105	60	105	0	0	0	0
	point283	283	7192	105	255	105	60	105	0	0	0	0
	point284	284	7192	105	255	105	60	105	0	0	0	0
	point285	285	7192	105	255	105	60	105	0	0	0	0
	point286	286	7192	105	255	105	60	105	0	0	0	0
	point287	287	7192	105	255	105	60	105	0	0	0	0
	point288	288	7192	105	255	105	60	105	0	0	0	0
	point289	289	7192	105	255	105	60	105	0	0	0	0
	point290	290	7192	105	255	105	60	105	0	0	0	0
	point291	291	7192	105	255	105	60	105	0	0	0	0
	point292	292	7192	105	255	105	60	105	0	0	0	0
	point293	293	7192	105	255	105	60	105	0	0	0	0
	point294	294	7192	105	255	105	60	105	0	0	0	0
	point295	295	7192	105	255	105	60	105	0	0	0	0
	point296	296	7192	105	255	105	60	105	0	0	0	0
	point297	297	7192	105	255	105	60	105	0	0	0	0
	point298	298	7192	105	255	105	60	105	0	0	0	0
	point299	299										
94 WB Ramp Off	point300	300	529	89	19	89	4	89	0	0	0	0
	point301	301	529	89	19	89	4	89	0	0	0	0
	point302	302	529	89	19	89	4	89	0	0	0	0

	point303	303	529	89	19	89	4	89	0	0	0	0
	point304	304	529	89	19	89	4	89	0	0	0	0
	point305	305	529	89	19	89	4	89	0	0	0	0
	point306	306	529	89	19	89	4	89	0	0	0	0
	point307	307	529	89	19	89	4	89	0	0	0	0
	point308	308	529	89	19	89	4	89	0	0	0	0
	point309	309	529	89	19	89	4	89	0	0	0	0
	point310	310	529	89	19	89	4	89	0	0	0	0
	point311	311										
94 WB Ramp On	point312	312	238	48	8	48	2	48	0	0	0	0
	point313	313	238	48	8	48	2	48	0	0	0	0
	point314	314	238	48	8	48	2	48	0	0	0	0
	point315	315	238	48	8	48	2	48	0	0	0	0
	point316	316	238	48	8	48	2	48	0	0	0	0
	point317	317	238	48	8	48	2	48	0	0	0	0
	point318	318										
32nd Street NB-2	point327	327	46	40	0	0	0	0	0	0	0	0
	point165	165	46	40	0	0	0	0	0	0	0	0
	point166	166	46	40	0	0	0	0	0	0	0	0
	point167	167	46	40	0	0	0	0	0	0	0	0
	point168	168	46	40	0	0	0	0	0	0	0	0
	point169	169	46	40	0	0	0	0	0	0	0	0
	point170	170	46	40	0	0	0	0	0	0	0	0
	point171	171	46	40	0	0	0	0	0	0	0	0
	point172	172	46	40	0	0	0	0	0	0	0	0
	point173	173	46	40	0	0	0	0	0	0	0	0
	point174	174	46	40	0	0	0	0	0	0	0	0
	point175	175	46	40	0	0	0	0	0	0	0	0
	point176	176	46	40	0	0	0	0	0	0	0	0
	point177	177	46	40	0	0	0	0	0	0	0	0
	point178	178										
32nd Street SB-2	point328	328	46	40	0	0	0	0	0	0	0	0
	point192	192	46	40	0	0	0	0	0	0	0	0
	point193	193	46	40	0	0	0	0	0	0	0	0
	point194	194	46	40	0	0	0	0	0	0	0	0
	point195	195	46	40	0	0	0	0	0	0	0	0

		point196	196	46	40	0	0	0	0	0	0	0	0
		point197	197	46	40	0	0	0	0	0	0	0	0
		point198	198	46	40	0	0	0	0	0	0	0	0
		point199	199	46	40	0	0	0	0	0	0	0	0
		point200	200	46	40	0	0	0	0	0	0	0	0
		point201	201	46	40	0	0	0	0	0	0	0	0
		point202	202	46	40	0	0	0	0	0	0	0	0
		point203	203	46	40	0	0	0	0	0	0	0	0
		point204	204										

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **B80709N1**
RUN: **Future**
BARRIER DESIGN: **INPUT HEIGHTS**

ATMOSPHERICS: **20 deg C, 50% RH**

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver

Name	**No.**	**#DUs**	**Existing**	**No Barrier**					**With Barrier**			
			LAeq1h	**LAeq1h**		**Increase over existing**		**Type**	**Calculated**	**Noise Reduction**		
				Calculated	**Crit'n**	**Calculated**	**Crit'n**	**Impact**	**LAeq1h**	**Calculated**	**Goal**	**Calculated**
							Sub'l Inc					**minus**
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1	3	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
2	4	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
3	5	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
4	6	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
5	7	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
6	8	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
7	9	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
8	10	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
9	11	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
10	12	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
11	13	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
12	14	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
13	15	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
14	16	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
15	17	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
16	18	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
17	19	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
18	20	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
19	21	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
20	22	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
21	23	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
22	24	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
23	25	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
24	26	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0

25	27	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
26	28	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
27	29	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
28	30	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
29	31	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
30	32	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
31	33	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
32	34	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
33	35	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
34	36	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
35	37	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
36	38	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
37	39	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
38	40	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
39	41	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
40	42	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
41	43	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
42	44	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
43	45	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
44	46	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
45	47	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
46	48	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
47	49	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
48	50	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
49	51	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
50	52	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
51	53	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
52	54	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
53	55	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
54	56	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
55	57	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
56	58	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
57	59	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
58	60	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
59	61	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
60	62	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
61	63	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
62	64	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
63	65	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
64	66	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
65	67	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0

66	68	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
67	69	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
68	70	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
69	71	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
70	72	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
71	73	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
72	74	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
73	75	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0
74	76	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
75	77	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
76	78	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
77	79	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
78	80	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
79	81	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
80	82	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
81	83	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
82	84	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
83	85	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
84	86	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
85	87	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
86	88	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
87	89	1	0.0	69.6	66	69.6	10	Snd Lvl	69.6	0.0	8	-8.0
88	90	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
89	91	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
90	92	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
91	93	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
92	94	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
93	3	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
94	95	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
95	96	1	0.0	69.9	66	69.9	10	Snd Lvl	69.9	0.0	8	-8.0
96	97	1	0.0	70.6	66	70.6	10	Snd Lvl	70.6	0.0	8	-8.0
97	98	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
98	99	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
99	100	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
100	101	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
101	102	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
102	103	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
103	104	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
104	105	1	0.0	69.9	66	69.9	10	Snd Lvl	69.9	0.0	8	-8.0
105	106	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
106	107	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0

107	108	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
108	109	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
109	110	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
110	111	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
111	112	1	0.0	69.6	66	69.6	10	Snd Lvl	69.6	0.0	8	-8.0
112	114	1	0.0	70.4	66	70.4	10	Snd Lvl	70.4	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	112	0.0	0.0	0.0
All Impacted	96	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Eilar Associates, Inc. **25 September 2018**
MLO **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B80709N1**
RUN: **Outdoor Use - As Designed**

Roadway	**Points**											
Name	**Name**	**No.**	**Segment**									
			Autos		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
C Street WB	point1	1	387	48	2	48	2	48	0	0	0	0
	point2	2	387	48	2	48	2	48	0	0	0	0
	point3	3	387	48	2	48	2	48	0	0	0	0
	point4	4	387	48	2	48	2	48	0	0	0	0
	point5	5	387	48	2	48	2	48	0	0	0	0
	point6	6	387	48	2	48	2	48	0	0	0	0
	point7	7	387	48	2	48	2	48	0	0	0	0
	point8	8	387	48	2	48	2	48	0	0	0	0
	point9	9	387	48	2	48	2	48	0	0	0	0
	point10	10	387	48	2	48	2	48	0	0	0	0
	point11	11	387	48	2	48	2	48	0	0	0	0
	point12	12	387	48	2	48	2	48	0	0	0	0
	point13	13	387	48	2	48	2	48	0	0	0	0
	point14	14	387	48	2	48	2	48	0	0	0	0
	point15	15	387	48	2	48	2	48	0	0	0	0
	point16	16	387	48	2	48	2	48	0	0	0	0
	point17	17	387	48	2	48	2	48	0	0	0	0
	point18	18	387	48	2	48	2	48	0	0	0	0
	point19	19	387	48	2	48	2	48	0	0	0	0
	point20	20	387	48	2	48	2	48	0	0	0	0
	point21	21	387	48	2	48	2	48	0	0	0	0
	point22	22	387	48	2	48	2	48	0	0	0	0
	point23	23	387	48	2	48	2	48	0	0	0	0

	point24	24	387	48	2	48	2	48	0	0	0	0
	point25	25	387	48	2	48	2	48	0	0	0	0
	point26	26	387	48	2	48	2	48	0	0	0	0
	point27	27	387	48	2	48	2	48	0	0	0	0
	point28	28	387	48	2	48	2	48	0	0	0	0
	point29	29	387	48	2	48	2	48	0	0	0	0
	point30	30	387	48	2	48	2	48	0	0	0	0
	point31	31	387	48	2	48	2	48	0	0	0	0
	point32	32	387	48	2	48	2	48	0	0	0	0
	point33	33	387	48	2	48	2	48	0	0	0	0
	point34	34	387	48	2	48	2	48	0	0	0	0
	point35	35	387	48	2	48	2	48	0	0	0	0
	point36	36	387	48	2	48	2	48	0	0	0	0
	point37	37	387	48	2	48	2	48	0	0	0	0
	point38	38	387	48	2	48	2	48	0	0	0	0
	point39	39	387	48	2	48	2	48	0	0	0	0
	point40	40	387	48	2	48	2	48	0	0	0	0
	point41	41	387	48	2	48	2	48	0	0	0	0
	point42	42	387	48	2	48	2	48	0	0	0	0
	point43	43	387	48	2	48	2	48	0	0	0	0
	point44	44	387	48	2	48	2	48	0	0	0	0
	point45	45	387	48	2	48	2	48	0	0	0	0
	point46	46	387	48	2	48	2	48	0	0	0	0
	point47	47	387	48	2	48	2	48	0	0	0	0
	point48	48	387	48	2	48	2	48	0	0	0	0
	point49	49	387	48	2	48	2	48	0	0	0	0
	point50	50	387	48	2	48	2	48	0	0	0	0
	point51	51	387	48	2	48	2	48	0	0	0	0
	point52	52	387	48	2	48	2	48	0	0	0	0
	point53	53	387	48	2	48	2	48	0	0	0	0
	point54	54	387	48	2	48	2	48	0	0	0	0
	point55	55	387	48	2	48	2	48	0	0	0	0
	point56	56	387	48	2	48	2	48	0	0	0	0
	point57	57	387	48	2	48	2	48	0	0	0	0
	point58	58	387	48	2	48	2	48	0	0	0	0
	point59	59	387	48	2	48	2	48	0	0	0	0

	point60	60	387	48	2	48	2	48	0	0	0	0
	point61	61	387	48	2	48	2	48	0	0	0	0
	point62	62	387	48	2	48	2	48	0	0	0	0
	point63	63	387	48	2	48	2	48	0	0	0	0
	point64	64	387	48	2	48	2	48	0	0	0	0
	point65	65	387	48	2	48	2	48	0	0	0	0
	point66	66	387	48	2	48	2	48	0	0	0	0
	point67	67	387	48	2	48	2	48	0	0	0	0
	point68	68	387	48	2	48	2	48	0	0	0	0
	point69	69	387	48	2	48	2	48	0	0	0	0
	point70	70	387	48	2	48	2	48	0	0	0	0
	point71	71	387	48	2	48	2	48	0	0	0	0
	point72	72	387	48	2	48	2	48	0	0	0	0
	point73	73	387	48	2	48	2	48	0	0	0	0
	point74	74	387	48	2	48	2	48	0	0	0	0
	point75	75	387	48	2	48	2	48	0	0	0	0
	point76	76										
C Street EB	point77	77	387	48	2	48	2	48	0	0	0	0
	point78	78	387	48	2	48	2	48	0	0	0	0
	point79	79	387	48	2	48	2	48	0	0	0	0
	point80	80	387	48	2	48	2	48	0	0	0	0
	point81	81	387	48	2	48	2	48	0	0	0	0
	point82	82	387	48	2	48	2	48	0	0	0	0
	point83	83	387	48	2	48	2	48	0	0	0	0
	point84	84	387	48	2	48	2	48	0	0	0	0
	point85	85	387	48	2	48	2	48	0	0	0	0
	point86	86	387	48	2	48	2	48	0	0	0	0
	point87	87	387	48	2	48	2	48	0	0	0	0
	point88	88	387	48	2	48	2	48	0	0	0	0
	point89	89	387	48	2	48	2	48	0	0	0	0
	point90	90	387	48	2	48	2	48	0	0	0	0
	point91	91	387	48	2	48	2	48	0	0	0	0
	point92	92	387	48	2	48	2	48	0	0	0	0
	point93	93	387	48	2	48	2	48	0	0	0	0
	point94	94	387	48	2	48	2	48	0	0	0	0
	point95	95	387	48	2	48	2	48	0	0	0	0

	point96	96	387	48	2	48	2	48	0	0	0	0
	point97	97	387	48	2	48	2	48	0	0	0	0
	point98	98	387	48	2	48	2	48	0	0	0	0
	point99	99	387	48	2	48	2	48	0	0	0	0
	point100	100	387	48	2	48	2	48	0	0	0	0
	point101	101	387	48	2	48	2	48	0	0	0	0
	point102	102	387	48	2	48	2	48	0	0	0	0
	point103	103	387	48	2	48	2	48	0	0	0	0
	point104	104	387	48	2	48	2	48	0	0	0	0
	point105	105	387	48	2	48	2	48	0	0	0	0
	point106	106	387	48	2	48	2	48	0	0	0	0
	point107	107	387	48	2	48	2	48	0	0	0	0
	point108	108	387	48	2	48	2	48	0	0	0	0
	point109	109	387	48	2	48	2	48	0	0	0	0
	point110	110	387	48	2	48	2	48	0	0	0	0
	point111	111	387	48	2	48	2	48	0	0	0	0
	point112	112	387	48	2	48	2	48	0	0	0	0
	point113	113	387	48	2	48	2	48	0	0	0	0
	point114	114	387	48	2	48	2	48	0	0	0	0
	point115	115	387	48	2	48	2	48	0	0	0	0
	point116	116	387	48	2	48	2	48	0	0	0	0
	point117	117	387	48	2	48	2	48	0	0	0	0
	point118	118	387	48	2	48	2	48	0	0	0	0
	point119	119	387	48	2	48	2	48	0	0	0	0
	point120	120	387	48	2	48	2	48	0	0	0	0
	point121	121	387	48	2	48	2	48	0	0	0	0
	point122	122	387	48	2	48	2	48	0	0	0	0
	point123	123	387	48	2	48	2	48	0	0	0	0
	point124	124	387	48	2	48	2	48	0	0	0	0
	point125	125	387	48	2	48	2	48	0	0	0	0
	point126	126	387	48	2	48	2	48	0	0	0	0
	point127	127	387	48	2	48	2	48	0	0	0	0
	point128	128	387	48	2	48	2	48	0	0	0	0
	point129	129	387	48	2	48	2	48	0	0	0	0
	point130	130	387	48	2	48	2	48	0	0	0	0
	point131	131	387	48	2	48	2	48	0	0	0	0

		point132	132	387	48	2	48	2	48	0	0	0	0
		point133	133	387	48	2	48	2	48	0	0	0	0
		point134	134	387	48	2	48	2	48	0	0	0	0
		point135	135	387	48	2	48	2	48	0	0	0	0
		point136	136	387	48	2	48	2	48	0	0	0	0
		point137	137	387	48	2	48	2	48	0	0	0	0
		point138	138	387	48	2	48	2	48	0	0	0	0
		point139	139	387	48	2	48	2	48	0	0	0	0
		point140	140	387	48	2	48	2	48	0	0	0	0
		point141	141	387	48	2	48	2	48	0	0	0	0
		point142	142	387	48	2	48	2	48	0	0	0	0
		point143	143	387	48	2	48	2	48	0	0	0	0
		point144	144	387	48	2	48	2	48	0	0	0	0
		point145	145	387	48	2	48	2	48	0	0	0	0
		point146	146	387	48	2	48	2	48	0	0	0	0
		point147	147	387	48	2	48	2	48	0	0	0	0
		point148	148	387	48	2	48	2	48	0	0	0	0
		point149	149	387	48	2	48	2	48	0	0	0	0
		point150	150	387	48	2	48	2	48	0	0	0	0
		point151	151	387	48	2	48	2	48	0	0	0	0
		point152	152										
32nd Street NB		point153	153	46	40	0	0	0	0	0	0	0	0
		point154	154	46	40	0	0	0	0	0	0	0	0
		point155	155	46	40	0	0	0	0	0	0	0	0
		point156	156	46	40	0	0	0	0	0	0	0	0
		point157	157	46	40	0	0	0	0	0	0	0	0
		point158	158	46	40	0	0	0	0	0	0	0	0
		point159	159	46	40	0	0	0	0	0	0	0	0
		point160	160	46	40	0	0	0	0	0	0	0	0
		point161	161	46	40	0	0	0	0	0	0	0	0
		point162	162	46	40	0	0	0	0	0	0	0	0
		point163	163	46	40	0	0	0	0	0	0	0	0
		point164	164										
32nd Street SB		point179	179	46	40	0	0	0	0	0	0	0	0
		point180	180	46	40	0	0	0	0	0	0	0	0
		point181	181	46	40	0	0	0	0	0	0	0	0

	point182	182	46	40	0	0	0	0	0	0	0	0
	point183	183	46	40	0	0	0	0	0	0	0	0
	point184	184	46	40	0	0	0	0	0	0	0	0
	point185	185	46	40	0	0	0	0	0	0	0	0
	point186	186	46	40	0	0	0	0	0	0	0	0
	point187	187	46	40	0	0	0	0	0	0	0	0
	point188	188	46	40	0	0	0	0	0	0	0	0
	point189	189	46	40	0	0	0	0	0	0	0	0
	point190	190	46	40	0	0	0	0	0	0	0	0
	point191	191										
94 EB	point205	205	8346	105	296	105	70	105	0	0	0	0
	point206	206	8346	105	296	105	70	105	0	0	0	0
	point207	207	8346	105	296	105	70	105	0	0	0	0
	point208	208	8346	105	296	105	70	105	0	0	0	0
	point209	209	8346	105	296	105	70	105	0	0	0	0
	point210	210	8346	105	296	105	70	105	0	0	0	0
	point211	211	8346	105	296	105	70	105	0	0	0	0
	point212	212	8346	105	296	105	70	105	0	0	0	0
	point213	213	8346	105	296	105	70	105	0	0	0	0
	point214	214	8346	105	296	105	70	105	0	0	0	0
	point215	215	8346	105	296	105	70	105	0	0	0	0
	point216	216	8346	105	296	105	70	105	0	0	0	0
	point217	217	8346	105	296	105	70	105	0	0	0	0
	point218	218	8346	105	296	105	70	105	0	0	0	0
	point219	219	8346	105	296	105	70	105	0	0	0	0
	point220	220	8346	105	0 5	105	70	105	0	0	0	0
	point221	221	8346	105	296	105	70	105	0	0	0	0
	point222	222	8346	105	296	105	70	105	0	0	0	0
	point223	223	8346	105	296	105	70	105	0	0	0	0
	point224	224	8346	105	296	105	70	105	0	0	0	0
	point225	225	8346	105	296	105	70	105	0	0	0	0
	point226	226	8346	105	296	105	70	105	0	0	0	0
	point227	227	8346	105	296	105	70	105	0	0	0	0
	point228	228	8346	105	296	105	70	105	0	0	0	0
	point229	229	8346	105	296	105	70	105	0	0	0	0
	point230	230	8346	105	296	105	70	105	0	0	0	0

	point231	231	8346	105	296	105	70	105	0	0	0	0
	point232	232	8346	105	296	105	70	105	0	0	0	0
	point233	233	8346	105	296	105	70	105	0	0	0	0
	point234	234	8346	105	296	105	70	105	0	0	0	0
	point235	235	8346	105	296	105	70	105	0	0	0	0
	point236	236	8346	105	296	105	70	105	0	0	0	0
	point237	237	8346	105	296	105	70	105	0	0	0	0
	point238	238	8346	105	296	105	70	105	0	0	0	0
	point239	239	8346	105	296	105	70	105	0	0	0	0
	point240	240	8346	105	296	105	70	105	0	0	0	0
	point241	241	8346	105	296	105	70	105	0	0	0	0
	point242	242	8346	105	296	105	70	105	0	0	0	0
	point243	243	8346	105	296	105	70	105	0	0	0	0
	point244	244	8346	105	296	105	70	105	0	0	0	0
	point245	245	8346	105	296	105	70	105	0	0	0	0
	point246	246	8346	105	296	105	70	105	0	0	0	0
	point247	247	8346	105	296	105	70	105	0	0	0	0
	point248	248	8346	105	296	105	70	105	0	0	0	0
	point249	249	8346	105	296	105	70	105	0	0	0	0
	point250	250	8346	105	296	105	70	105	0	0	0	0
	point251	251	8346	105	296	105	70	105	0	0	0	0
	point252	252										
94 WB	point253	253	7192	105	255	105	60	105	0	0	0	0
	point254	254	7192	105	255	105	60	105	0	0	0	0
	point255	255	7192	105	255	105	60	105	0	0	0	0
	point256	256	7192	105	255	105	60	105	0	0	0	0
	point257	257	7192	105	255	105	60	105	0	0	0	0
	point258	258	7192	105	255	105	60	105	0	0	0	0
	point259	259	7192	105	255	105	60	105	0	0	0	0
	point260	260	7192	105	255	105	60	105	0	0	0	0
	point261	261	7192	105	255	105	60	105	0	0	0	0
	point262	262	7192	105	255	105	60	105	0	0	0	0
	point263	263	7192	105	255	105	60	105	0	0	0	0
	point264	264	7192	105	255	105	60	105	0	0	0	0
	point265	265	7192	105	255	105	60	105	0	0	0	0
	point266	266	7192	105	255	105	60	105	0	0	0	0

	point267	267	7192	105	255	105	60	105	0	0	0	0
	point268	268	7192	105	255	105	60	105	0	0	0	0
	point269	269	7192	105	255	105	60	105	0	0	0	0
	point270	270	7192	105	255	105	60	105	0	0	0	0
	point271	271	7192	105	255	105	60	105	0	0	0	0
	point272	272	7192	105	255	105	60	105	0	0	0	0
	point273	273	7192	105	255	105	60	105	0	0	0	0
	point274	274	7192	105	255	105	60	105	0	0	0	0
	point275	275	7192	105	255	105	60	105	0	0	0	0
	point276	276	7192	105	255	105	60	105	0	0	0	0
	point277	277	7192	105	255	105	60	105	0	0	0	0
	point278	278	7192	105	255	105	60	105	0	0	0	0
	point279	279	7192	105	255	105	60	105	0	0	0	0
	point280	280	7192	105	255	105	60	105	0	0	0	0
	point281	281	7192	105	255	105	60	105	0	0	0	0
	point282	282	7192	105	255	105	60	105	0	0	0	0
	point283	283	7192	105	255	105	60	105	0	0	0	0
	point284	284	7192	105	255	105	60	105	0	0	0	0
	point285	285	7192	105	255	105	60	105	0	0	0	0
	point286	286	7192	105	255	105	60	105	0	0	0	0
	point287	287	7192	105	255	105	60	105	0	0	0	0
	point288	288	7192	105	255	105	60	105	0	0	0	0
	point289	289	7192	105	255	105	60	105	0	0	0	0
	point290	290	7192	105	255	105	60	105	0	0	0	0
	point291	291	7192	105	255	105	60	105	0	0	0	0
	point292	292	7192	105	255	105	60	105	0	0	0	0
	point293	293	7192	105	255	105	60	105	0	0	0	0
	point294	294	7192	105	255	105	60	105	0	0	0	0
	point295	295	7192	105	255	105	60	105	0	0	0	0
	point296	296	7192	105	255	105	60	105	0	0	0	0
	point297	297	7192	105	255	105	60	105	0	0	0	0
	point298	298	7192	105	255	105	60	105	0	0	0	0
	point299	299										
94 WB Ramp Off	point300	300	793	89	28	89	7	89	0	0	0	0
	point301	301	793	89	28	89	7	89	0	0	0	0
	point302	302	793	89	28	89	7	89	0	0	0	0

	point303	303	793	89	28	89	7	89	0	0	0	0
	point304	304	793	89	28	89	7	89	0	0	0	0
	point305	305	793	89	28	89	7	89	0	0	0	0
	point306	306	793	89	28	89	7	89	0	0	0	0
	point307	307	793	89	28	89	7	89	0	0	0	0
	point308	308	793	89	28	89	7	89	0	0	0	0
	point309	309	793	89	28	89	7	89	0	0	0	0
	point310	310	793	89	28	89	7	89	0	0	0	0
	point311	311										
94 WB Ramp On	point312	312	238	48	8	48	2	48	0	0	0	0
	point313	313	238	48	8	48	2	48	0	0	0	0
	point314	314	238	48	8	48	2	48	0	0	0	0
	point315	315	238	48	8	48	2	48	0	0	0	0
	point316	316	238	48	8	48	2	48	0	0	0	0
	point317	317	238	48	8	48	2	48	0	0	0	0
	point318	318										
32nd Street NB-2	point327	327	46	40	0	0	0	0	0	0	0	0
	point165	165	46	40	0	0	0	0	0	0	0	0
	point166	166	46	40	0	0	0	0	0	0	0	0
	point167	167	46	40	0	0	0	0	0	0	0	0
	point168	168	46	40	0	0	0	0	0	0	0	0
	point169	169	46	40	0	0	0	0	0	0	0	0
	point170	170	46	40	0	0	0	0	0	0	0	0
	point171	171	46	40	0	0	0	0	0	0	0	0
	point172	172	46	40	0	0	0	0	0	0	0	0
	point173	173	46	40	0	0	0	0	0	0	0	0
	point174	174	46	40	0	0	0	0	0	0	0	0
	point175	175	46	40	0	0	0	0	0	0	0	0
	point176	176	46	40	0	0	0	0	0	0	0	0
	point177	177	46	40	0	0	0	0	0	0	0	0
	point178	178										
32nd Street SB-2	point328	328	46	40	0	0	0	0	0	0	0	0
	point192	192	46	40	0	0	0	0	0	0	0	0
	point193	193	46	40	0	0	0	0	0	0	0	0
	point194	194	46	40	0	0	0	0	0	0	0	0
	point195	195	46	40	0	0	0	0	0	0	0	0

		point196	196	46	40	0	0	0	0	0	0	0	0
		point197	197	46	40	0	0	0	0	0	0	0	0
		point198	198	46	40	0	0	0	0	0	0	0	0
		point199	199	46	40	0	0	0	0	0	0	0	0
		point200	200	46	40	0	0	0	0	0	0	0	0
		point201	201	46	40	0	0	0	0	0	0	0	0
		point202	202	46	40	0	0	0	0	0	0	0	0
		point203	203	46	40	0	0	0	0	0	0	0	0
		point204	204										

Eilar Associates, Inc.
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TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: **B80709N1**
RUN: **Outdoor Use - As Designed**

Receiver											
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**				**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**	**Calc.**
			m	m	m	m	dBA	dBA	dB	dB	
OU1	3	0	562.8	434.4	52.96	1.07	0.00	66	10.0	8.0	Y
OU2	4	0	562.8	440.4	53.07	1.07	0.00	66	10.0	8.0	Y
OU3	5	0	562.8	446.5	53.16	1.07	0.00	66	10.0	8.0	Y
OU4	6	0	564.3	452.6	52.96	1.07	0.00	66	10.0	8.0	Y
OU5	7	0	564.5	458.5	53.02	1.07	0.00	66	10.0	8.0	Y
OU6	8	0	564.5	464.7	53.12	1.07	0.00	66	10.0	8.0	Y
OU7	9	0	586.6	465.9	50.13	1.07	0.00	66	10.0	8.0	Y
OU8	10	0	592.9	465.9	49.99	1.07	0.00	66	10.0	8.0	Y
OU9	11	0	598.8	465.9	49.86	1.07	0.00	66	10.0	8.0	Y
OU10	12	0	605.0	465.9	49.73	1.07	0.00	66	10.0	8.0	Y
OU11	13	0	610.8	466.0	49.61	1.07	0.00	66	10.0	8.0	Y
OU12	14	0	633.8	464.6	47.25	7.17	0.00	66	10.0	8.0	Y
OU13	15	0	634.1	457.4	47.14	7.17	0.00	66	10.0	8.0	Y
OU14	16	0	633.8	445.7	47.09	7.17	0.00	66	10.0	8.0	Y
OU15	17	0	634.1	438.3	46.99	7.17	0.00	66	10.0	8.0	Y
OU16	18	0	603.7	431.6	49.79	4.12	0.00	66	10.0	8.0	Y
OU17	19	0	597.8	431.6	49.91	4.12	0.00	66	10.0	8.0	Y
OU18	20	0	591.7	431.5	50.02	4.12	0.00	66	10.0	8.0	Y
OU19	114	0	585.6	431.7	50.14	4.12	0.00	66	10.0	8.0	Y

Eilar Associates, Inc. **25 September 2018**
MLO **TNM 2.5**

INPUT: BARRIERS
PROJECT/CONTRACT: **B80709N1**
RUN: **Outdoor Use - As Designed**

Barrier									**Points**										
Name	**Type**	**Height**		**If Wall**	**If Berm**			**Add'tnl**	**Name**	**No.**	**Coordinates (bottom)**			**Height**	**Segment**				
		Min	**Max**	**$ per**	**$ per**	**Top**	**Run:Rise**	**$ per**			**X**	**Y**	**Z**	**at**	**Seg Ht Perturbs**			**On**	**Important**
				Unit	**Unit**	**Width**		**Unit**						**Point**	**Incre-**	**#Up**	**#Dn**	**Struct?**	**Reflec-**
				Area	**Vol.**			**Length**							**ment**				**tions?**
		m	m	$/sq m	$/cu m	m	m:m	$/m			m	m	m	m	m				
Building A	W	0.00	30.48	0.00				0.00	point29	29	574.9	466.3	51.08	8.22	0.00	0	0		
									point30	30	564.0	466.4	53.24	6.06	0.00	0	0		
									point31	31	564.0	466.3	53.24	6.06	0.00	0	0		
									point32	32	565.2	466.3	52.99	6.31	0.00	0	0		
									point33	33	565.2	462.8	52.94	6.36	0.00	0	0		
									point34	34	563.4	462.8	53.30	6.00	0.00	0	0		
									point35	35	563.4	460.4	53.26	6.04	0.00	0	0		
									point36	36	565.3	460.3	52.89	6.41	0.00	0	0		
									point37	37	565.2	456.9	52.84	6.46	0.00	0	0		
									point38	38	563.4	456.8	53.21	6.09	0.00	0	0		
									point39	39	563.4	454.4	53.17	6.13	0.00	0	0		
									point40	40	565.2	454.4	52.80	6.50	0.00	0	0		
									point41	41	565.2	450.8	52.75	6.55	0.00	0	0		
									point42	42	563.3	450.8	53.12	6.18	0.00	0	0		
									point43	43	563.4	448.3	53.08	6.22	0.00	0	0		
									point44	44	562.4	448.3	53.27	6.03	0.00	0	0		
									point45	45	562.4	448.2	53.27	6.03	0.00	0	0		
									point46	46	563.7	448.2	53.00	6.30	0.00	0	0		
									point47	47	563.7	444.8	52.95	6.35	0.00	0	0		
									point48	48	561.8	444.8	53.33	5.97	0.00	0	0		
									point49	49	561.8	442.3	53.29	6.01	0.00	0	0		
									point50	50	563.7	442.3	52.91	6.39	0.00	0	0		
									point51	51	563.7	438.8	52.86	6.44	0.00	0	0		
									point52	52	561.8	438.8	53.24	6.06	0.00	0	0		
									point53	53	561.8	436.3	53.20	6.10	0.00	0	0		
									point54	54	563.7	436.3	52.82	6.48	0.00	0	0		
									point55	55	563.7	432.8	52.76	6.54	0.00	0	0		
									point56	56	561.8	432.8	53.14	6.16	0.00	0	0		
									point57	57	561.8	430.3	53.10	6.20	0.00	0	0		
									point58	58	572.8	430.3	50.90	8.40	0.00	0	0		
									point59	59	572.8	431.4	50.92	8.38	0.00	0	0		
									point60	60	573.4	431.4	50.80	8.50	0.00	0	0		
									point61	61	573.4	448.3	51.07	8.23	0.00	0	0		
									point62	62	574.3	448.4	50.89	8.41	0.00	0	0		
									point63	63	574.3	449.4	50.91	8.39	0.00	0	0		

									point64	64	574.9	449.5	50.79	8.51	0.00	0	0		
									point65	65	574.9	466.3	51.08	8.22					
Building B	W	0.00	30.48	0.00				0.00	point66	66	614.4	449.5	49.53	8.00	0.00	0	0		
									point67	67	584.3	449.5	50.17	7.36	0.00	0	0		
									point68	68	584.3	465.1	50.18	7.35	0.00	0	0		
									point69	69	614.4	465.0	49.53	8.00	0.00	0	0		
									point70	70	614.4	449.5	49.53	8.00					
Building C	W	0.00	30.48	0.00				0.00	point71	71	624.0	438.3	48.88	6.64	0.00	0	0		
									point72	72	628.6	438.3	48.02	7.50	0.00	0	0		
									point73	73	628.6	437.0	48.01	7.51	0.00	0	0		
									point74	74	631.5	437.0	47.45	8.07	0.00	0	0		
									point75	75	631.5	439.8	47.48	8.04	0.00	0	0		
									point76	76	636.3	439.8	46.58	8.94	0.00	0	0		
									point77	77	636.3	444.2	46.62	8.90	0.00	0	0		
									point78	78	631.6	444.2	47.51	8.01	0.00	0	0		
									point79	79	631.6	447.1	47.53	7.99	0.00	0	0		
									point80	80	636.4	447.1	46.64	8.88	0.00	0	0		
									point81	81	636.3	456.0	46.71	8.81	0.00	0	0		
									point82	82	631.6	456.0	47.61	7.91	0.00	0	0		
									point83	83	631.5	458.9	47.64	7.88	0.00	0	0		
									point84	84	636.3	458.9	46.74	8.78	0.00	0	0		
									point85	85	636.3	463.3	46.78	8.74	0.00	0	0		
									point86	86	631.6	463.3	47.66	7.86	0.00	0	0		
									point87	87	631.5	466.1	47.69	7.83	0.00	0	0		
									point88	88	628.6	466.2	48.24	7.28	0.00	0	0		
									point89	89	628.6	464.9	48.22	7.30	0.00	0	0		
									point90	90	624.0	464.9	49.08	6.44	0.00	0	0		
									point91	91	624.0	438.3	48.88	6.64					
Building D	W	0.00	30.48	0.00				0.00	point92	92	583.8	442.0	50.17	8.54	0.00	0	0		
									point93	93	583.8	431.0	50.17	8.54	0.00	0	0		
									point94	94	583.9	431.0	50.17	8.54	0.00	0	0		
									point95	95	583.9	432.3	50.17	8.54	0.00	0	0		
									point96	96	587.3	432.3	50.10	8.61	0.00	0	0		
									point97	97	587.3	430.4	50.10	8.61	0.00	0	0		
									point98	98	589.8	430.4	50.06	8.65	0.00	0	0		
									point99	99	589.8	432.3	50.06	8.65	0.00	0	0		
									point100	100	593.3	432.3	49.99	8.72	0.00	0	0		
									point101	101	593.3	430.4	49.99	8.72	0.00	0	0		
									point102	102	595.8	430.4	49.94	8.77	0.00	0	0		
									point103	103	595.8	432.3	49.94	8.77	0.00	0	0		
									point104	104	599.3	432.3	49.88	8.83	0.00	0	0		
									point105	105	599.4	430.4	49.87	8.84	0.00	0	0		
									point106	106	601.9	430.4	49.83	8.88	0.00	0	0		
									point107	107	601.8	432.3	49.83	8.88	0.00	0	0		
									point108	108	605.4	432.3	49.76	8.95	0.00	0	0		
									point109	109	605.4	430.4	49.76	8.95	0.00	0	0		
									point110	110	607.9	430.4	49.71	9.00	0.00	0	0		
									point111	111	607.8	441.4	49.71	9.00	0.00	0	0		
									point112	112	606.8	441.3	49.73	8.98	0.00	0	0		

									point113	113	606.8	442.0	49.73	8.98	0.00	0	0		
									point114	114	583.8	442.0	50.17	8.54					

Eilar Associates, Inc. **25 September 2018**
MLO **TNM 2.5**

INPUT: TERRAIN LINES
PROJECT/CONTRACT: **B80709N1**
RUN: **Outdoor Use - As Designed**

Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		m	m	m
Terrain Line1	1	1,077.5	420.3	30.50
	2	1,039.2	433.7	30.50
	3	959.0	406.8	30.50
	4	889.3	376.2	30.50
	5	881.3	363.6	30.50
Terrain Line2	6	884.9	342.3	30.50
	7	890.4	339.1	30.50
Terrain Line3	8	1,005.8	349.9	30.50
	9	1,098.6	357.9	30.50
	10	1,099.8	339.0	30.50
	11	1,088.5	327.6	30.50
Terrain Line4	12	919.7	315.0	30.50
	13	914.2	285.2	30.50
	14	836.5	224.3	30.50
	15	820.1	197.8	30.50
	16	778.1	198.7	30.50
	17	749.5	222.2	30.50
	18	708.0	214.6	30.50
	19	686.1	220.1	30.50
	20	684.0	231.4	30.50
	21	693.7	262.9	30.50
	22	622.7	228.9	30.50
	23	610.1	192.8	30.50
Terrain Line5	24	763.7	363.2	36.60
	25	755.0	363.2	36.60
	26	700.7	342.9	36.60
	27	671.7	341.9	36.60
	28	681.0	373.2	36.60
	29	680.3	413.2	36.60
	30	695.7	427.9	36.60
	31	706.0	454.6	36.60
	32	710.7	450.3	36.60
	33	721.0	429.9	36.60
	34	755.0	423.2	36.60
	35	771.7	409.9	36.60
	36	793.7	420.9	36.60
	37	837.4	404.9	36.60

	38	1,038.7	477.6	36.60
	39	1,122.1	724.3	36.60
Terrain Line6	40	471.4	151.4	36.60
	41	486.1	206.5	36.60
	42	506.6	213.2	36.60
	43	535.2	207.7	36.60
	44	672.6	273.3	36.60
	45	718.3	295.1	36.60
Terrain Line7	46	771.3	341.3	36.60
	47	763.7	331.2	36.60
Terrain Line8	48	592.0	656.3	42.70
	49	625.1	508.4	42.70
	50	640.4	491.7	42.70
Terrain Line9	51	635.2	653.6	42.70
	52	712.8	541.5	42.70
	53	731.6	544.1	42.70
	54	745.9	527.3	42.70
	55	768.2	497.9	42.70
	56	785.8	489.1	42.70
Terrain Line10	57	648.0	474.4	42.70
	58	653.1	450.0	42.70
	59	653.5	424.8	42.70
	60	660.2	392.1	42.70
	61	645.9	374.4	42.70
	62	625.8	363.9	42.70
	63	619.1	348.8	42.70
	64	565.3	317.5	42.70
Terrain Line11	65	579.3	300.4	42.70
	66	581.4	294.4	42.70
Terrain Line12	67	567.4	239.2	42.70
	68	527.2	220.8	42.70
	69	514.4	221.7	42.70
Terrain Line13	70	487.4	231.8	42.70
	71	471.3	226.8	42.70
Terrain Line14	72	470.2	203.1	42.70
	73	439.4	145.6	42.70
Terrain Line15	74	431.3	122.7	42.70
	75	430.2	62.0	42.70
Terrain Line16	76	792.1	473.8	42.70
	77	828.6	463.2	42.70
	78	891.0	455.2	42.70
	79	932.3	477.5	42.70
Terrain Line17	80	945.5	493.9	42.70
	81	978.9	525.1	42.70
Terrain Line18	82	570.7	656.5	48.80
	83	583.9	607.5	48.80
	84	588.9	564.2	48.80
	85	574.7	543.8	48.80

		86	594.8	522.6	48.80
		87	599.0	493.5	48.80
Terrain Line20		101	352.6	313.7	48.80
		102	358.7	300.0	48.80
		103	394.2	275.1	48.80
		104	410.8	248.9	48.80
		105	410.3	235.9	48.80
		106	343.6	207.1	48.80
Terrain Line21		107	367.0	166.8	48.80
		108	374.3	157.2	48.80
		109	339.6	126.8	48.80
		110	337.3	75.6	48.80
		111	141.9	66.3	48.80
Terrain Line22		112	545.4	657.0	54.90
		113	559.4	613.9	54.90
		114	570.3	599.3	54.90
		115	560.0	572.1	54.90
		116	561.6	493.7	54.90
Terrain Line24		119	548.6	434.0	54.90
		120	520.3	353.0	54.90
		121	454.9	362.8	54.90
		122	445.4	404.6	54.90
		123	392.2	360.2	54.90
		124	366.3	368.6	54.90
		125	354.4	408.0	54.90
		126	351.7	455.7	54.90
		127	333.5	458.6	54.90
		128	298.8	377.9	54.90
Terrain Line25		129	305.1	345.3	54.90
		130	334.2	297.4	54.90
		131	383.9	266.2	54.90
		132	374.6	236.6	54.90
		133	251.9	189.5	54.90
Terrain Line26		134	528.5	655.4	61.00
		135	524.5	617.7	61.00
		136	536.1	580.3	61.00
		137	523.1	563.3	61.00
		138	519.1	536.0	61.00
		139	527.1	521.7	61.00
		140	525.5	508.0	61.00
		141	510.8	488.7	61.00
Terrain Line27		142	513.5	472.7	61.00
		143	479.4	404.7	61.00
		144	466.1	407.3	61.00
		145	442.8	454.0	61.00
		146	429.4	416.3	61.00
		147	408.1	413.0	61.00
		148	384.4	397.7	61.00

	149	377.1	427.7	61.00
	150	382.4	472.0	61.00
Terrain Line28	151	387.1	490.3	61.00
	152	350.1	576.0	61.00
	153	326.4	562.3	61.00
	154	300.4	490.0	61.00
Terrain Line29	155	302.4	470.8	61.00
	156	296.0	426.1	61.00
	157	239.4	378.8	61.00
Terrain Line30	158	224.0	356.1	61.00
	159	275.4	343.8	61.00
	160	283.0	311.1	61.00
	161	263.4	265.1	61.00
	162	167.4	268.4	61.00
Terrain Line31	163	305.2	651.0	67.10
	164	328.2	620.6	67.10
	165	349.2	634.3	67.10
	166	368.5	611.3	67.10
	167	411.2	592.3	67.10
	168	395.5	583.0	67.10
	169	414.2	559.6	67.10
	170	429.5	579.3	67.10
	171	449.2	537.6	67.10
	172	484.5	574.0	67.10
	173	485.8	600.6	67.10
	174	503.5	615.6	67.10
	175	508.5	654.6	67.10
Terrain Line32	176	169.9	651.1	71.00
	177	171.5	608.2	71.00
Terrain Line19	178	639.9	414.1	48.80
	179	621.9	399.3	48.80
	180	590.2	409.1	48.80
	181	572.2	395.8	48.80
	182	561.1	353.2	48.80
	183	542.0	333.7	48.80
	184	465.0	349.5	48.80
	185	447.0	348.2	48.80
	186	434.6	364.4	48.80
	187	399.7	336.0	48.80
	188	356.8	352.5	48.80
Pad A	189	560.2	428.8	53.30
	190	575.7	428.9	50.30
	191	575.9	467.6	50.90
	192	560.5	467.8	54.00
	193	560.5	429.2	53.30
Pad B	194	583.3	466.4	50.20
	195	615.7	466.3	49.50
	196	615.6	448.2	49.50

		197	583.0	448.2	50.20
		198	582.8	466.4	50.20
Pad C		199	622.7	436.0	49.10
		200	622.7	467.4	49.30
		201	639.1	467.4	46.30
		202	638.9	435.8	46.10
		203	622.9	435.7	49.10
Pad D		204	582.5	442.7	50.20
		205	609.6	442.5	49.70
		206	609.6	429.0	49.70
		207	582.2	429.0	50.20
		208	582.0	442.7	50.20

Eilar Associates, Inc. **25 September 2018**
MLO **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **B80709N1**
RUN: **Outdoor Use - As Designed**
BARRIER DESIGN: **INPUT HEIGHTS**

ATMOSPHERICS: **20 deg C, 50% RH**

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	**No.**	**#DUs**	**Existing**	**No Barrier**					**With Barrier**			
			LAeq1h	**LAeq1h**		**Increase over existing**		**Type**	**Calculated**	**Noise Reduction**		
				Calculated	**Crit'n**	**Calculated**	**Crit'n Sub'l Inc**	**Impact**	**LAeq1h**	**Calculated**	**Goal**	**Calculated minus Goal**
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
OU1	3	0	0.0	52.4	66	52.4	10	----	52.4	0.0	8	-8.0
OU2	4	0	0.0	52.0	66	52.0	10	----	52.0	0.0	8	-8.0
OU3	5	0	0.0	52.4	66	52.4	10	----	52.4	0.0	8	-8.0
OU4	6	0	0.0	51.0	66	51.0	10	----	51.0	0.0	8	-8.0
OU5	7	0	0.0	51.4	66	51.4	10	----	51.4	0.0	8	-8.0
OU6	8	0	0.0	53.9	66	53.9	10	----	53.9	0.0	8	-8.0
OU7	9	0	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
OU8	10	0	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
OU9	11	0	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
OU10	12	0	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
OU11	13	0	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0
OU12	14	0	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
OU13	15	0	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
OU14	16	0	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
OU15	17	0	0.0	70.8	66	70.8	10	Snd Lvl	70.8	0.0	8	-8.0
OU16	18	0	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0
OU17	19	0	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
OU18	20	0	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
OU19	114	0	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	0	0.0	0.0	0.0

All Impacted		0	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

Eilar Associates, Inc. **25 September 2018**
MLO **TNM 2.5**

INPUT: BARRIERS
PROJECT/CONTRACT: **B80709N1**
RUN: **Outdoor Use - Mitigation**

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht Perturbs			On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		m	m	$/sq m	$/cu m	m	m:m	$/m			m	m	m	m	m				
Building A	W	0.00	30.48	0.00				0.00	point29	29	574.9	466.3	51.08	8.22	0.00	0	0		
									point30	30	564.0	466.4	53.24	6.06	0.00	0	0		
									point31	31	564.0	466.3	53.24	6.06	0.00	0	0		
									point32	32	565.2	466.3	52.99	6.31	0.00	0	0		
									point33	33	565.2	462.8	52.94	6.36	0.00	0	0		
									point34	34	563.4	462.8	53.30	6.00	0.00	0	0		
									point35	35	563.4	460.4	53.26	6.04	0.00	0	0		
									point36	36	565.3	460.3	52.89	6.41	0.00	0	0		
									point37	37	565.2	456.9	52.84	6.46	0.00	0	0		
									point38	38	563.4	456.8	53.21	6.09	0.00	0	0		
									point39	39	563.4	454.4	53.17	6.13	0.00	0	0		
									point40	40	565.2	454.4	52.80	6.50	0.00	0	0		
									point41	41	565.2	450.8	52.75	6.55	0.00	0	0		
									point42	42	563.3	450.8	53.12	6.18	0.00	0	0		
									point43	43	563.4	448.3	53.08	6.22	0.00	0	0		
									point44	44	562.4	448.3	53.27	6.03	0.00	0	0		
									point45	45	562.4	448.2	53.27	6.03	0.00	0	0		
									point46	46	563.7	448.2	53.00	6.30	0.00	0	0		
									point47	47	563.7	444.8	52.95	6.35	0.00	0	0		
									point48	48	561.8	444.8	53.33	5.97	0.00	0	0		
									point49	49	561.8	442.3	53.29	6.01	0.00	0	0		
									point50	50	563.7	442.3	52.91	6.39	0.00	0	0		
									point51	51	563.7	438.8	52.86	6.44	0.00	0	0		
									point52	52	561.8	438.8	53.24	6.06	0.00	0	0		
									point53	53	561.8	436.3	53.20	6.10	0.00	0	0		
									point54	54	563.7	436.3	52.82	6.48	0.00	0	0		
									point55	55	563.7	432.8	52.76	6.54	0.00	0	0		
									point56	56	561.8	432.8	53.14	6.16	0.00	0	0		
									point57	57	561.8	430.3	53.10	6.20	0.00	0	0		
									point58	58	572.8	430.3	50.90	8.40	0.00	0	0		
									point59	59	572.8	431.4	50.92	8.38	0.00	0	0		
									point60	60	573.4	431.4	50.80	8.50	0.00	0	0		
									point61	61	573.4	448.3	51.07	8.23	0.00	0	0		
									point62	62	574.3	448.4	50.89	8.41	0.00	0	0		
									point63	63	574.3	449.4	50.91	8.39	0.00	0	0		

									point64	64	574.9	449.5	50.79	8.51	0.00	0	0		
									point65	65	574.9	466.3	51.08	8.22					
Building B	W	0.00	30.48	0.00				0.00	point66	66	614.4	449.5	49.53	8.00	0.00	0	0		
									point67	67	584.3	449.5	50.17	7.36	0.00	0	0		
									point68	68	584.3	465.1	50.18	7.35	0.00	0	0		
									point69	69	614.4	465.0	49.53	8.00	0.00	0	0		
									point70	70	614.4	449.5	49.53	8.00					
Building C	W	0.00	30.48	0.00				0.00	point71	71	624.0	438.3	48.88	6.64	0.00	0	0		
									point72	72	628.6	438.3	48.02	7.50	0.00	0	0		
									point73	73	628.6	437.0	48.01	7.51	0.00	0	0		
									point74	74	631.5	437.0	47.45	8.07	0.00	0	0		
									point75	75	631.5	439.8	47.48	8.04	0.00	0	0		
									point76	76	636.3	439.8	46.58	8.94	0.00	0	0		
									point77	77	636.3	444.2	46.62	8.90	0.00	0	0		
									point78	78	631.6	444.2	47.51	8.01	0.00	0	0		
									point79	79	631.6	447.1	47.53	7.99	0.00	0	0		
									point80	80	636.4	447.1	46.64	8.88	0.00	0	0		
									point81	81	636.3	456.0	46.71	8.81	0.00	0	0		
									point82	82	631.6	456.0	47.61	7.91	0.00	0	0		
									point83	83	631.5	458.9	47.64	7.88	0.00	0	0		
									point84	84	636.3	458.9	46.74	8.78	0.00	0	0		
									point85	85	636.3	463.3	46.78	8.74	0.00	0	0		
									point86	86	631.6	463.3	47.66	7.86	0.00	0	0		
									point87	87	631.5	466.1	47.69	7.83	0.00	0	0		
									point88	88	628.6	466.2	48.24	7.28	0.00	0	0		
									point89	89	628.6	464.9	48.22	7.30	0.00	0	0		
									point90	90	624.0	464.9	49.08	6.44	0.00	0	0		
									point91	91	624.0	438.3	48.88	6.64					
Building D	W	0.00	30.48	0.00				0.00	point92	92	583.8	442.0	50.17	8.54	0.00	0	0		
									point93	93	583.8	431.0	50.17	8.54	0.00	0	0		
									point94	94	583.9	431.0	50.17	8.54	0.00	0	0		
									point95	95	583.9	432.3	50.17	8.54	0.00	0	0		
									point96	96	587.3	432.3	50.10	8.61	0.00	0	0		
									point97	97	587.3	430.4	50.10	8.61	0.00	0	0		
									point98	98	589.8	430.4	50.06	8.65	0.00	0	0		
									point99	99	589.8	432.3	50.06	8.65	0.00	0	0		
									point100	100	593.3	432.3	49.99	8.72	0.00	0	0		
									point101	101	593.3	430.4	49.99	8.72	0.00	0	0		
									point102	102	595.8	430.4	49.94	8.77	0.00	0	0		
									point103	103	595.8	432.3	49.94	8.77	0.00	0	0		
									point104	104	599.3	432.3	49.88	8.83	0.00	0	0		
									point105	105	599.4	430.4	49.87	8.84	0.00	0	0		
									point106	106	601.9	430.4	49.83	8.88	0.00	0	0		
									point107	107	601.8	432.3	49.83	8.88	0.00	0	0		
									point108	108	605.4	432.3	49.76	8.95	0.00	0	0		
									point109	109	605.4	430.4	49.76	8.95	0.00	0	0		
									point110	110	607.9	430.4	49.71	9.00	0.00	0	0		
									point111	111	607.8	441.4	49.71	9.00	0.00	0	0		
									point112	112	606.8	441.3	49.73	8.98	0.00	0	0		

									point113	113	606.8	442.0	49.73	8.98	0.00	0	0		
									point114	114	583.8	442.0	50.17	8.54					
Barrier C	W	0.00	30.48	0.00				0.00	point115	115	636.4	440.4	46.58	7.47	0.00	0	0		
									point116	116	636.3	437.0	46.55	7.47	0.00	0	0		
									point117	117	630.8	436.9	47.58	7.47					
Barrier D	W	0.00	30.48	0.00				0.00	point118	118	583.7	431.4	50.17	4.12	0.00	0	0		
									point119	119	583.7	430.3	50.17	4.12	0.00	0	0		
									point120	120	587.3	430.3	50.10	4.12	0.00	0	0		
									point121	121	589.8	430.3	50.06	4.12	0.00	0	0		
									point122	122	593.3	430.3	49.99	4.12	0.00	0	0		
									point123	123	595.8	430.3	49.94	4.12	0.00	0	0		
									point124	124	599.4	430.3	49.87	4.12	0.00	0	0		
									point125	125	601.9	430.3	49.83	4.12	0.00	0	0		
									point126	126	605.4	430.3	49.76	4.12	0.00	0	0		
									point127	127	607.9	430.3	49.71	4.12	0.00	0	0		
									point128	128	608.0	431.1	49.71	4.12					

Eilar Associates, Inc. **25 September 2018**
MLO **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **B80709N1**
RUN: **Outdoor Use - Mitigation**
BARRIER DESIGN: **INPUT HEIGHTS**

ATMOSPHERICS: **20 deg C, 50% RH**

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	**No.**	**#DUs**	**Existing**	**No Barrier**					**With Barrier**			
			LAeq1h	**LAeq1h**		**Increase over existing**		**Type**	**Calculated**	**Noise Reduction**		
				Calculated	**Crit'n**	**Calculated**	**Crit'n Sub'l Inc**	**Impact**	**LAeq1h**	**Calculated**	**Goal**	**Calculated minus Goal**
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
OU1	3	0	0.0	52.4	66	52.4	10	----	52.4	0.0	8	-8.0
OU2	4	0	0.0	52.0	66	52.0	10	----	52.0	0.0	8	-8.0
OU3	5	0	0.0	52.4	66	52.4	10	----	52.4	0.0	8	-8.0
OU4	6	0	0.0	51.0	66	51.0	10	----	51.0	0.0	8	-8.0
OU5	7	0	0.0	51.4	66	51.4	10	----	51.4	0.0	8	-8.0
OU6	8	0	0.0	53.9	66	53.9	10	----	53.9	0.0	8	-8.0
OU7	9	0	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
OU8	10	0	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
OU9	11	0	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
OU10	12	0	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
OU11	13	0	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0
OU12	14	0	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
OU13	15	0	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
OU14	16	0	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
OU15	17	0	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
OU16	18	0	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
OU17	19	0	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
OU18	20	0	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
OU19	114	0	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	0	0.0	0.0	0.0

All Impacted		0	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B80709N1**
RUN: **Facades**

Roadway	**Points**											
Name	**Name**	**No.**	**Segment**									
			Autos		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
C Street WB	point1	1	387	48	2	48	2	48	0	0	0	0
	point2	2	387	48	2	48	2	48	0	0	0	0
	point3	3	387	48	2	48	2	48	0	0	0	0
	point4	4	387	48	2	48	2	48	0	0	0	0
	point5	5	387	48	2	48	2	48	0	0	0	0
	point6	6	387	48	2	48	2	48	0	0	0	0
	point7	7	387	48	2	48	2	48	0	0	0	0
	point8	8	387	48	2	48	2	48	0	0	0	0
	point9	9	387	48	2	48	2	48	0	0	0	0
	point10	10	387	48	2	48	2	48	0	0	0	0
	point11	11	387	48	2	48	2	48	0	0	0	0
	point12	12	387	48	2	48	2	48	0	0	0	0
	point13	13	387	48	2	48	2	48	0	0	0	0
	point14	14	387	48	2	48	2	48	0	0	0	0
	point15	15	387	48	2	48	2	48	0	0	0	0
	point16	16	387	48	2	48	2	48	0	0	0	0
	point17	17	387	48	2	48	2	48	0	0	0	0
	point18	18	387	48	2	48	2	48	0	0	0	0
	point19	19	387	48	2	48	2	48	0	0	0	0
	point20	20	387	48	2	48	2	48	0	0	0	0
	point21	21	387	48	2	48	2	48	0	0	0	0
	point22	22	387	48	2	48	2	48	0	0	0	0
	point23	23	387	48	2	48	2	48	0	0	0	0

		point24	24	387	48	2	48	2	48	0	0	0	0
		point25	25	387	48	2	48	2	48	0	0	0	0
		point26	26	387	48	2	48	2	48	0	0	0	0
		point27	27	387	48	2	48	2	48	0	0	0	0
		point28	28	387	48	2	48	2	48	0	0	0	0
		point29	29	387	48	2	48	2	48	0	0	0	0
		point30	30	387	48	2	48	2	48	0	0	0	0
		point31	31	387	48	2	48	2	48	0	0	0	0
		point32	32	387	48	2	48	2	48	0	0	0	0
		point33	33	387	48	2	48	2	48	0	0	0	0
		point34	34	387	48	2	48	2	48	0	0	0	0
		point35	35	387	48	2	48	2	48	0	0	0	0
		point36	36	387	48	2	48	2	48	0	0	0	0
		point37	37	387	48	2	48	2	48	0	0	0	0
		point38	38	387	48	2	48	2	48	0	0	0	0
		point39	39	387	48	2	48	2	48	0	0	0	0
		point40	40	387	48	2	48	2	48	0	0	0	0
		point41	41	387	48	2	48	2	48	0	0	0	0
		point42	42	387	48	2	48	2	48	0	0	0	0
		point43	43	387	48	2	48	2	48	0	0	0	0
		point44	44	387	48	2	48	2	48	0	0	0	0
		point45	45	387	48	2	48	2	48	0	0	0	0
		point46	46	387	48	2	48	2	48	0	0	0	0
		point47	47	387	48	2	48	2	48	0	0	0	0
		point48	48	387	48	2	48	2	48	0	0	0	0
		point49	49	387	48	2	48	2	48	0	0	0	0
		point50	50	387	48	2	48	2	48	0	0	0	0
		point51	51	387	48	2	48	2	48	0	0	0	0
		point52	52	387	48	2	48	2	48	0	0	0	0
		point53	53	387	48	2	48	2	48	0	0	0	0
		point54	54	387	48	2	48	2	48	0	0	0	0
		point55	55	387	48	2	48	2	48	0	0	0	0
		point56	56	387	48	2	48	2	48	0	0	0	0
		point57	57	387	48	2	48	2	48	0	0	0	0
		point58	58	387	48	2	48	2	48	0	0	0	0
		point59	59	387	48	2	48	2	48	0	0	0	0

	point60	60	387	48	2	48	2	48	0	0	0	0
	point61	61	387	48	2	48	2	48	0	0	0	0
	point62	62	387	48	2	48	2	48	0	0	0	0
	point63	63	387	48	2	48	2	48	0	0	0	0
	point64	64	387	48	2	48	2	48	0	0	0	0
	point65	65	387	48	2	48	2	48	0	0	0	0
	point66	66	387	48	2	48	2	48	0	0	0	0
	point67	67	387	48	2	48	2	48	0	0	0	0
	point68	68	387	48	2	48	2	48	0	0	0	0
	point69	69	387	48	2	48	2	48	0	0	0	0
	point70	70	387	48	2	48	2	48	0	0	0	0
	point71	71	387	48	2	48	2	48	0	0	0	0
	point72	72	387	48	2	48	2	48	0	0	0	0
	point73	73	387	48	2	48	2	48	0	0	0	0
	point74	74	387	48	2	48	2	48	0	0	0	0
	point75	75	387	48	2	48	2	48	0	0	0	0
	point76	76										
C Street EB	point77	77	387	48	2	48	2	48	0	0	0	0
	point78	78	387	48	2	48	2	48	0	0	0	0
	point79	79	387	48	2	48	2	48	0	0	0	0
	point80	80	387	48	2	48	2	48	0	0	0	0
	point81	81	387	48	2	48	2	48	0	0	0	0
	point82	82	387	48	2	48	2	48	0	0	0	0
	point83	83	387	48	2	48	2	48	0	0	0	0
	point84	84	387	48	2	48	2	48	0	0	0	0
	point85	85	387	48	2	48	2	48	0	0	0	0
	point86	86	387	48	2	48	2	48	0	0	0	0
	point87	87	387	48	2	48	2	48	0	0	0	0
	point88	88	387	48	2	48	2	48	0	0	0	0
	point89	89	387	48	2	48	2	48	0	0	0	0
	point90	90	387	48	2	48	2	48	0	0	0	0
	point91	91	387	48	2	48	2	48	0	0	0	0
	point92	92	387	48	2	48	2	48	0	0	0	0
	point93	93	387	48	2	48	2	48	0	0	0	0
	point94	94	387	48	2	48	2	48	0	0	0	0
	point95	95	387	48	2	48	2	48	0	0	0	0

	point96	96	387	48	2	48	2	48	0	0	0	0
	point97	97	387	48	2	48	2	48	0	0	0	0
	point98	98	387	48	2	48	2	48	0	0	0	0
	point99	99	387	48	2	48	2	48	0	0	0	0
	point100	100	387	48	2	48	2	48	0	0	0	0
	point101	101	387	48	2	48	2	48	0	0	0	0
	point102	102	387	48	2	48	2	48	0	0	0	0
	point103	103	387	48	2	48	2	48	0	0	0	0
	point104	104	387	48	2	48	2	48	0	0	0	0
	point105	105	387	48	2	48	2	48	0	0	0	0
	point106	106	387	48	2	48	2	48	0	0	0	0
	point107	107	387	48	2	48	2	48	0	0	0	0
	point108	108	387	48	2	48	2	48	0	0	0	0
	point109	109	387	48	2	48	2	48	0	0	0	0
	point110	110	387	48	2	48	2	48	0	0	0	0
	point111	111	387	48	2	48	2	48	0	0	0	0
	point112	112	387	48	2	48	2	48	0	0	0	0
	point113	113	387	48	2	48	2	48	0	0	0	0
	point114	114	387	48	2	48	2	48	0	0	0	0
	point115	115	387	48	2	48	2	48	0	0	0	0
	point116	116	387	48	2	48	2	48	0	0	0	0
	point117	117	387	48	2	48	2	48	0	0	0	0
	point118	118	387	48	2	48	2	48	0	0	0	0
	point119	119	387	48	2	48	2	48	0	0	0	0
	point120	120	387	48	2	48	2	48	0	0	0	0
	point121	121	387	48	2	48	2	48	0	0	0	0
	point122	122	387	48	2	48	2	48	0	0	0	0
	point123	123	387	48	2	48	2	48	0	0	0	0
	point124	124	387	48	2	48	2	48	0	0	0	0
	point125	125	387	48	2	48	2	48	0	0	0	0
	point126	126	387	48	2	48	2	48	0	0	0	0
	point127	127	387	48	2	48	2	48	0	0	0	0
	point128	128	387	48	2	48	2	48	0	0	0	0
	point129	129	387	48	2	48	2	48	0	0	0	0
	point130	130	387	48	2	48	2	48	0	0	0	0
	point131	131	387	48	2	48	2	48	0	0	0	0

	point132	132	387	48	2	48	2	48	0	0	0	0
	point133	133	387	48	2	48	2	48	0	0	0	0
	point134	134	387	48	2	48	2	48	0	0	0	0
	point135	135	387	48	2	48	2	48	0	0	0	0
	point136	136	387	48	2	48	2	48	0	0	0	0
	point137	137	387	48	2	48	2	48	0	0	0	0
	point138	138	387	48	2	48	2	48	0	0	0	0
	point139	139	387	48	2	48	2	48	0	0	0	0
	point140	140	387	48	2	48	2	48	0	0	0	0
	point141	141	387	48	2	48	2	48	0	0	0	0
	point142	142	387	48	2	48	2	48	0	0	0	0
	point143	143	387	48	2	48	2	48	0	0	0	0
	point144	144	387	48	2	48	2	48	0	0	0	0
	point145	145	387	48	2	48	2	48	0	0	0	0
	point146	146	387	48	2	48	2	48	0	0	0	0
	point147	147	387	48	2	48	2	48	0	0	0	0
	point148	148	387	48	2	48	2	48	0	0	0	0
	point149	149	387	48	2	48	2	48	0	0	0	0
	point150	150	387	48	2	48	2	48	0	0	0	0
	point151	151	387	48	2	48	2	48	0	0	0	0
	point152	152										
32nd Street NB	point153	153	46	40	0	0	0	0	0	0	0	0
	point154	154	46	40	0	0	0	0	0	0	0	0
	point155	155	46	40	0	0	0	0	0	0	0	0
	point156	156	46	40	0	0	0	0	0	0	0	0
	point157	157	46	40	0	0	0	0	0	0	0	0
	point158	158	46	40	0	0	0	0	0	0	0	0
	point159	159	46	40	0	0	0	0	0	0	0	0
	point160	160	46	40	0	0	0	0	0	0	0	0
	point161	161	46	40	0	0	0	0	0	0	0	0
	point162	162	46	40	0	0	0	0	0	0	0	0
	point163	163	46	40	0	0	0	0	0	0	0	0
	point164	164										
32nd Street SB	point179	179	46	40	0	0	0	0	0	0	0	0
	point180	180	46	40	0	0	0	0	0	0	0	0
	point181	181	46	40	0	0	0	0	0	0	0	0

	point182	182	46	40	0	0	0	0	0	0	0	0
	point183	183	46	40	0	0	0	0	0	0	0	0
	point184	184	46	40	0	0	0	0	0	0	0	0
	point185	185	46	40	0	0	0	0	0	0	0	0
	point186	186	46	40	0	0	0	0	0	0	0	0
	point187	187	46	40	0	0	0	0	0	0	0	0
	point188	188	46	40	0	0	0	0	0	0	0	0
	point189	189	46	40	0	0	0	0	0	0	0	0
	point190	190	46	40	0	0	0	0	0	0	0	0
	point191	191										
94 EB	point205	205	8346	105	296	105	70	105	0	0	0	0
	point206	206	8346	105	296	105	70	105	0	0	0	0
	point207	207	8346	105	296	105	70	105	0	0	0	0
	point208	208	8346	105	296	105	70	105	0	0	0	0
	point209	209	8346	105	296	105	70	105	0	0	0	0
	point210	210	8346	105	296	105	70	105	0	0	0	0
	point211	211	8346	105	296	105	70	105	0	0	0	0
	point212	212	8346	105	296	105	70	105	0	0	0	0
	point213	213	8346	105	296	105	70	105	0	0	0	0
	point214	214	8346	105	296	105	70	105	0	0	0	0
	point215	215	8346	105	296	105	70	105	0	0	0	0
	point216	216	8346	105	296	105	70	105	0	0	0	0
	point217	217	8346	105	296	105	70	105	0	0	0	0
	point218	218	8346	105	296	105	70	105	0	0	0	0
	point219	219	8346	105	296	105	70	105	0	0	0	0
	point220	220	8346	105	296	105	70	105	0	0	0	0
	point221	221	8346	105	296	105	70	105	0	0	0	0
	point222	222	8346	105	296	105	70	105	0	0	0	0
	point223	223	8346	105	296	105	70	105	0	0	0	0
	point224	224	8346	105	296	105	70	105	0	0	0	0
	point225	225	8346	105	296	105	70	105	0	0	0	0
	point226	226	8346	105	296	105	70	105	0	0	0	0
	point227	227	8346	105	296	105	70	105	0	0	0	0
	point228	228	8346	105	296	105	70	105	0	0	0	0
	point229	229	8346	105	296	105	70	105	0	0	0	0
	point230	230	8346	105	296	105	70	105	0	0	0	0

	point231	231	8346	105	296	105	70	105	0	0	0	0
	point232	232	8346	105	296	105	70	105	0	0	0	0
	point233	233	8346	105	296	105	70	105	0	0	0	0
	point234	234	8346	105	296	105	70	105	0	0	0	0
	point235	235	8346	105	296	105	70	105	0	0	0	0
	point236	236	8346	105	296	105	70	105	0	0	0	0
	point237	237	8346	105	296	105	70	105	0	0	0	0
	point238	238	8346	105	296	105	70	105	0	0	0	0
	point239	239	8346	105	296	105	70	105	0	0	0	0
	point240	240	8346	105	296	105	70	105	0	0	0	0
	point241	241	8346	105	296	105	70	105	0	0	0	0
	point242	242	8346	105	296	105	70	105	0	0	0	0
	point243	243	8346	105	296	105	70	105	0	0	0	0
	point244	244	8346	105	296	105	70	105	0	0	0	0
	point245	245	8346	105	296	105	70	105	0	0	0	0
	point246	246	8346	105	296	105	70	105	0	0	0	0
	point247	247	8346	105	296	105	70	105	0	0	0	0
	point248	248	8346	105	296	105	70	105	0	0	0	0
	point249	249	8346	105	296	105	70	105	0	0	0	0
	point250	250	8346	105	296	105	70	105	0	0	0	0
	point251	251	8346	105	296	105	70	105	0	0	0	0
	point252	252										
94 WB	point253	253	7192	105	255	105	60	105	0	0	0	0
	point254	254	7192	105	255	105	60	105	0	0	0	0
	point255	255	7192	105	255	105	60	105	0	0	0	0
	point256	256	7192	105	255	105	60	105	0	0	0	0
	point257	257	7192	105	255	105	60	105	0	0	0	0
	point258	258	7192	105	255	105	60	105	0	0	0	0
	point259	259	7192	105	255	105	60	105	0	0	0	0
	point260	260	7192	105	255	105	60	105	0	0	0	0
	point261	261	7192	105	255	105	60	105	0	0	0	0
	point262	262	7192	105	255	105	60	105	0	0	0	0
	point263	263	7192	105	255	105	60	105	0	0	0	0
	point264	264	7192	105	255	105	60	105	0	0	0	0
	point265	265	7192	105	255	105	60	105	0	0	0	0
	point266	266	7192	105	255	105	60	105	0	0	0	0

	point267	267	7192	105	255	105	60	105	0	0	0	0
	point268	268	7192	105	255	105	60	105	0	0	0	0
	point269	269	7192	105	255	105	60	105	0	0	0	0
	point270	270	7192	105	255	105	60	105	0	0	0	0
	point271	271	7192	105	255	105	60	105	0	0	0	0
	point272	272	7192	105	255	105	60	105	0	0	0	0
	point273	273	7192	105	255	105	60	105	0	0	0	0
	point274	274	7192	105	255	105	60	105	0	0	0	0
	point275	275	7192	105	255	105	60	105	0	0	0	0
	point276	276	7192	105	255	105	60	105	0	0	0	0
	point277	277	7192	105	255	105	60	105	0	0	0	0
	point278	278	7192	105	255	105	60	105	0	0	0	0
	point279	279	7192	105	255	105	60	105	0	0	0	0
	point280	280	7192	105	255	105	60	105	0	0	0	0
	point281	281	7192	105	255	105	60	105	0	0	0	0
	point282	282	7192	105	255	105	60	105	0	0	0	0
	point283	283	7192	105	255	105	60	105	0	0	0	0
	point284	284	7192	105	255	105	60	105	0	0	0	0
	point285	285	7192	105	255	105	60	105	0	0	0	0
	point286	286	7192	105	255	105	60	105	0	0	0	0
	point287	287	7192	105	255	105	60	105	0	0	0	0
	point288	288	7192	105	255	105	60	105	0	0	0	0
	point289	289	7192	105	255	105	60	105	0	0	0	0
	point290	290	7192	105	255	105	60	105	0	0	0	0
	point291	291	7192	105	255	105	60	105	0	0	0	0
	point292	292	7192	105	255	105	60	105	0	0	0	0
	point293	293	7192	105	255	105	60	105	0	0	0	0
	point294	294	7192	105	255	105	60	105	0	0	0	0
	point295	295	7192	105	255	105	60	105	0	0	0	0
	point296	296	7192	105	255	105	60	105	0	0	0	0
	point297	297	7192	105	255	105	60	105	0	0	0	0
	point298	298	7192	105	255	105	60	105	0	0	0	0
	point299	299										
94 WB Ramp Off	point300	300	793	89	28	89	7	89	0	0	0	0
	point301	301	793	89	28	89	7	89	0	0	0	0
	point302	302	793	89	28	89	7	89	0	0	0	0

		point303	303	793	89	28	89	7	89	0	0	0	0
		point304	304	793	89	28	89	7	89	0	0	0	0
		point305	305	793	89	28	89	7	89	0	0	0	0
		point306	306	793	89	28	89	7	89	0	0	0	0
		point307	307	793	89	28	89	7	89	0	0	0	0
		point308	308	793	89	28	89	7	89	0	0	0	0
		point309	309	793	89	28	89	7	89	0	0	0	0
		point310	310	793	89	28	89	7	89	0	0	0	0
		point311	311										
94 WB Ramp On		point312	312	238	48	8	48	2	48	0	0	0	0
		point313	313	238	48	8	48	2	48	0	0	0	0
		point314	314	238	48	8	48	2	48	0	0	0	0
		point315	315	238	48	8	48	2	48	0	0	0	0
		point316	316	238	48	8	48	2	48	0	0	0	0
		point317	317	238	48	8	48	2	48	0	0	0	0
		point318	318										
32nd Street NB-2		point327	327	46	40	0	0	0	0	0	0	0	0
		point165	165	46	40	0	0	0	0	0	0	0	0
		point166	166	46	40	0	0	0	0	0	0	0	0
		point167	167	46	40	0	0	0	0	0	0	0	0
		point168	168	46	40	0	0	0	0	0	0	0	0
		point169	169	46	40	0	0	0	0	0	0	0	0
		point170	170	46	40	0	0	0	0	0	0	0	0
		point171	171	46	40	0	0	0	0	0	0	0	0
		point172	172	46	40	0	0	0	0	0	0	0	0
		point173	173	46	40	0	0	0	0	0	0	0	0
		point174	174	46	40	0	0	0	0	0	0	0	0
		point175	175	46	40	0	0	0	0	0	0	0	0
		point176	176	46	40	0	0	0	0	0	0	0	0
		point177	177	46	40	0	0	0	0	0	0	0	0
		point178	178										
32nd Street SB-2		point328	328	46	40	0	0	0	0	0	0	0	0
		point192	192	46	40	0	0	0	0	0	0	0	0
		point193	193	46	40	0	0	0	0	0	0	0	0
		point194	194	46	40	0	0	0	0	0	0	0	0
		point195	195	46	40	0	0	0	0	0	0	0	0

		point196	196	46	40	0	0	0	0	0	0	0	0
		point197	197	46	40	0	0	0	0	0	0	0	0
		point198	198	46	40	0	0	0	0	0	0	0	0
		point199	199	46	40	0	0	0	0	0	0	0	0
		point200	200	46	40	0	0	0	0	0	0	0	0
		point201	201	46	40	0	0	0	0	0	0	0	0
		point202	202	46	40	0	0	0	0	0	0	0	0
		point203	203	46	40	0	0	0	0	0	0	0	0
		point204	204										

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **B80709N1**
RUN: **Facades**

Receiver Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**				**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**	**Calc.**
			m	m	m	m	dBA	dBA	dB	dB	
F1-1	3	0	561.1	433.4	53.29	1.52	0.00	66	10.0	8.0	Y
F2-1	4	0	561.2	442.3	53.42	1.52	0.00	66	10.0	8.0	Y
F3-1	5	0	562.8	454.2	53.28	1.52	0.00	66	10.0	8.0	Y
F4-1	6	0	562.7	463.5	53.44	1.52	0.00	66	10.0	8.0	Y
F5-1	7	0	569.0	466.9	52.24	1.52	0.00	66	10.0	8.0	Y
F6-1	8	0	574.9	463.6	51.03	1.52	0.00	66	10.0	8.0	Y
F7-1	9	0	575.0	454.3	50.86	1.52	0.00	66	10.0	8.0	Y
F8-1	10	0	573.9	442.3	50.88	1.52	0.00	66	10.0	8.0	Y
F9-1	11	0	573.5	433.2	50.79	1.52	0.00	66	10.0	8.0	Y
F10-1	12	0	567.2	429.6	52.02	1.52	0.00	66	10.0	8.0	Y
F11-1	13	0	587.4	465.7	50.11	1.52	0.00	66	10.0	8.0	Y
F12-1	14	0	599.5	465.5	49.85	1.52	0.00	66	10.0	8.0	Y
F13-1	15	0	611.7	465.4	49.59	1.52	0.00	66	10.0	8.0	Y
F14-1	16	0	615.2	456.8	49.51	1.52	0.00	66	10.0	8.0	Y
F15-1	17	0	611.4	448.7	49.59	1.52	0.00	66	10.0	8.0	Y
F16-1	18	0	599.5	448.8	49.85	1.52	0.00	66	10.0	8.0	Y
F17-1	19	0	587.3	448.9	50.11	1.52	0.00	66	10.0	8.0	Y
F18-1	20	0	583.4	457.2	50.19	1.52	0.00	66	10.0	8.0	Y
F19-1	21	0	631.1	466.9	47.77	1.52	0.00	66	10.0	8.0	Y
F20-1	22	0	638.4	462.0	46.37	1.52	0.00	66	10.0	8.0	Y
F21-1	23	0	638.3	451.3	46.31	1.52	0.00	66	10.0	8.0	Y
F22-1	24	0	638.1	440.2	46.26	1.52	0.00	66	10.0	8.0	Y

F23-1	25	0	630.5	436.2	47.65	1.52	0.00	66	10.0	8.0	Y
F24-1	26	0	623.3	440.4	49.02	1.52	0.00	66	10.0	8.0	Y
F25-1	27	0	623.3	451.3	49.11	1.52	0.00	66	10.0	8.0	Y
F26-1	28	0	623.5	462.1	49.15	1.52	0.00	66	10.0	8.0	Y
F27-1	29	0	586.9	441.9	50.12	1.52	0.00	66	10.0	8.0	Y
F28-1	30	0	596.0	441.8	49.94	1.52	0.00	66	10.0	8.0	Y
F29-1	31	0	605.1	441.9	49.77	1.52	0.00	66	10.0	8.0	Y
F30-1	32	0	609.0	436.2	49.69	1.52	0.00	66	10.0	8.0	Y
F31-1	33	0	605.1	429.8	49.77	1.52	0.00	66	10.0	8.0	Y
F32-1	34	0	595.8	429.8	49.94	1.52	0.00	66	10.0	8.0	Y
F33-1	35	0	586.5	429.8	50.12	1.52	0.00	66	10.0	8.0	Y
F34-1	36	0	583.0	435.3	50.19	1.52	0.00	66	10.0	8.0	Y
F1-2	37	0	561.1	433.4	53.29	4.57	0.00	66	10.0	8.0	Y
F2-2	38	0	561.2	442.3	53.42	4.57	0.00	66	10.0	8.0	Y
F3-2	39	0	562.8	454.2	53.28	4.57	0.00	66	10.0	8.0	Y
F4-2	40	0	562.7	463.5	53.44	4.57	0.00	66	10.0	8.0	Y
F5-2	41	0	569.0	466.9	52.24	4.57	0.00	66	10.0	8.0	Y
F6-2	42	0	574.9	463.6	51.03	4.57	0.00	66	10.0	8.0	Y
F7-2	43	0	575.0	454.3	50.86	4.57	0.00	66	10.0	8.0	Y
F8-2	44	0	573.9	442.3	50.88	4.57	0.00	66	10.0	8.0	Y
F9-2	45	0	573.5	433.2	50.79	4.57	0.00	66	10.0	8.0	Y
F10-2	46	0	567.2	429.6	52.02	4.57	0.00	66	10.0	8.0	Y
F11-2	47	0	587.4	465.7	50.11	4.57	0.00	66	10.0	8.0	Y
F12-2	48	0	599.5	465.5	49.85	4.57	0.00	66	10.0	8.0	Y
F13-2	49	0	611.7	465.4	49.59	4.57	0.00	66	10.0	8.0	Y
F14-2	50	0	615.2	456.8	49.51	4.57	0.00	66	10.0	8.0	Y
F15-2	51	0	611.4	448.7	49.59	4.57	0.00	66	10.0	8.0	Y
F16-2	52	0	599.5	448.8	49.85	4.57	0.00	66	10.0	8.0	Y
F17-2	53	0	587.3	448.9	50.11	4.57	0.00	66	10.0	8.0	Y
F18-2	54	0	583.4	457.2	50.19	4.57	0.00	66	10.0	8.0	Y
F19-2	55	0	631.1	466.9	47.77	4.57	0.00	66	10.0	8.0	Y
F20-2	56	0	638.4	462.0	46.37	4.57	0.00	66	10.0	8.0	Y
F21-2	57	0	638.3	451.3	46.31	4.57	0.00	66	10.0	8.0	Y
F22-2	58	0	638.1	440.2	46.26	4.57	0.00	66	10.0	8.0	Y
F23-2	59	0	630.5	436.2	47.65	4.57	0.00	66	10.0	8.0	Y
F24-2	60	0	623.3	440.4	49.02	4.57	0.00	66	10.0	8.0	Y

F25-2	61	0	623.3	451.3	49.11	4.57	0.00	66	10.0	8.0	Y
F26-2	62	0	623.5	462.1	49.15	4.57	0.00	66	10.0	8.0	Y
F27-2	63	0	586.9	441.9	50.12	4.57	0.00	66	10.0	8.0	Y
F28-2	64	0	596.0	441.8	49.94	4.57	0.00	66	10.0	8.0	Y
F29-2	65	0	605.1	441.9	49.77	4.57	0.00	66	10.0	8.0	Y
F30-2	66	0	609.0	436.2	49.69	4.57	0.00	66	10.0	8.0	Y
F31-2	67	0	605.1	429.8	49.77	4.57	0.00	66	10.0	8.0	Y
F32-2	68	0	595.8	429.8	49.94	4.57	0.00	66	10.0	8.0	Y
F33-2	69	0	586.5	429.8	50.12	4.57	0.00	66	10.0	8.0	Y
F34-2	70	0	583.0	435.3	50.19	4.57	0.00	66	10.0	8.0	Y
F1-3	71	0	561.1	433.4	53.29	7.62	0.00	66	10.0	8.0	Y
F2-3	72	0	561.2	442.3	53.42	7.62	0.00	66	10.0	8.0	Y
F3-3	73	0	562.8	454.2	53.28	7.62	0.00	66	10.0	8.0	Y
F4-3	74	0	562.7	463.5	53.44	7.62	0.00	66	10.0	8.0	Y
F5-3	75	0	569.0	466.9	52.24	7.62	0.00	66	10.0	8.0	Y
F6-3	76	0	574.9	463.6	51.03	7.62	0.00	66	10.0	8.0	Y
F7-3	77	0	575.0	454.3	50.86	7.62	0.00	66	10.0	8.0	Y
F8-3	78	0	573.9	442.3	50.88	7.62	0.00	66	10.0	8.0	Y
F9-3	79	0	573.5	433.2	50.79	7.62	0.00	66	10.0	8.0	Y
F10-3	80	0	567.2	429.6	52.02	7.62	0.00	66	10.0	8.0	Y
F11-3	81	0	587.4	465.7	50.11	7.62	0.00	66	10.0	8.0	Y
F12-3	82	0	599.5	465.5	49.85	7.62	0.00	66	10.0	8.0	Y
F13-3	83	0	611.7	465.4	49.59	7.62	0.00	66	10.0	8.0	Y
F14-3	84	0	615.2	456.8	49.51	7.62	0.00	66	10.0	8.0	Y
F15-3	85	0	611.4	448.7	49.59	7.62	0.00	66	10.0	8.0	Y
F16-3	86	0	599.5	448.8	49.85	7.62	0.00	66	10.0	8.0	Y
F17-3	87	0	587.3	448.9	50.11	7.62	0.00	66	10.0	8.0	Y
F18-3	88	0	583.4	457.2	50.19	7.62	0.00	66	10.0	8.0	Y
F19-3	89	0	631.1	466.9	47.77	7.62	0.00	66	10.0	8.0	Y
F20-3	90	0	638.4	462.0	46.37	7.62	0.00	66	10.0	8.0	Y
F21-3	91	0	638.3	451.3	46.31	7.62	0.00	66	10.0	8.0	Y
F22-3	92	0	638.1	440.2	46.26	7.62	0.00	66	10.0	8.0	Y
F23-3	93	0	630.5	436.2	47.65	7.62	0.00	66	10.0	8.0	Y
F24-3	94	0	623.3	440.4	49.02	7.62	0.00	66	10.0	8.0	Y
F25-3	3	0	623.3	451.3	49.11	7.62	0.00	66	10.0	8.0	Y
F26-3	95	0	623.5	462.1	49.15	7.62	0.00	66	10.0	8.0	Y

F27-3	96	0	586.9	441.9	50.12	7.62	0.00	66	10.0	8.0	Y
F28-3	97	0	596.0	441.8	49.94	7.62	0.00	66	10.0	8.0	Y
F29-3	98	0	605.1	441.9	49.77	7.62	0.00	66	10.0	8.0	Y
F30-3	99	0	609.0	436.2	49.69	7.62	0.00	66	10.0	8.0	Y
F31-3	100	0	605.1	429.8	49.77	7.62	0.00	66	10.0	8.0	Y
F32-3	101	0	595.8	429.8	49.94	7.62	0.00	66	10.0	8.0	Y
F33-3	102	0	586.5	429.8	50.12	7.62	0.00	66	10.0	8.0	Y
F34-3	114	0	583.0	435.3	50.19	7.62	0.00	66	10.0	8.0	Y

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**

INPUT: BARRIERS
PROJECT/CONTRACT: **B80709N1**
RUN: **Facades**

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht Perturbs			On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		m	m	$/sq m	$/cu m	m	m:m	$/m			m	m	m	m	m				
Building A	W	0.00	30.48	0.00				0.00	point1	1	562.0	430.5	53.76	7.00	0.00	0	0		
									point2	2	562.1	448.5	54.79	7.00	0.00	0	0		
									point3	3	563.6	448.4	54.60	7.00	0.00	0	0		
									point4	4	563.6	466.4	54.76	7.00	0.00	0	0		
									point5	5	574.4	466.3	53.46	7.00	0.00	0	0		
									point6	6	574.4	448.4	53.30	7.00	0.00	0	0		
									point7	7	572.9	448.4	53.48	7.00	0.00	0	0		
									point8	8	572.8	430.4	52.59	7.00	0.00	0	0		
									point9	9	562.0	430.5	53.76	7.00					
Building B	W	0.00	30.48	0.00				0.00	point10	10	584.3	449.5	50.17	8.00	0.00	0	0		
									point11	11	584.3	465.0	50.18	8.00	0.00	0	0		
									point12	12	614.3	464.7	49.53	8.00	0.00	0	0		
									point13	13	614.4	449.5	49.52	8.00	0.00	0	0		
									point14	14	584.3	449.5	50.17	8.00					
Building C	W	0.00	30.48	0.00				0.00	point15	15	624.2	438.4	48.85	6.67	0.00	0	0		
									point16	16	624.3	464.9	49.03	6.49	0.00	0	0		
									point17	17	628.8	464.8	48.18	7.34	0.00	0	0		
									point18	18	628.9	466.1	48.18	7.34	0.00	0	0		
									point19	19	637.6	466.1	46.56	8.96	0.00	0	0		
									point20	20	637.2	436.8	46.38	9.14	0.00	0	0		
									point21	21	628.6	436.8	48.00	7.52	0.00	0	0		
									point22	22	628.7	438.2	48.00	7.52	0.00	0	0		
									point23	23	624.2	438.4	48.85	6.67					
Building D	W	0.00	30.48	0.00				0.00	point24	24	583.9	441.2	50.17	9.00	0.00	0	0		
									point25	25	607.9	441.2	49.71	9.00	0.00	0	0		
									point26	26	607.9	430.5	49.71	9.00	0.00	0	0		
									point27	27	583.9	430.4	50.17	9.00	0.00	0	0		
									point28	28	583.9	441.2	50.17	9.00					

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**

INPUT: TERRAIN LINES
PROJECT/CONTRACT: **B80709N1**
RUN: **Facades**

Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		m	m	m
Terrain Line1	1	1,077.5	420.3	30.50
	2	1,039.2	433.7	30.50
	3	959.0	406.8	30.50
	4	889.3	376.2	30.50
	5	881.3	363.6	30.50
Terrain Line2	6	884.9	342.3	30.50
	7	890.4	339.1	30.50
Terrain Line3	8	1,005.8	349.9	30.50
	9	1,098.6	357.9	30.50
	10	1,099.8	339.0	30.50
	11	1,088.5	327.6	30.50
Terrain Line4	12	919.7	315.0	30.50
	13	914.2	285.2	30.50
	14	836.5	224.3	30.50
	15	820.1	197.8	30.50
	16	778.1	198.7	30.50
	17	749.5	222.2	30.50
	18	708.0	214.6	30.50
	19	686.1	220.1	30.50
	20	684.0	231.4	30.50
	21	693.7	262.9	30.50
	22	622.7	228.9	30.50
	23	610.1	192.8	30.50
Terrain Line5	24	763.7	363.2	36.60
	25	755.0	363.2	36.60
	26	700.7	342.9	36.60
	27	671.7	341.9	36.60
	28	681.0	373.2	36.60
	29	680.3	413.2	36.60
	30	695.7	427.9	36.60
	31	706.0	454.6	36.60
	32	710.7	450.3	36.60
	33	721.0	429.9	36.60
	34	755.0	423.2	36.60
	35	771.7	409.9	36.60
	36	793.7	420.9	36.60
	37	837.4	404.9	36.60

	38	1,038.7	477.6	36.60
	39	1,122.1	724.3	36.60
Terrain Line6	40	471.4	151.4	36.60
	41	486.1	206.5	36.60
	42	506.6	213.2	36.60
	43	535.2	207.7	36.60
	44	672.6	273.3	36.60
	45	718.3	295.1	36.60
Terrain Line7	46	771.3	341.3	36.60
	47	763.7	331.2	36.60
Terrain Line8	48	592.0	656.3	42.70
	49	625.1	508.4	42.70
	50	640.4	491.7	42.70
Terrain Line9	51	635.2	653.6	42.70
	52	712.8	541.5	42.70
	53	731.6	544.1	42.70
	54	745.9	527.3	42.70
	55	768.2	497.9	42.70
	56	785.8	489.1	42.70
Terrain Line10	57	648.0	474.4	42.70
	58	653.1	450.0	42.70
	59	653.5	424.8	42.70
	60	660.2	392.1	42.70
	61	645.9	374.4	42.70
	62	625.8	363.9	42.70
	63	619.1	348.8	42.70
	64	565.3	317.5	42.70
Terrain Line11	65	579.3	300.4	42.70
	66	581.4	294.4	42.70
Terrain Line12	67	567.4	239.2	42.70
	68	527.2	220.8	42.70
	69	514.4	221.7	42.70
Terrain Line13	70	487.4	231.8	42.70
	71	471.3	226.8	42.70
Terrain Line14	72	470.2	203.1	42.70
	73	439.4	145.6	42.70
Terrain Line15	74	431.3	122.7	42.70
	75	430.2	62.0	42.70
Terrain Line16	76	792.1	473.8	42.70
	77	828.6	463.2	42.70
	78	891.0	455.2	42.70
	79	932.3	477.5	42.70
Terrain Line17	80	945.5	493.9	42.70
	81	978.9	525.1	42.70
Terrain Line18	82	570.7	656.5	48.80
	83	583.9	607.5	48.80
	84	588.9	564.2	48.80
	85	574.7	543.8	48.80

	86	594.8	522.6	48.80
	87	599.0	493.5	48.80
Terrain Line20	101	352.6	313.7	48.80
	102	358.7	300.0	48.80
	103	394.2	275.1	48.80
	104	410.8	248.9	48.80
	105	410.3	235.9	48.80
	106	343.6	207.1	48.80
Terrain Line21	107	367.0	166.8	48.80
	108	374.3	157.2	48.80
	109	339.6	126.8	48.80
	110	337.3	75.6	48.80
	111	141.9	66.3	48.80
Terrain Line22	112	545.4	657.0	54.90
	113	559.4	613.9	54.90
	114	570.3	599.3	54.90
	115	560.0	572.1	54.90
	116	561.6	493.7	54.90
Terrain Line24	119	548.6	434.0	54.90
	120	520.3	353.0	54.90
	121	454.9	362.8	54.90
	122	445.4	404.6	54.90
	123	392.2	360.2	54.90
	124	366.3	368.6	54.90
	125	354.4	408.0	54.90
	126	351.7	455.7	54.90
	127	333.5	458.6	54.90
	128	298.8	377.9	54.90
Terrain Line25	129	305.1	345.3	54.90
	130	334.2	297.4	54.90
	131	383.9	266.2	54.90
	132	374.6	236.6	54.90
	133	251.9	189.5	54.90
Terrain Line26	134	528.5	655.4	61.00
	135	524.5	617.7	61.00
	136	536.1	580.3	61.00
	137	523.1	563.3	61.00
	138	519.1	536.0	61.00
	139	527.1	521.7	61.00
	140	525.5	508.0	61.00
	141	510.8	488.7	61.00
Terrain Line27	142	513.5	472.7	61.00
	143	479.4	404.7	61.00
	144	466.1	407.3	61.00
	145	442.8	454.0	61.00
	146	429.4	416.3	61.00
	147	408.1	413.0	61.00
	148	384.4	397.7	61.00

	149	377.1	427.7	61.00
	150	382.4	472.0	61.00
Terrain Line28	151	387.1	490.3	61.00
	152	350.1	576.0	61.00
	153	326.4	562.3	61.00
	154	300.4	490.0	61.00
Terrain Line29	155	302.4	470.8	61.00
	156	296.0	426.1	61.00
	157	239.4	378.8	61.00
Terrain Line30	158	224.0	356.1	61.00
	159	275.4	343.8	61.00
	160	283.0	311.1	61.00
	161	263.4	265.1	61.00
	162	167.4	268.4	61.00
Terrain Line31	163	305.2	651.0	67.10
	164	328.2	620.6	67.10
	165	349.2	634.3	67.10
	166	368.5	611.3	67.10
	167	411.2	592.3	67.10
	168	395.5	583.0	67.10
	169	414.2	559.6	67.10
	170	429.5	579.3	67.10
	171	449.2	537.6	67.10
	172	484.5	574.0	67.10
	173	485.8	600.6	67.10
	174	503.5	615.6	67.10
	175	508.5	654.6	67.10
Terrain Line32	176	169.9	651.1	71.00
	177	171.5	608.2	71.00
Terrain Line19	178	639.9	414.1	48.80
	179	621.9	399.3	48.80
	180	590.2	409.1	48.80
	181	572.2	395.8	48.80
	182	561.1	353.2	48.80
	183	542.0	333.7	48.80
	184	465.0	349.5	48.80
	185	447.0	348.2	48.80
	186	434.6	364.4	48.80
	187	399.7	336.0	48.80
	188	356.8	352.5	48.80
Pad A	189	560.2	428.8	53.30
	190	575.7	428.9	50.30
	191	575.9	467.6	50.90
	192	560.5	467.8	54.00
	193	560.5	429.2	53.30
Pad B	194	583.3	466.4	50.20
	195	615.7	466.3	49.50
	196	615.6	448.2	49.50

	197	583.0	448.2	50.20
	198	582.8	466.4	50.20
Pad C	199	622.7	436.0	49.10
	200	622.7	467.4	49.30
	201	639.1	467.4	46.30
	202	638.9	435.8	46.10
	203	622.9	435.7	49.10
Pad D	204	582.5	442.7	50.20
	205	609.6	442.5	49.70
	206	609.6	429.0	49.70
	207	582.2	429.0	50.20
	208	582.0	442.7	50.20

Eilar Associates, Inc. **7 August 2018**
MLO **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **B80709N1**
RUN: **Facades**
BARRIER DESIGN: **INPUT HEIGHTS**

ATMOSPHERICS: **20 deg C, 50% RH**

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	**No.**	**#DUs**	**Existing**	**No Barrier**					**With Barrier**			
			LAeq1h	**LAeq1h**		**Increase over existing**		**Type**	**Calculated**	**Noise Reduction**		
				Calculated	**Crit'n**	**Calculated**	**Crit'n**	**Impact**	**LAeq1h**	**Calculated**	**Goal**	**Calculated**
							Sub'l Inc					**minus**
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
F1-1	3	0	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
F2-1	4	0	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
F3-1	5	0	0.0	57.0	66	57.0	10	----	57.0	0.0	8	-8.0
F4-1	6	0	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
F5-1	7	0	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
F6-1	8	0	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
F7-1	9	0	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
F8-1	10	0	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
F9-1	11	0	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
F10-1	12	0	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
F11-1	13	0	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
F12-1	14	0	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
F13-1	15	0	0.0	58.9	66	58.9	10	----	58.9	0.0	8	-8.0
F14-1	16	0	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
F15-1	17	0	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
F16-1	18	0	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
F17-1	19	0	0.0	55.6	66	55.6	10	----	55.6	0.0	8	-8.0
F18-1	20	0	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
F19-1	21	0	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
F20-1	22	0	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
F21-1	23	0	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
F22-1	24	0	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
F23-1	25	0	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
F24-1	26	0	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0

F25-1	27	0	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
F26-1	28	0	0.0	58.9	66	58.9	10	----	58.9	0.0	8	-8.0
F27-1	29	0	0.0	44.0	66	44.0	10	----	44.0	0.0	8	-8.0
F28-1	30	0	0.0	42.6	66	42.6	10	----	42.6	0.0	8	-8.0
F29-1	31	0	0.0	50.7	66	50.7	10	----	50.7	0.0	8	-8.0
F30-1	32	0	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
F31-1	33	0	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0
F32-1	34	0	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
F33-1	35	0	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
F34-1	36	0	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
F1-2	37	0	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
F2-2	38	0	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
F3-2	39	0	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
F4-2	40	0	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
F5-2	41	0	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
F6-2	42	0	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
F7-2	43	0	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
F8-2	44	0	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
F9-2	45	0	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
F10-2	46	0	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
F11-2	47	0	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
F12-2	48	0	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
F13-2	49	0	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
F14-2	50	0	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
F15-2	51	0	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
F16-2	52	0	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
F17-2	53	0	0.0	59.0	66	59.0	10	----	59.0	0.0	8	-8.0
F18-2	54	0	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
F19-2	55	0	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
F20-2	56	0	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
F21-2	57	0	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
F22-2	58	0	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
F23-2	59	0	0.0	70.7	66	70.7	10	Snd Lvl	70.7	0.0	8	-8.0
F24-2	60	0	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
F25-2	61	0	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
F26-2	62	0	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
F27-2	63	0	0.0	47.6	66	47.6	10	----	47.6	0.0	8	-8.0
F28-2	64	0	0.0	45.1	66	45.1	10	----	45.1	0.0	8	-8.0
F29-2	65	0	0.0	51.9	66	51.9	10	----	51.9	0.0	8	-8.0
F30-2	66	0	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
F31-2	67	0	0.0	70.7	66	70.7	10	Snd Lvl	70.7	0.0	8	-8.0

F32-2	68	0	0.0	70.4	66	70.4	10	Snd Lvl	70.4	0.0	8	-8.0
F33-2	69	0	0.0	70.1	66	70.1	10	Snd Lvl	70.1	0.0	8	-8.0
F34-2	70	0	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
F1-3	71	0	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
F2-3	72	0	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
F3-3	73	0	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
F4-3	74	0	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
F5-3	75	0	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
F6-3	76	0	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
F7-3	77	0	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
F8-3	78	0	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
F9-3	79	0	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
F10-3	80	0	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
F11-3	81	0	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
F12-3	82	0	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
F13-3	83	0	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
F14-3	84	0	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
F15-3	85	0	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
F16-3	86	0	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
F17-3	87	0	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
F18-3	88	0	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
F19-3	89	0	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
F20-3	90	0	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
F21-3	91	0	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
F22-3	92	0	0.0	69.7	66	69.7	10	Snd Lvl	69.7	0.0	8	-8.0
F23-3	93	0	0.0	70.9	66	70.9	10	Snd Lvl	70.9	0.0	8	-8.0
F24-3	94	0	0.0	70.7	66	70.7	10	Snd Lvl	70.7	0.0	8	-8.0
F25-3	3	0	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
F26-3	95	0	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
F27-3	96	0	0.0	51.9	66	51.9	10	----	51.9	0.0	8	-8.0
F28-3	97	0	0.0	51.9	66	51.9	10	----	51.9	0.0	8	-8.0
F29-3	98	0	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
F30-3	99	0	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
F31-3	100	0	0.0	71.0	66	71.0	10	Snd Lvl	71.0	0.0	8	-8.0
F32-3	101	0	0.0	70.8	66	70.8	10	Snd Lvl	70.8	0.0	8	-8.0
F33-3	102	0	0.0	70.6	66	70.6	10	Snd Lvl	70.6	0.0	8	-8.0
F34-3	114	0	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
Dwelling Units		**# DUs**	**Noise Reduction**									
			Min	**Avg**	**Max**							
			dB	**dB**	**dB**							
All Selected		0	0.0	0.0	0.0							

All Impacted		0	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

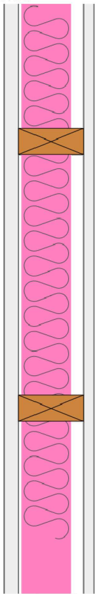
APPENDIX D

Sound Insulation Prediction Results

Sound Insulation Prediction (v9.0.5)

- Key No. 1866
Job Name: 32nd and C
Job No.: B80709 Initials:mouwenga
Date.:8/4/2018
File Name:exterior.ixl

Notes: Exterior Wall Assembly



STC 38
OITC 30

Mass-air-mass resonant frequency = =56 Hz

Panel Size = 2.7 ft x 4.0 ft

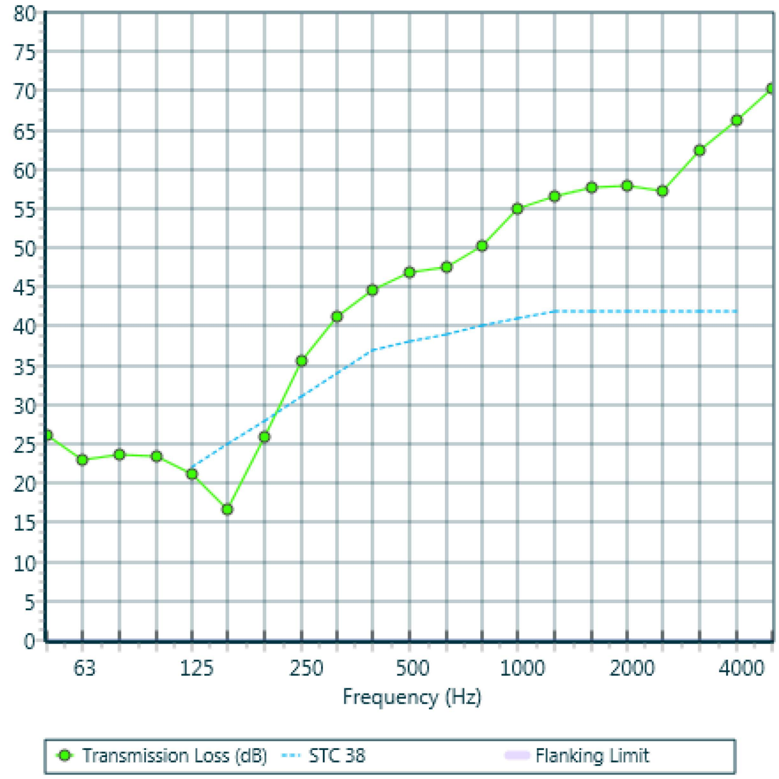
Partition surface mass = 12.4 lb/ft2

System description

Panel 1 : 1 x 0.87 in -Coat Plaster (sand:gypsum =3:1)

Frame: Timber stud; Cavity Width 3.9 in ,Stud spacing 16 in , 1 x fiberglass (0.6 lb/ft3) Thickness 3.0 in (ρ:10 lbs/ft3, Rf:3500 Rayl/m)
Panel 2 + 1 x 0.63 in Type X Gypsum Board

freq.(Hz)	TL(dB)	TL(dB)
50	26	
63	23	24
80	24	
100	23	
125	21	20
160	17	
200	26	
250	36	30
315	41	
400	45	
500	47	46
630	48	
800	50	
1000	55	53
1250	57	
1600	58	
2000	58	58
2500	57	
3150	62	
4000	66	65
5000	70	

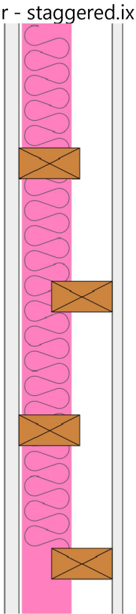


Sound Insulation Prediction (v9.0.5)

INSUL

- Key No. 1866
Job Name: 32nd and C
Job No.: B80709 Initials:mouwenga
Date.:8/4/2018
File Name:exterior - staggered.ixl

Notes: Exterior Wall Assembly - Staggered Stud



STC 59
OITC 46

Mass-air-mass resonant frequency = =46 Hz

Panel Size = 2.7 ft x 4.0 ft

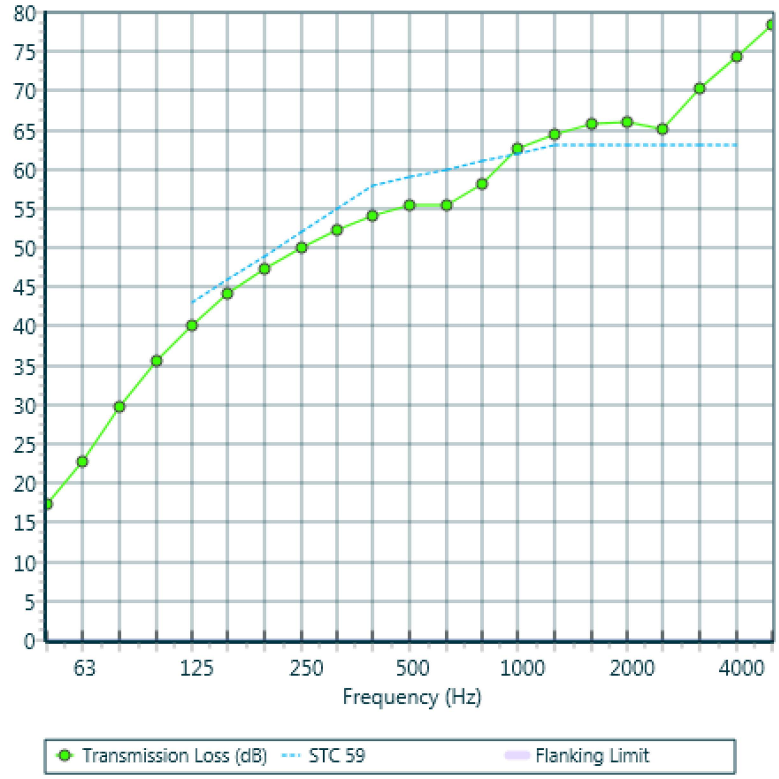
Partition surface mass = 12.4 lb/ft2

System description

Panel 1 : 1 x 0.87 in -Coat Plaster (sand:gypsum =3:1)

Frame: Staggered Stud; Cavity Width 5.7 in ,Stud spacing 16 in , 1 x fiberglass (0.6 lb/ft3) Thickness 3.0 in (ρ:10 lbs/ft3, Rf:3500 Rayl/m)
Panel 2 + 1 x 0.63 in Type X Gypsum Board

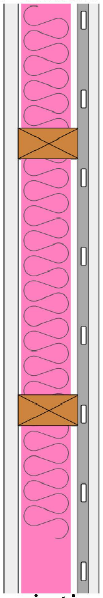
freq.(Hz)	TL(dB)	TL(dB)
50	17	21
63	23	
80	30	
100	35	39
125	40	
160	44	
200	47	49
250	50	
315	52	
400	54	55
500	55	
630	55	
800	58	61
1000	63	
1250	64	
1600	66	66
2000	66	
2500	65	
3150	70	73
4000	74	
5000	78	



Sound Insulation Prediction (v9.0.5)

 - Key No. 1866
Job Name: 32nd and C
Job No.: B80709 Initials:mouwenga
Date.:8/4/2018
File Name:exterior - resilient channels.ixl

Notes: Exterior Wall Assembly - Resilient Channels



STC 59
OITC 43

Mass-air-mass resonant frequency = =54 Hz

Panel Size = 2.7 ft x 4.0 ft

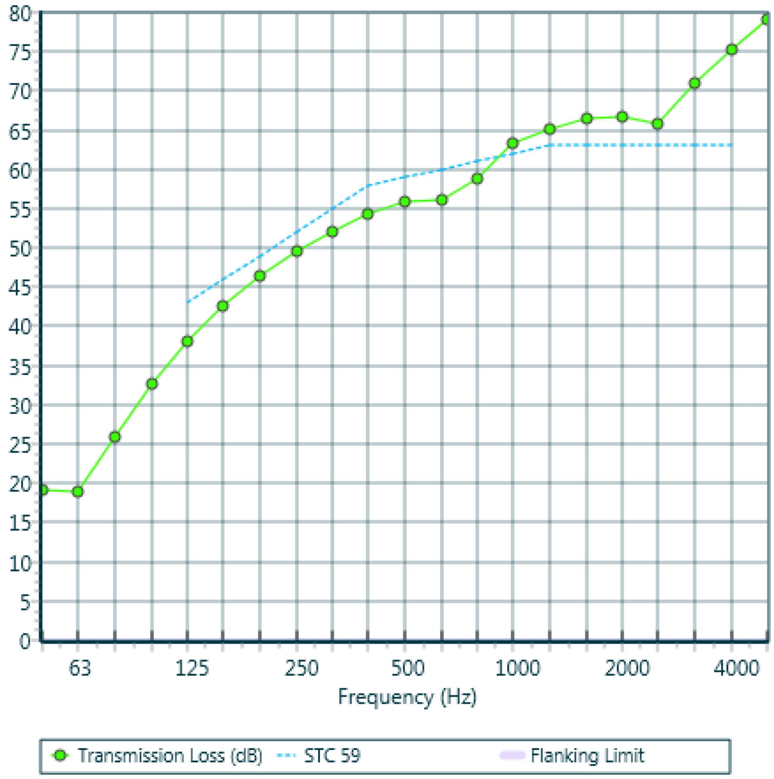
Partition surface mass = 12.4 lb/ft2

System description

Panel 1 : 1 x 0.87 in -Coat Plaster (sand:gypsum =3:1)

Frame: Timber stud + Resilient rail/bar; Cavity Width 4.2 in ,Stud spacing 16 in , 1 x fiberglass (0.6 lb/ft3) Thickness 3.0 in (ρ:10 lbs/ft3, Rf:3500 Rayl/m)
Panel 2 + 1 x 0.63 in Type X Gypsum Board

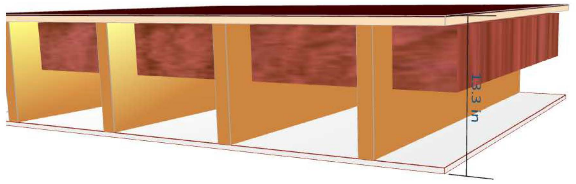
freq.(Hz)	TL(dB)	TL(dB)
50	19	
63	19	20
80	26	
100	33	
125	38	36
160	43	
200	46	
250	50	49
315	52	
400	54	
500	56	55
630	56	
800	59	
1000	63	62
1250	65	
1600	66	
2000	67	66
2500	66	
3150	71	
4000	75	74
5000	79	



Sound Insulation Prediction (v9.0.5)

- Key No. 1866
Job Name: 32nd and C
Job No.: B80709 Initials:mouwenga
Date.:8/4/2018
File Name:roof.ixl

Notes: Roof Assembly



STC 34
OITC 24

Mass-air-mass resonant frequency = =38 Hz

Panel Size = 2.7 ft x 4.0 ft

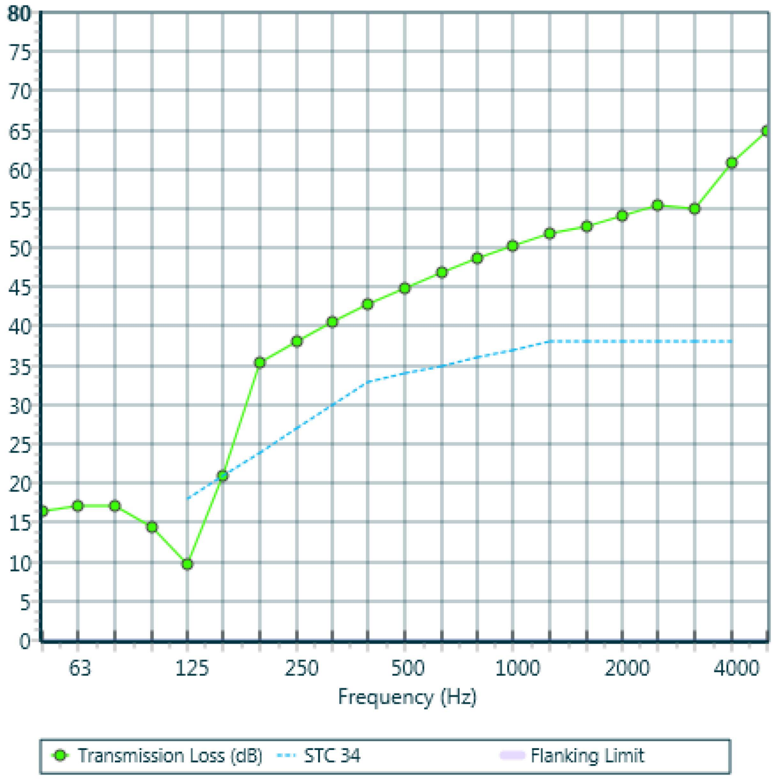
Partition surface mass = 6.61 lb/ft2

System description

Panel 1 : 1 x 0.12 in Asphalt Shingles (2.7lb/ft²) + 1 x 0.69 in Plywood

Frame: Timber stud; Cavity Width 12.0 in ,Stud spacing 16 in , 1 x fiberglass (0.6 lb/ft3) Thickness 6.0 in (p:10 lbs/ft3, Rf:3500 Rayl/m)
Panel 2 + 1 x 0.50 in Type X Gypsum Board

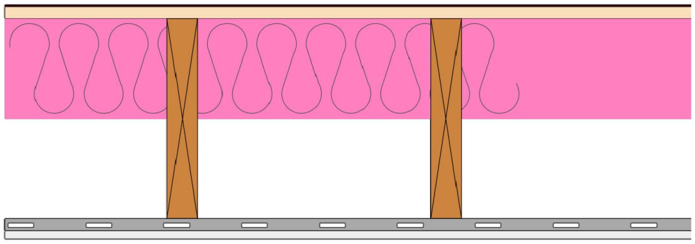
freq.(Hz)	TL(dB)	TL(dB)
50	17	
63	17	17
80	17	
100	14	
125	10	13
160	21	
200	35	
250	38	38
315	41	
400	43	
500	45	44
630	47	
800	49	
1000	50	50
1250	52	
1600	53	
2000	54	54
2500	55	
3150	55	
4000	61	58
5000	65	



Sound Insulation Prediction (v9.0.5)

 - Key No. 1866
Job Name: 32nd and C
Job No.: B80709 Initials:mouwenga
Date.:8/4/2018
File Name:roof - resilient rail.ixl

Notes: Roof Assembly - With Resilient Rail



STC 57
OITC 45

Mass-air-mass resonant frequency = =37 Hz

Panel Size = 2.7 ft x 4.0 ft

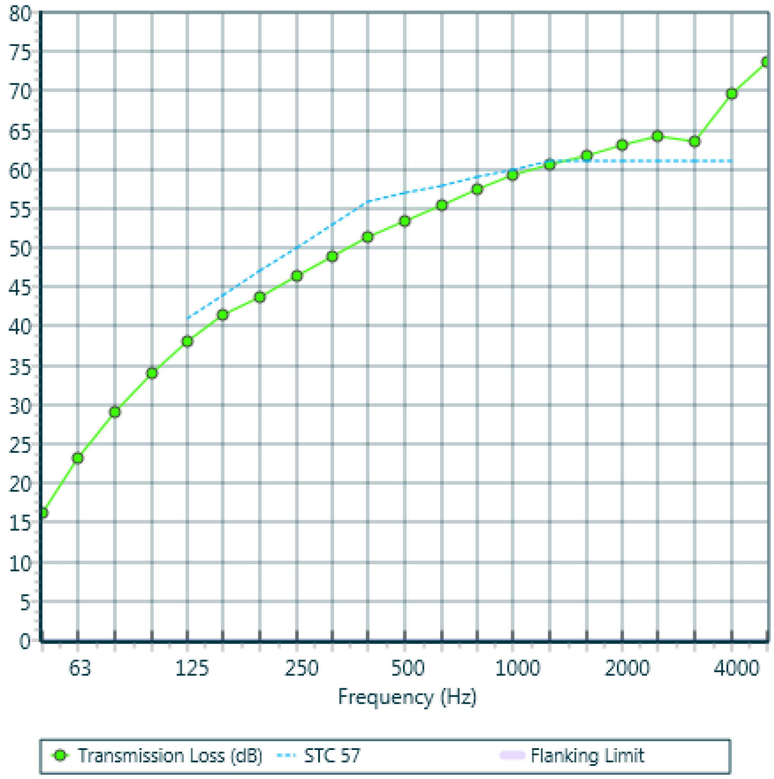
Partition surface mass = 6.61 lb/ft2

System description

Panel 1 : 1 x 0.12 in Asphalt Shingles (2.7lb/ft²) + 1 x 0.69 in Plywood

Frame: Solid Joist with resilient rail; Cavity Width 12.7 in ,Stud spacing 16 in , 1 x fiberglass (0.6 lb/ft3) Thickness 6.0 in (ρ:10 lbs/ft3, Rf:3500 Rayl/m)
Panel 2 + 1 x 0.50 in Type X Gypsum Board

freq.(Hz)	TL(dB)	TL(dB)
50	16	
63	23	20
80	29	
100	34	
125	38	37
160	41	
200	44	
250	46	46
315	49	
400	51	
500	53	53
630	56	
800	57	
1000	59	59
1250	61	
1600	62	
2000	63	63
2500	64	
3150	64	
4000	70	67
5000	74	



APPENDIX E

Exterior-to-Interior Noise Analysis

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Kitchen / Great Room (Unit 1 Evaluated)

Wall 1 of 4

Room Type : **Medium Soft**	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.8	0.8	0.8	0.8	0.7	0.7	: Fairly Absorptive Room
Room Absorption (Sabins) :	304	304	304	304	380	380	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**67.8**	**CNEL**	51.1	56.6	59.1	63.1	63.1	57.1	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**70.4**	**CNEL**	54.4	61.8	64.3	65.1	64.2	58.2	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	25	9	1	137.0	20	30	46	53	58	65
STC 28 1/2-inch Sliding Glass Door	N	9	7	1	63.0	23	23	22	32	43	37
STC 28 1/2-inch Dual Insulating Window	N	4	2	2	16.0	23	23	22	32	43	37
STC 28 1/2-inch Dual Insulating Window	Y	3	3	1	9.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **22.5** ft

Overall Area: **225** ft²
Volume: **5063** ft³

Number of Impacted Walls: **4**

Windows Open		
Interior Noise Level:	**57.5**	**CNEL**
Windows Closed		
Interior Noise Level:	**45.3**	**CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.4	61.8	64.3	65.1	64.2	58.2	: Exterior Wall Noise Exposure
15.5	16.5	16.5	16.9	17.0	17.0	: Transmission Loss
23.5	23.5	23.5	23.5	23.5	23.5	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
37.6	44.0	46.5	46.8	45.0	39.0	: Noise Level
52.1	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.4	61.8	64.3	65.1	64.2	58.2	: Exterior Wall Noise Exposure
20.9	25.8	26.1	36.4	46.5	41.4	: Transmission Loss
23.5	23.5	23.5	23.5	23.5	23.5	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
32.2	34.7	36.9	27.4	15.5	14.6	: Noise Level
40.0	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 4**
Project # : B80709N1
Room Name: Plan 1 - Kitchen / Great Room (Unit 1 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**70.3**	**CNEL**	53.6	59.1	61.6	65.6	65.6	59.6	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**72.0**	**CNEL**	55.8	62.7	65.2	66.8	66.3	60.3	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	18	9	1	136.0	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	N	2	6.5	2	26.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 162 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.8	62.7	65.2	66.8	66.3	60.3	: Exterior Wall Noise Exposure
20.4	27.8	29.9	40.1	49.9	45.2	: Transmission Loss
22.1	22.1	22.1	22.1	22.1	22.1	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
32.7	32.2	32.6	24.0	12.6	11.3	: Noise Level

37.5 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.8	62.7	65.2	66.8	66.3	60.3	: Exterior Wall Noise Exposure
20.4	27.8	29.9	40.1	49.9	45.2	: Transmission Loss
22.1	22.1	22.1	22.1	22.1	22.1	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
32.7	32.2	32.6	24.0	12.6	11.3	: Noise Level

37.5 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 3 of 4**
Project # : B80709N1
Room Name: Plan 1 - Kitchen / Great Room (Unit 1 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**68.7**	**CNEL**	52.0	57.5	60.0	64.0	64.0	58.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**70.9**	**CNEL**	54.9	62.1	64.6	65.7	64.9	58.9	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	17	9	1	133.0	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	Y	4	5	1	20.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **153** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.9	62.1	64.6	65.7	64.9	58.9	: Exterior Wall Noise Exposure
11.3	11.8	11.8	11.8	11.8	11.8	: Transmission Loss
21.8	21.8	21.8	21.8	21.8	21.8	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
40.6	47.3	49.8	50.9	49.1	43.1	: Noise Level
55.9	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.9	62.1	64.6	65.7	64.9	58.9	: Exterior Wall Noise Exposure
20.3	28.1	30.8	40.9	50.7	46.1	: Transmission Loss
21.8	21.8	21.8	21.8	21.8	21.8	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
31.6	31.0	30.8	21.8	10.3	8.9	: Noise Level
36.1	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 4 of 4**
Project # : B80709N1
Room Name: Plan 1 - Kitchen / Great Room (Unit 1 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	25	22.5	1	562.5	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 562.5 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
27.5	27.5	27.5	27.5	27.5	27.5	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
41.4	24.9	21.4	13.4	5.4	-4.6	: Noise Level
41.6	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
27.5	27.5	27.5	27.5	27.5	27.5	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
41.4	24.9	21.4	13.4	5.4	-4.6	: Noise Level
41.6	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Kitchen / Great Room (Unit 2 Evaluated)

Wall 1 of 3

Room Type : **Medium Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.8	0.8	0.8	0.8	0.7	0.7	: Fairly Absorptive Room
Room Absorption (Sabins) :	304	304	304	304	380	380	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**64.6**	**CNEL**	47.9	53.4	55.9	59.9	59.9	53.9	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**69.0**	**CNEL**	53.2	61.1	63.6	63.4	62.0	56.0	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	25	9	1	137.0	20	30	46	53	58	65
STC 25 1/2-inch Glass Door	N	9	7	1	63.0	14	21	24	22	30	29
STC 25 1/2-inch Dual Insulating Window	N	4	2	2	16.0	14	21	24	22	30	29
STC 25 1/2-inch Dual Insulating Window	Y	3	3	1	9.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **22.5** ft

Overall Area: **225** ft²
Volume: **5063** ft³

Number of Impacted Walls: **3**

Windows Open
Interior Noise Level: **56.1** **CNEL**

Windows Closed
Interior Noise Level: **45.2** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
53.2	61.1	63.6	63.4	62.0	56.0	: Exterior Wall Noise Exposure
13.9	16.3	16.7	16.5	16.9	16.9	: Transmission Loss
23.5	23.5	23.5	23.5	23.5	23.5	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
38.1	43.5	45.6	45.5	42.8	36.8	: Noise Level

50.9 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
53.2	61.1	63.6	63.4	62.0	56.0	: Exterior Wall Noise Exposure
16.6	24.3	28.0	26.1	34.1	33.1	: Transmission Loss
23.5	23.5	23.5	23.5	23.5	23.5	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
35.3	35.5	34.2	36.0	25.6	20.6	: Noise Level

41.5 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Kitchen / Great Room (Unit 2 Evaluated)

Wall 2 of 3

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**65.3**	**CNEL**	48.6	54.1	56.6	60.6	60.6	54.6	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**69.2**	**CNEL**	53.5	61.2	63.7	63.7	62.4	56.4	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	17	9	1	133.0	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	Y	4	5	1	20.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 153 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
53.5	61.2	63.7	63.7	62.4	56.4	: Exterior Wall Noise Exposure
11.2	11.8	11.8	11.8	11.8	11.8	: Transmission Loss
21.8	21.8	21.8	21.8	21.8	21.8	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
39.3	46.5	48.9	48.9	46.6	40.6	: Noise Level
54.2	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
53.5	61.2	63.7	63.7	62.4	56.4	: Exterior Wall Noise Exposure
18.6	27.2	32.7	30.8	38.8	37.8	: Transmission Loss
21.8	21.8	21.8	21.8	21.8	21.8	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
31.9	31.0	28.0	29.9	19.7	14.6	: Noise Level
36.6	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 3 of 3**
Project # : B80709N1
Room Name: Plan 1 - Kitchen / Great Room (Unit 2 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	25	22.5	1	562.5	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **562.5** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
27.5	27.5	27.5	27.5	27.5	27.5	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
41.4	24.9	21.4	13.4	5.4	-4.6	: Noise Level
41.6	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
27.5	27.5	27.5	27.5	27.5	27.5	: Wall Surface Area Factor
24.8	24.8	24.8	24.8	25.8	25.8	: Absorption
41.4	24.9	21.4	13.4	5.4	-4.6	: Noise Level
41.6	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Master Bedroom (Unit 16 Evaluated)

Wall 1 of 3

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	141	141	141	141	170	170	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**71.0**	**CNEL**	54.3	59.8	62.3	66.3	66.3	60.3	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**72.5**	**CNEL**	56.2	63.0	65.5	67.4	66.9	60.9	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	21	8.5	1	123.5	20	30	46	53	58	65
STC 31 5/8-inch Dual Insulating Window	Y	6.5	6	1	39.0	24	20	26	34	46	39
STC 31 5/8-inch Dual Insulating Window	N	4	2	2	16.0	24	20	26	34	46	39
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **9.7** ft
Overall Area: **178.5** ft²
Volume: **1731** ft³
Number of Impacted Walls: **3**

Windows Open
Interior Noise Level: **63.6** **CNEL**

Windows Closed
Interior Noise Level: **45.1** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.2	63.0	65.5	67.4	66.9	60.9	: Exterior Wall Noise Exposure
9.3	9.5	9.6	9.6	9.6	9.6	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
47.9	54.5	57.0	58.8	57.5	51.5	: Noise Level

63.6 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.2	63.0	65.5	67.4	66.9	60.9	: Exterior Wall Noise Exposure
20.9	24.5	30.6	39.4	50.5	44.1	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
36.4	39.5	35.9	28.9	16.6	17.0	: Noise Level

42.6 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 3**
Project # : B80709N1
Room Name: Plan 1 - Master Bedroom (Unit 16 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**69.4**	**CNEL**	52.7	58.2	60.7	64.7	64.7	58.7	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**71.4**	**CNEL**	55.3	62.3	64.8	66.2	65.5	59.5	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	5.3	8.5	1	35.1	20	30	46	53	58	65
STC 31 5/8-inch Dual Insulating Window	N	2	5	1	10.0	24	20	26	34	46	39
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 45.05 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.3	62.3	64.8	66.2	65.5	59.5	: Exterior Wall Noise Exposure
20.6	25.5	32.0	40.8	51.7	45.5	: Transmission Loss
16.5	16.5	16.5	16.5	16.5	16.5	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
29.7	31.9	27.9	20.4	8.1	8.3	: Noise Level

35.1 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.3	62.3	64.8	66.2	65.5	59.5	: Exterior Wall Noise Exposure
20.6	25.5	32.0	40.8	51.7	45.5	: Transmission Loss
16.5	16.5	16.5	16.5	16.5	16.5	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
29.7	31.9	27.9	20.4	8.1	8.3	: Noise Level

35.1 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 3 of 3**
Project # : B80709N1
Room Name: Plan 1 - Master Bedroom (Unit 16 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	21	9.7	1	203.7	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **203.7** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
23.1	23.1	23.1	23.1	23.1	23.1	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level

40.5 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
23.1	23.1	23.1	23.1	23.1	23.1	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level

40.5 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Master Bedroom (Unit 1 Evaluated)

Wall 1 of 3

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	141	141	141	141	170	170	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**67.8**	**CNEL**	51.1	56.6	59.1	63.1	63.1	57.1	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**70.4**	**CNEL**	54.4	61.8	64.3	65.1	64.2	58.2	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	21	8.5	1	123.5	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	Y	6.5	6	1	39.0	23	23	22	32	43	37
STC 28 1/2-inch Dual Insulating Window	N	4	2	2	16.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **9.7** ft

Overall Area: **178.5** ft²
Volume: **1731** ft³

Number of Impacted Walls: **3**

Windows Open
Interior Noise Level: **61.7** **CNEL**

Windows Closed
Interior Noise Level: **44.7** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.4	61.8	64.3	65.1	64.2	58.2	: Exterior Wall Noise Exposure
9.3	9.5	9.6	9.6	9.6	9.6	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
46.1	53.3	55.7	56.5	54.8	48.8	: Noise Level

61.6 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.4	61.8	64.3	65.1	64.2	58.2	: Exterior Wall Noise Exposure
20.7	26.4	27.2	37.4	47.4	42.4	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
34.8	36.4	38.2	28.7	17.0	16.0	: Noise Level

41.7 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 3**
Project # : B80709N1
Room Name: Plan 1 - Master Bedroom (Unit 1 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**70.3**	**CNEL**	53.6	59.1	61.6	65.6	65.6	59.6	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**72.0**	**CNEL**	55.8	62.7	65.2	66.8	66.3	60.3	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	5.3	8.5	1	35.1	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	N	2	5	1	10.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **45.05** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.8	62.7	65.2	66.8	66.3	60.3	: Exterior Wall Noise Exposure
20.5	27.2	28.6	38.7	48.7	43.8	: Transmission Loss
16.5	16.5	16.5	16.5	16.5	16.5	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
30.3	30.6	31.7	23.1	11.8	10.7	: Noise Level
35.9	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.8	62.7	65.2	66.8	66.3	60.3	: Exterior Wall Noise Exposure
20.5	27.2	28.6	38.7	48.7	43.8	: Transmission Loss
16.5	16.5	16.5	16.5	16.5	16.5	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
30.3	30.6	31.7	23.1	11.8	10.7	: Noise Level
35.9	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 3 of 3**
Project # : B80709N1
Room Name: Plan 1 - Master Bedroom (Unit 1 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	21	9.7	1	203.7	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **203.7** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
23.1	23.1	23.1	23.1	23.1	23.1	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level
40.5	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
23.1	23.1	23.1	23.1	23.1	23.1	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level
40.5	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Master Bedroom (Unit 2 Evaluated)

Wall 1 of 2

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	141	141	141	141	170	170	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**66.0**	**CNEL**	49.3	54.8	57.3	61.3	61.3	55.3	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**69.5**	**CNEL**	53.7	61.3	63.8	64.0	62.9	56.9	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	21	8.5	1	123.5	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	Y	6.5	6	1	39.0	14	21	24	22	30	29
STC 25 1/2-inch Dual Insulating Window	N	4	2	2	16.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **9.7** ft

Overall Area: **178.5** ft²
Volume: **1731** ft³

Number of Impacted Walls: **2**

Windows Open
Interior Noise Level: **60.8** **CNEL**

Windows Closed
Interior Noise Level: **45.2** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
53.7	61.3	63.8	64.0	62.9	56.9	: Exterior Wall Noise Exposure
9.1	9.5	9.6	9.6	9.6	9.6	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
45.6	52.8	55.3	55.5	53.5	47.5	: Noise Level

60.8 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
53.7	61.3	63.8	64.0	62.9	56.9	: Exterior Wall Noise Exposure
17.2	25.0	29.1	27.1	35.1	34.1	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
37.5	37.3	35.8	37.9	28.0	23.0	: Noise Level

43.4 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Master Bedroom (Unit 2 Evaluated)

Wall 2 of 2

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	21	9.7	1	203.7	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **203.7** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
23.1	23.1	23.1	23.1	23.1	23.1	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level
40.5	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
23.1	23.1	23.1	23.1	23.1	23.1	: Wall Surface Area Factor
21.5	21.5	21.5	21.5	22.3	22.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level
40.5	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Bedroom 2 (Unit 1 Evaluated)

Wall 1 of 3

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	112	112	112	112	135	135	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**68.7**	**CNEL**	52.0	57.5	60.0	64.0	64.0	58.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**70.9**	**CNEL**	54.9	62.1	64.6	65.7	64.9	58.9	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	21	8.5	1	126.5	20	30	46	53	58	65
STC 31 5/8-inch Dual Insulating Window	Y	6.5	6	1	39.0	24	20	26	34	46	39
STC 31 5/8-inch Dual Insulating Window	N	6.5	2	1	13.0	24	20	26	34	46	39
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **7.7** ft **Overall Area:** **178.5** ft²
Volume: **1374** ft³

Number of Impacted Walls: **3**

Windows Open
Interior Noise Level: **63.2** **CNEL**

Windows Closed
Interior Noise Level: **45.1** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.9	62.1	64.6	65.7	64.9	58.9	: Exterior Wall Noise Exposure
9.3	9.5	9.6	9.6	9.6	9.6	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
47.6	54.6	57.0	58.1	56.5	50.5	: Noise Level

63.1 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.9	62.1	64.6	65.7	64.9	58.9	: Exterior Wall Noise Exposure
20.8	24.7	30.9	39.7	50.7	44.3	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
36.1	39.4	35.7	28.0	15.4	15.9	: Noise Level

42.4 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Bedroom 2 (Unit 1 Evaluated)

Wall 2 of 3

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**70.3**	**CNEL**	53.6	59.1	61.6	65.6	65.6	59.6	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**72.0**	**CNEL**	55.8	62.7	65.2	66.8	66.3	60.3	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	4.5	8.5	1	28.3	20	30	46	53	58	65
STC 31 5/8-inch Dual Insulating Window	N	2	5	1	10.0	24	20	26	34	46	39
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 38.25 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.8	62.7	65.2	66.8	66.3	60.3	: Exterior Wall Noise Exposure
20.7	25.0	31.3	40.1	51.1	44.8	: Transmission Loss
15.8	15.8	15.8	15.8	15.8	15.8	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
30.4	33.0	29.2	22.0	9.7	10.0	: Noise Level
36.1	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.8	62.7	65.2	66.8	66.3	60.3	: Exterior Wall Noise Exposure
20.7	25.0	31.3	40.1	51.1	44.8	: Transmission Loss
15.8	15.8	15.8	15.8	15.8	15.8	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
30.4	33.0	29.2	22.0	9.7	10.0	: Noise Level
36.1	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 3 of 3**
Project # : B80709N1
Room Name: Plan 1 - Bedroom 2 (Unit 1 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	21	7.7	1	161.7	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **161.7** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
22.1	22.1	22.1	22.1	22.1	22.1	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level
40.5	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
22.1	22.1	22.1	22.1	22.1	22.1	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level
40.5	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Bedroom 2 (Unit 16 Evaluated)

Wall 1 of 3

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	112	112	112	112	135	135	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**57.5**	**CNEL**	40.8	46.3	48.8	52.8	52.8	46.8	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.5**	**CNEL**	52.1	60.4	62.9	61.4	58.9	52.9	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	21	8.5	1	126.5	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	Y	6.5	6	1	39.0	23	23	22	32	43	37
STC 28 1/2-inch Dual Insulating Window	N	6.5	2	1	13.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **7.7** ft

Overall Area: **178.5** ft²

Volume: **1374** ft³

Number of Impacted Walls: **3**

Windows Open
Interior Noise Level: **59.8** **CNEL**

Windows Closed
Interior Noise Level: **44.4** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.1	60.4	62.9	61.4	58.9	52.9	: Exterior Wall Noise Exposure
9.3	9.6	9.6	9.6	9.6	9.6	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
44.8	52.9	55.4	53.8	50.6	44.6	: Noise Level

59.8 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.1	60.4	62.9	61.4	58.9	52.9	: Exterior Wall Noise Exposure
20.7	26.6	27.4	37.6	47.7	42.7	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
33.4	35.9	37.5	25.8	12.5	11.5	: Noise Level

40.8 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 3**
Project # : B80709N1
Room Name: Plan 1 - Bedroom 2 (Unit 16 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**69.4**	**CNEL**	52.7	58.2	60.7	64.7	64.7	58.7	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**71.4**	**CNEL**	55.3	62.3	64.8	66.2	65.5	59.5	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	4.5	8.5	1	28.3	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	N	2	5	1	10.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **38.25** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.3	62.3	64.8	66.2	65.5	59.5	: Exterior Wall Noise Exposure
20.6	26.8	27.9	38.1	48.1	43.1	: Transmission Loss
15.8	15.8	15.8	15.8	15.8	15.8	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
30.0	30.9	32.3	23.4	12.0	10.9	: Noise Level
36.2	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.3	62.3	64.8	66.2	65.5	59.5	: Exterior Wall Noise Exposure
20.6	26.8	27.9	38.1	48.1	43.1	: Transmission Loss
15.8	15.8	15.8	15.8	15.8	15.8	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
30.0	30.9	32.3	23.4	12.0	10.9	: Noise Level
36.2	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 3 of 3**
Project # : B80709N1
Room Name: Plan 1 - Bedroom 2 (Unit 16 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	21	7.7	1	161.7	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 161.7 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
22.1	22.1	22.1	22.1	22.1	22.1	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level

40.5 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
22.1	22.1	22.1	22.1	22.1	22.1	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level

40.5 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Bedroom 2 (Unit 4 Evaluated)

Wall 1 of 2

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	112	112	112	112	135	135	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**63.3**	**CNEL**	46.6	52.1	54.6	58.6	58.6	52.6	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**68.5**	**CNEL**	52.9	60.9	63.4	62.8	61.2	55.2	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	21	8.5	1	126.5	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	Y	6.5	6	1	39.0	14	21	24	22	30	29
STC 25 1/2-inch Dual Insulating Window	N	6.5	2	1	13.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **7.7** ft

Overall Area: **178.5** ft²
Volume: **1374** ft³

Number of Impacted Walls: **2**

Windows Open		
Interior Noise Level:	**60.9**	**CNEL**
Windows Closed		
Interior Noise Level:	**45.2**	**CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.9	60.9	63.4	62.8	61.2	55.2	: Exterior Wall Noise Exposure
9.1	9.5	9.6	9.6	9.6	9.6	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
45.8	53.3	55.8	55.3	52.8	46.8	: Noise Level
60.8	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.9	60.9	63.4	62.8	61.2	55.2	: Exterior Wall Noise Exposure
17.3	25.2	29.3	27.3	35.3	34.4	: Transmission Loss
22.5	22.5	22.5	22.5	22.5	22.5	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
37.6	37.7	36.1	37.5	27.1	22.1	: Noise Level
43.4	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Bedroom 2 (Unit 4 Evaluated)

Wall 2 of 2

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	21	7.7	1	161.7	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 161.7 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
22.1	22.1	22.1	22.1	22.1	22.1	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level

40.5 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
22.1	22.1	22.1	22.1	22.1	22.1	: Wall Surface Area Factor
20.5	20.5	20.5	20.5	21.3	21.3	: Absorption
40.3	23.8	20.3	12.3	4.5	-5.5	: Noise Level

40.5 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 1 - Bedroom 3 (Unit 16 Evaluated)

Wall 1 of 1

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	75	75	75	75	91	91	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**69.3**	**CNEL**	52.6	58.1	60.6	64.6	64.6	58.6	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**71.3**	**CNEL**	55.2	62.3	64.8	66.1	65.4	59.4	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	10.5	8	1	64.0	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	Y	4	5	1	20.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **11** ft

Overall Area: **84** ft²
Volume: **924** ft³

Number of Impacted Walls: **1**

Windows Open
Interior Noise Level: **62.3** **CNEL**

Windows Closed
Interior Noise Level: **43.5** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.2	62.3	64.8	66.1	65.4	59.4	: Exterior Wall Noise Exposure
8.8	9.2	9.2	9.2	9.2	9.2	: Transmission Loss
19.2	19.2	19.2	19.2	19.2	19.2	: Wall Surface Area Factor
18.8	18.8	18.8	18.8	19.6	19.6	: Absorption
46.9	53.6	56.1	57.4	55.9	49.9	: Noise Level

62.3 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.2	62.3	64.8	66.1	65.4	59.4	: Exterior Wall Noise Exposure
17.7	25.8	30.1	28.2	36.2	35.2	: Transmission Loss
19.2	19.2	19.2	19.2	19.2	19.2	: Wall Surface Area Factor
18.8	18.8	18.8	18.8	19.6	19.6	: Absorption
38.0	37.0	35.1	38.3	28.9	23.9	: Noise Level

43.5 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 2 - Kitchen / Dining Room / Great Room (Unit 11 Evaluated)

Wall 1 of 2

Room Type : **Medium Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.8	0.8	0.8	0.8	0.7	0.7	: Fairly Absorptive Room
Room Absorption (Sabins) :	324	324	324	324	405	405	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**58.9**	**CNEL**	42.2	47.7	50.2	54.2	54.2	48.2	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.6**	**CNEL**	52.2	60.5	63.0	61.6	59.3	53.3	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	20	10	1	104.0	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	N	9	8	1	72.0	14	21	24	22	30	29
1 3/4" Thick Solid Core Door	N	3	8	1	24.0	18	22	26	24	23	20
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **27** ft

Overall Area: **200** ft²
Volume: **5400** ft³

Number of Impacted Walls: **2**

Windows Open
Interior Noise Level: 53.6 CNEL

Windows Closed
Interior Noise Level: 42.5 CNEL

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.2	60.5	63.0	61.6	59.3	53.3	: Exterior Wall Noise Exposure
16.7	23.8	27.6	25.6	30.2	27.8	: Transmission Loss
23.0	23.0	23.0	23.0	23.0	23.0	: Wall Surface Area Factor
25.1	25.1	25.1	25.1	26.1	26.1	: Absorption
33.4	34.5	33.3	33.9	26.1	22.5	: Noise Level

40.1 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.2	60.5	63.0	61.6	59.3	53.3	: Exterior Wall Noise Exposure
16.7	23.8	27.6	25.6	30.2	27.8	: Transmission Loss
23.0	23.0	23.0	23.0	23.0	23.0	: Wall Surface Area Factor
25.1	25.1	25.1	25.1	26.1	26.1	: Absorption
33.4	34.5	33.3	33.9	26.1	22.5	: Noise Level

40.1 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 2**
Project # : B80709N1
Room Name: Plan 2 - Kitchen / Dining Room / Great Room (Unit 11 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**57.4**	**CNEL**	40.7	46.2	48.7	52.7	52.7	46.7	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.5**	**CNEL**	52.1	60.4	62.9	61.4	58.9	52.9	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	31	10	1	258.0	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	N	2	6.5	2	26.0	14	21	24	22	30	29
STC 25 1/2-inch Dual Insulating Window	Y	4	6.5	1	26.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **310** ft²

2

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.1	60.4	62.9	61.4	58.9	52.9	: Exterior Wall Noise Exposure
12.6	13.6	13.7	13.7	13.8	13.8	: Transmission Loss
24.9	24.9	24.9	24.9	24.9	24.9	: Wall Surface Area Factor
25.1	25.1	25.1	25.1	26.1	26.1	: Absorption
39.3	46.6	49.0	47.5	44.0	38.0	: Noise Level

53.4 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.1	60.4	62.9	61.4	58.9	52.9	: Exterior Wall Noise Exposure
18.2	26.6	31.6	29.7	37.7	36.7	: Transmission Loss
24.9	24.9	24.9	24.9	24.9	24.9	: Wall Surface Area Factor
25.1	25.1	25.1	25.1	26.1	26.1	: Absorption
33.6	33.6	31.1	31.4	20.0	15.0	: Noise Level

38.7 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 2 - Master Bedroom (Unit 11 Evaluated)

Wall 1 of 3

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	165	165	165	165	198	198	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**60.4**	**CNEL**	43.7	49.2	51.7	55.7	55.7	49.7	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.9**	**CNEL**	52.4	60.6	63.1	61.9	59.8	53.8	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	19.5	9	1	120.5	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	N	6	6.5	1	39.0	14	21	24	22	30	29
STC 25 1/2-inch Dual Insulating Window	Y	4	2	2	16.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **11.5** ft

Overall Area: **175.5** ft²
Volume: **2018** ft³

Number of Impacted Walls: **3**

Windows Open
Interior Noise Level: **55.0** **CNEL**

Windows Closed
Interior Noise Level: **45.2** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.4	60.6	63.1	61.9	59.8	53.8	: Exterior Wall Noise Exposure
12.0	13.2	13.3	13.3	13.4	13.4	: Transmission Loss
22.4	22.4	22.4	22.4	22.4	22.4	: Wall Surface Area Factor
22.2	22.2	22.2	22.2	23.0	23.0	: Absorption
40.6	47.7	50.0	48.9	45.9	40.0	: Noise Level
54.8	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.4	60.6	63.1	61.9	59.8	53.8	: Exterior Wall Noise Exposure
17.1	25.0	29.0	27.0	35.0	34.0	: Transmission Loss
22.4	22.4	22.4	22.4	22.4	22.4	: Wall Surface Area Factor
22.2	22.2	22.2	22.2	23.0	23.0	: Absorption
35.5	35.9	34.4	35.2	24.3	19.3	: Noise Level
41.4	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 3**
Project # : B80709N1
Room Name: Plan 2 - Master Bedroom (Unit 11 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**64.2**	**CNEL**	47.5	53.0	55.5	59.5	59.5	53.5	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**68.8**	**CNEL**	53.1	61.0	63.5	63.2	61.7	55.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	13.5	9	1	95.5	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	N	2	6.5	2	26.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 121.5 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
53.1	61.0	63.5	63.2	61.7	55.7	: Exterior Wall Noise Exposure
17.9	26.0	30.6	28.7	36.7	35.7	: Transmission Loss
20.8	20.8	20.8	20.8	20.8	20.8	: Wall Surface Area Factor
22.2	22.2	22.2	22.2	23.0	23.0	: Absorption
33.9	33.6	31.6	33.2	22.9	17.9	: Noise Level
39.3	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
53.1	61.0	63.5	63.2	61.7	55.7	: Exterior Wall Noise Exposure
17.9	26.0	30.6	28.7	36.7	35.7	: Transmission Loss
20.8	20.8	20.8	20.8	20.8	20.8	: Wall Surface Area Factor
22.2	22.2	22.2	22.2	23.0	23.0	: Absorption
33.9	33.6	31.6	33.2	22.9	17.9	: Noise Level
39.3	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 2 - Master Bedroom (Unit 11 Evaluated)

Wall 3 of 3

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	19.5	11.5	1	224.3	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **224.25** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
23.5	23.5	23.5	23.5	23.5	23.5	: Wall Surface Area Factor
22.2	22.2	22.2	22.2	23.0	23.0	: Absorption
40.1	23.6	20.1	12.1	4.3	-5.7	: Noise Level

40.2 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
23.5	23.5	23.5	23.5	23.5	23.5	: Wall Surface Area Factor
22.2	22.2	22.2	22.2	23.0	23.0	: Absorption
40.1	23.6	20.1	12.1	4.3	-5.7	: Noise Level

40.2 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 2 - Bedroom 2 (Unit 7 Evaluated)

Wall 1 of 3

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	84	84	84	84	101	101	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**61.9**	**CNEL**	45.2	50.7	53.2	57.2	57.2	51.2	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**68.2**	**CNEL**	52.6	60.7	63.2	62.3	60.5	54.5	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	11.7	9	1	72.8	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	Y	5	6.5	1	32.5	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: 9.8 ft

Overall Area: 105.3 ft²
Volume: 1032 ft³

Number of Impacted Walls: 3

Windows Open		
Interior Noise Level:	**60.9**	**CNEL**
Windows Closed		
Interior Noise Level:	**44.7**	**CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.6	60.7	63.2	62.3	60.5	54.5	: Exterior Wall Noise Exposure
7.9	8.1	8.1	8.1	8.1	8.1	: Transmission Loss
20.2	20.2	20.2	20.2	20.2	20.2	: Wall Surface Area Factor
19.3	19.3	19.3	19.3	20.0	20.0	: Absorption
45.7	53.6	56.1	55.2	52.6	46.6	: Noise Level
60.9	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.6	60.7	63.2	62.3	60.5	54.5	: Exterior Wall Noise Exposure
20.7	26.4	27.2	37.4	47.4	42.4	: Transmission Loss
20.2	20.2	20.2	20.2	20.2	20.2	: Wall Surface Area Factor
19.3	19.3	19.3	19.3	20.0	20.0	: Absorption
32.9	35.2	37.0	25.9	13.2	12.3	: Noise Level
40.3	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 3**
Project # : B80709N1
Room Name: Plan 2 - Bedroom 2 (Unit 7 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**59.0**	**CNEL**	42.3	47.8	50.3	54.3	54.3	48.3	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.6**	**CNEL**	52.2	60.5	63.0	61.6	59.4	53.4	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	9.3	9	1	57.7	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	N	2	6.5	2	26.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **83.7** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.2	60.5	63.0	61.6	59.4	53.4	: Exterior Wall Noise Exposure
20.7	26.4	27.1	37.3	47.4	42.4	: Transmission Loss
19.2	19.2	19.2	19.2	19.2	19.2	: Wall Surface Area Factor
19.3	19.3	19.3	19.3	20.0	20.0	: Absorption
31.5	34.0	35.8	24.3	11.1	10.2	: Noise Level
39.1	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.2	60.5	63.0	61.6	59.4	53.4	: Exterior Wall Noise Exposure
20.7	26.4	27.1	37.3	47.4	42.4	: Transmission Loss
19.2	19.2	19.2	19.2	19.2	19.2	: Wall Surface Area Factor
19.3	19.3	19.3	19.3	20.0	20.0	: Absorption
31.5	34.0	35.8	24.3	11.1	10.2	: Noise Level
39.1	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 3 of 3**
Project # : B80709N1
Room Name: Plan 2 - Bedroom 2 (Unit 7 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	11.7	9.8	1	114.7	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **114.66** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
20.6	20.6	20.6	20.6	20.6	20.6	: Wall Surface Area Factor
19.3	19.3	19.3	19.3	20.0	20.0	: Absorption
40.1	23.6	20.1	12.1	4.3	-5.7	: Noise Level

40.2 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
20.6	20.6	20.6	20.6	20.6	20.6	: Wall Surface Area Factor
19.3	19.3	19.3	19.3	20.0	20.0	: Absorption
40.1	23.6	20.1	12.1	4.3	-5.7	: Noise Level

40.2 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 2 - Bedroom 2 (Unit 10 Evaluated)

Wall 1 of 2

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	85	85	85	85	101	101	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**61.7**	**CNEL**	45.0	50.5	53.0	57.0	57.0	51.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**68.1**	**CNEL**	52.6	60.7	63.2	62.3	60.4	54.4	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	9.2	9	1	50.3	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	Y	5	6.5	1	32.5	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **12.5** ft

Overall Area: **82.8** ft²
Volume: **1035** ft³

Number of Impacted Walls: **2**

Windows Open
Interior Noise Level: **60.9** **CNEL**

Windows Closed
Interior Noise Level: **44.1** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.6	60.7	63.2	62.3	60.4	54.4	: Exterior Wall Noise Exposure
6.8	7.0	7.1	7.0	7.1	7.1	: Transmission Loss
19.2	19.2	19.2	19.2	19.2	19.2	: Wall Surface Area Factor
19.3	19.3	19.3	19.3	20.1	20.1	: Absorption
45.7	53.6	56.0	55.1	52.4	46.4	: Noise Level

60.8 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.6	60.7	63.2	62.3	60.4	54.4	: Exterior Wall Noise Exposure
16.6	24.3	28.0	26.1	34.1	33.1	: Transmission Loss
19.2	19.2	19.2	19.2	19.2	19.2	: Wall Surface Area Factor
19.3	19.3	19.3	19.3	20.1	20.1	: Absorption
35.8	36.3	35.1	36.1	25.5	20.5	: Noise Level

42.0 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C

Project # : B80709N1

Room Name: Plan 2 - Bedroom 2 (Unit 10 Evaluated)

Wall 2 of 2

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	11	10	1	110.0	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **110** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
20.4	20.4	20.4	20.4	20.4	20.4	: Wall Surface Area Factor
19.3	19.3	19.3	19.3	20.1	20.1	: Absorption
39.9	23.4	19.9	11.9	4.1	-5.9	: Noise Level
40.0	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
20.4	20.4	20.4	20.4	20.4	20.4	: Wall Surface Area Factor
19.3	19.3	19.3	19.3	20.1	20.1	: Absorption
39.9	23.4	19.9	11.9	4.1	-5.9	: Noise Level
40.0	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 2 - Bedroom 3 (Unit 11 Evaluated)

Wall 1 of 3

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	92	92	92	92	110	110	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**64.2**	**CNEL**	47.5	53.0	55.5	59.5	59.5	53.5	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**68.8**	**CNEL**	53.1	61.0	63.5	63.2	61.7	55.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	12.5	9	1	99.5	20	30	46	53	58	65
STC 31 5/8-inch Dual Insulating Window	N	2	6.5	1	13.0	24	20	26	34	46	39
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **10** ft

Overall Area: **112.5** ft²
Volume: **1125** ft³

Number of Impacted Walls: **3**

Windows Open
Interior Noise Level: **65.3** **CNEL**

Windows Closed
Interior Noise Level: **45.3** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
53.1	61.0	63.5	63.2	61.7	55.7	: Exterior Wall Noise Exposure
20.3	27.1	34.7	43.4	53.7	48.3	: Transmission Loss
20.5	20.5	20.5	20.5	20.5	20.5	: Wall Surface Area Factor
19.6	19.6	19.6	19.6	20.4	20.4	: Absorption
33.7	34.8	29.7	20.7	8.2	7.6	: Noise Level

38.1 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
53.1	61.0	63.5	63.2	61.7	55.7	: Exterior Wall Noise Exposure
20.3	27.1	34.7	43.4	53.7	48.3	: Transmission Loss
20.5	20.5	20.5	20.5	20.5	20.5	: Wall Surface Area Factor
19.6	19.6	19.6	19.6	20.4	20.4	: Absorption
33.7	34.8	29.7	20.7	8.2	7.6	: Noise Level

38.1 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 2 - Bedroom 3 (Unit 11 Evaluated)

Wall 2 of 3

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**66.9**	**CNEL**	50.2	55.7	58.2	62.2	62.2	56.2	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**70.0**	**CNEL**	54.0	61.5	64.0	64.5	63.5	57.5	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	11	9	1	34.0	20	30	46	53	58	65
STC 31 5/8-inch Dual Insulating Window	Y	5	6.5	2	65.0	24	20	26	34	46	39
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **99** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.0	61.5	64.0	64.5	63.5	57.5	: Exterior Wall Noise Exposure
4.8	4.8	4.8	4.8	4.8	4.8	: Transmission Loss
20.0	20.0	20.0	20.0	20.0	20.0	: Wall Surface Area Factor
19.6	19.6	19.6	19.6	20.4	20.4	: Absorption
49.6	57.1	59.5	60.0	58.2	52.2	: Noise Level

65.2 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.0	61.5	64.0	64.5	63.5	57.5	: Exterior Wall Noise Exposure
22.1	21.9	27.4	36.3	47.7	40.8	: Transmission Loss
20.0	20.0	20.0	20.0	20.0	20.0	: Wall Surface Area Factor
19.6	19.6	19.6	19.6	20.4	20.4	: Absorption
32.3	39.9	37.0	28.6	15.4	16.3	: Noise Level

42.4 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 3 of 3**
Project # : B80709N1
Room Name: Plan 2 - Bedroom 3 (Unit 11 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	12.5	10	1	125.0	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **125** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
21.0	21.0	21.0	21.0	21.0	21.0	: Wall Surface Area Factor
19.6	19.6	19.6	19.6	20.4	20.4	: Absorption
40.1	23.6	20.1	12.1	4.3	-5.7	: Noise Level
40.2	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
21.0	21.0	21.0	21.0	21.0	21.0	: Wall Surface Area Factor
19.6	19.6	19.6	19.6	20.4	20.4	: Absorption
40.1	23.6	20.1	12.1	4.3	-5.7	: Noise Level
40.2	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 2 - Bedroom 3 (Unit 10 Evaluated)

Wall 1 of 2

Room Type : **Soft**	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	81	81	81	81	97	97	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**61.7**	**CNEL**	45.0	50.5	53.0	57.0	57.0	51.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**68.1**	**CNEL**	52.6	60.7	63.2	62.3	60.4	54.4	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	11	9	1	66.5	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	Y	5	6.5	1	32.5	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **10** ft **Overall Area:** **99** ft²
Volume: **990** ft³

Number of Impacted Walls: **2**

Windows Open Interior Noise Level:	**61.1**	**CNEL**
Windows Closed Interior Noise Level:	**44.4**	**CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.6	60.7	63.2	62.3	60.4	54.4	: Exterior Wall Noise Exposure
7.5	7.8	7.8	7.8	7.8	7.8	: Transmission Loss
20.0	20.0	20.0	20.0	20.0	20.0	: Wall Surface Area Factor
19.1	19.1	19.1	19.1	19.9	19.9	: Absorption
45.9	53.8	56.2	55.3	52.6	46.6	: Noise Level
61.0	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.6	60.7	63.2	62.3	60.4	54.4	: Exterior Wall Noise Exposure
17.0	24.8	28.8	26.8	34.8	33.8	: Transmission Loss
20.0	20.0	20.0	20.0	20.0	20.0	: Wall Surface Area Factor
19.1	19.1	19.1	19.1	19.9	19.9	: Absorption
36.4	36.7	35.3	36.3	25.7	20.7	: Noise Level
42.4	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 2**
Project # : B80709N1
Room Name: Plan 2 - Bedroom 3 (Unit 10 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	11	10	1	110.0	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 110 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
20.4	20.4	20.4	20.4	20.4	20.4	: Wall Surface Area Factor
19.1	19.1	19.1	19.1	19.9	19.9	: Absorption
40.1	23.6	20.1	12.1	4.3	-5.7	: Noise Level
40.2	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
20.4	20.4	20.4	20.4	20.4	20.4	: Wall Surface Area Factor
19.1	19.1	19.1	19.1	19.9	19.9	: Absorption
40.1	23.6	20.1	12.1	4.3	-5.7	: Noise Level
40.2	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 3 - Kitchen / Dining Room / Great Room (Unit 15 Evaluated)

Wall 1 of 4

Room Type : **Medium Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.8	0.8	0.8	0.8	0.7	0.7	: Fairly Absorptive Room
Room Absorption (Sabins) :	337	337	337	337	421	421	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**70.9**	**CNEL**	54.2	59.7	62.2	66.2	66.2	60.2	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**72.4**	**CNEL**	56.2	63.0	65.5	67.3	66.8	60.8	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	48	9	1	288.0	20	30	46	53	58	65
STC 37 1.5-inch Dual Insulating Window	N	12	7	1	84.0	22	26	35	40	38	49
STC 37 1.5-inch Dual Insulating Window	N	6	2	4	48.0	22	26	35	40	38	49
STC 37 1.5-inch Dual Insulating Window	N	6	2	1	12.0	22	26	35	40	38	49
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **13** ft

Overall Area: **432** ft²
Volume: **5616** ft³

Number of Impacted Walls: **4**

Windows Open
Interior Noise Level: **59.3** **CNEL**

Windows Closed
Interior Noise Level: **44.6** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.2	63.0	65.5	67.3	66.8	60.8	: Exterior Wall Noise Exposure
20.5	28.5	39.4	44.8	42.2	53.8	: Transmission Loss
26.4	26.4	26.4	26.4	26.4	26.4	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
36.8	35.6	27.2	23.6	24.7	7.1	: Noise Level

39.7 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.2	63.0	65.5	67.3	66.8	60.8	: Exterior Wall Noise Exposure
20.5	28.5	39.4	44.8	42.2	53.8	: Transmission Loss
26.4	26.4	26.4	26.4	26.4	26.4	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
36.8	35.6	27.2	23.6	24.7	7.1	: Noise Level

39.7 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 4**
Project # : B80709N1
Room Name: Plan 3 - Kitchen / Dining Room / Great Room (Unit 15 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**69.7**	**CNEL**	53.0	58.5	61.0	65.0	65.0	59.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**71.6**	**CNEL**	55.4	62.5	65.0	66.4	65.8	59.8	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	13.5	9	1	69.5	20	30	46	53	58	65
STC 37 1.5-inch Dual Insulating Window	N	8	6.5	1	52.0	22	26	35	40	38	49
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 121.5 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.4	62.5	65.0	66.4	65.8	59.8	: Exterior Wall Noise Exposure
20.6	28.1	38.5	43.9	41.2	52.8	: Transmission Loss
20.8	20.8	20.8	20.8	20.8	20.8	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
30.4	29.9	22.0	18.1	19.2	1.6	: Noise Level
33.8	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.4	62.5	65.0	66.4	65.8	59.8	: Exterior Wall Noise Exposure
20.6	28.1	38.5	43.9	41.2	52.8	: Transmission Loss
20.8	20.8	20.8	20.8	20.8	20.8	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
30.4	29.9	22.0	18.1	19.2	1.6	: Noise Level
33.8	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 3 of 4**
Project # : B80709N1
Room Name: Plan 3 - Kitchen / Dining Room / Great Room (Unit 15 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**70.7**	**CNEL**	54.0	59.5	62.0	66.0	66.0	60.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**72.2**	**CNEL**	56.0	62.9	65.4	67.1	66.6	60.6	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	11.7	9.8	1	78.7	20	30	46	53	58	65
STC 37 1.5-inch Dual Insulating Window	Y	6	6	1	36.0	22	26	35	40	38	49
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 114.66 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.0	62.9	65.4	67.1	66.6	60.6	: Exterior Wall Noise Exposure
7.8	8.0	8.0	8.0	8.0	8.0	: Transmission Loss
20.6	20.6	20.6	20.6	20.6	20.6	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
43.5	50.2	52.7	54.4	52.9	46.9	: Noise Level

59.2 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.0	62.9	65.4	67.1	66.6	60.6	: Exterior Wall Noise Exposure
20.4	28.5	39.6	45.0	42.5	54.0	: Transmission Loss
20.6	20.6	20.6	20.6	20.6	20.6	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
30.9	29.7	21.1	17.4	18.5	0.9	: Noise Level

33.8 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 4 of 4**
Project # : B80709N1
Room Name: Plan 3 - Kitchen / Dining Room / Great Room (Unit 15 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	13	48	1	624.0	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **624** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
28.0	28.0	28.0	28.0	28.0	28.0	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
41.4	24.9	21.4	13.4	5.4	-4.6	: Noise Level
41.6	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
28.0	28.0	28.0	28.0	28.0	28.0	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
41.4	24.9	21.4	13.4	5.4	-4.6	: Noise Level
41.6	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 3 - Kitchen / Dining Room / Great Room (Unit 15 Evaluated)

Wall 1 of 4

Room Type : **Medium Soft**	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.8	0.8	0.8	0.8	0.7	0.7	: Fairly Absorptive Room
Room Absorption (Sabins) :	337	337	337	337	421	421	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**70.9**	**CNEL**	54.2	59.7	62.2	66.2	66.2	60.2	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**72.4**	**CNEL**	56.2	63.0	65.5	67.3	66.8	60.8	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall - Resilient Channels B80709N1	N	48	9	1	288.0	36	49	55	62	66	74
STC 28 1/2-inch Sliding Glass Door	N	12	7	1	84.0	23	23	22	32	43	37
STC 28 1/2-inch Dual Insulating Window	N	6	2	4	48.0	23	23	22	32	43	37
STC 28 1/2-inch Dual Insulating Window	N	6	2	1	12.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **13** ft

Overall Area: **432** ft²
Volume: **5616** ft³

Number of Impacted Walls: **4**

Windows Open
Interior Noise Level: **59.3** **CNEL**

Windows Closed
Interior Noise Level: **44.1** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.2	63.0	65.5	67.3	66.8	60.8	: Exterior Wall Noise Exposure
27.2	27.6	26.9	37.1	47.3	42.1	: Transmission Loss
26.4	26.4	26.4	26.4	26.4	26.4	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
30.0	36.4	39.7	31.3	19.6	18.8	: Noise Level
42.1	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.2	63.0	65.5	67.3	66.8	60.8	: Exterior Wall Noise Exposure
27.2	27.6	26.9	37.1	47.3	42.1	: Transmission Loss
26.4	26.4	26.4	26.4	26.4	26.4	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
30.0	36.4	39.7	31.3	19.6	18.8	: Noise Level
42.1	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 4**
Project # : B80709N1
Room Name: Plan 3 - Kitchen / Dining Room / Great Room (Unit 15 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**69.7**	**CNEL**	53.0	58.5	61.0	65.0	65.0	59.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**71.6**	**CNEL**	55.4	62.5	65.0	66.4	65.8	59.8	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall - Resilient Channels B80709N1	N	13.5	9	1	69.5	36	49	55	62	66	74
STC 28 1/2-inch Dual Insulating Window	N	8	6.5	1	52.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 121.5 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.4	62.5	65.0	66.4	65.8	59.8	: Exterior Wall Noise Exposure
26.3	26.5	25.8	36.0	46.3	41.0	: Transmission Loss
20.8	20.8	20.8	20.8	20.8	20.8	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
24.7	31.5	34.8	25.9	14.1	13.3	: Noise Level

37.1 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.4	62.5	65.0	66.4	65.8	59.8	: Exterior Wall Noise Exposure
26.3	26.5	25.8	36.0	46.3	41.0	: Transmission Loss
20.8	20.8	20.8	20.8	20.8	20.8	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
24.7	31.5	34.8	25.9	14.1	13.3	: Noise Level

37.1 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 3 of 4**
Project # : B80709N1
Room Name: Plan 3 - Kitchen / Dining Room / Great Room (Unit 15 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**70.7**	**CNEL**	54.0	59.5	62.0	66.0	66.0	60.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**72.2**	**CNEL**	56.0	62.9	65.4	67.1	66.6	60.6	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall - Resilient Channels B80709N1	N	11.7	9.8	1	78.7	36	49	55	62	66	74
STC 28 1/2-inch Dual Insulating Window	Y	6	6	1	36.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **114.66** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.0	62.9	65.4	67.1	66.6	60.6	: Exterior Wall Noise Exposure
8.0	8.0	8.0	8.0	8.0	8.0	: Transmission Loss
20.6	20.6	20.6	20.6	20.6	20.6	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
43.3	50.2	52.7	54.4	52.9	46.9	: Noise Level

59.2 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.0	62.9	65.4	67.1	66.6	60.6	: Exterior Wall Noise Exposure
27.5	27.9	27.1	37.4	47.6	42.4	: Transmission Loss
20.6	20.6	20.6	20.6	20.6	20.6	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
23.9	30.3	33.6	25.1	13.4	12.6	: Noise Level

36.0 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 4 of 4**
Project # : B80709N1
Room Name: Plan 3 - Kitchen / Dining Room / Great Room (Unit 15 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof - Resilient Rail B80709N1	N	13	48	1	624.0	37	46	53	59	63	67
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **624** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
37.0	46.0	53.0	59.0	63.0	67.0	: Transmission Loss
28.0	28.0	28.0	28.0	28.0	28.0	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
17.4	16.9	12.4	4.4	-3.6	-13.6	: Noise Level
21.0	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
37.0	46.0	53.0	59.0	63.0	67.0	: Transmission Loss
28.0	28.0	28.0	28.0	28.0	28.0	: Wall Surface Area Factor
25.3	25.3	25.3	25.3	26.2	26.2	: Absorption
17.4	16.9	12.4	4.4	-3.6	-13.6	: Noise Level
21.0	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 3 - Master Bedroom (Unit 15 Evaluated)

Wall 1 of 3

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	124	124	124	124	149	149	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**70.7**	**CNEL**	54.0	59.5	62.0	66.0	66.0	60.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**72.2**	**CNEL**	56.0	62.9	65.4	67.1	66.6	60.6	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	14	8.7	1	101.8	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	N	2	5	2	20.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **12.5** ft

Overall Area: **121.8** ft²
Volume: **1523** ft³

Number of Impacted Walls: **3**

Windows Open
Interior Noise Level: 63.2 CNEL

Windows Closed
Interior Noise Level: 45.4 CNEL

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.0	62.9	65.4	67.1	66.6	60.6	: Exterior Wall Noise Exposure
20.4	27.7	29.8	40.0	49.8	45.1	: Transmission Loss
20.9	20.9	20.9	20.9	20.9	20.9	: Wall Surface Area Factor
20.9	20.9	20.9	20.9	21.7	21.7	: Absorption
35.6	35.1	35.5	27.1	15.9	14.6	: Noise Level

40.4 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
56.0	62.9	65.4	67.1	66.6	60.6	: Exterior Wall Noise Exposure
20.4	27.7	29.8	40.0	49.8	45.1	: Transmission Loss
20.9	20.9	20.9	20.9	20.9	20.9	: Wall Surface Area Factor
20.9	20.9	20.9	20.9	21.7	21.7	: Absorption
35.6	35.1	35.5	27.1	15.9	14.6	: Noise Level

40.4 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 3**
Project # : B80709N1
Room Name: Plan 3 - Master Bedroom (Unit 15 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**69.5**	**CNEL**	52.8	58.3	60.8	64.8	64.8	58.8	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**71.4**	**CNEL**	55.3	62.4	64.9	66.2	65.6	59.6	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	12.5	8.7	1	69.8	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	Y	6	6.5	1	39.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 108.75 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.3	62.4	64.9	66.2	65.6	59.6	: Exterior Wall Noise Exposure
7.3	7.4	7.4	7.5	7.5	7.5	: Transmission Loss
20.4	20.4	20.4	20.4	20.4	20.4	: Wall Surface Area Factor
20.9	20.9	20.9	20.9	21.7	21.7	: Absorption
47.4	54.4	56.9	58.2	56.7	50.7	: Noise Level
63.2	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
55.3	62.4	64.9	66.2	65.6	59.6	: Exterior Wall Noise Exposure
20.8	26.0	26.5	36.7	46.8	41.8	: Transmission Loss
20.4	20.4	20.4	20.4	20.4	20.4	: Wall Surface Area Factor
20.9	20.9	20.9	20.9	21.7	21.7	: Absorption
33.9	35.8	37.8	28.9	17.4	16.4	: Noise Level
41.2	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 3 of 3**
Project # : B80709N1
Room Name: Plan 3 - Master Bedroom (Unit 15 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	14	12.5	1	175.0	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **175** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
22.4	22.4	22.4	22.4	22.4	22.4	: Wall Surface Area Factor
20.9	20.9	20.9	20.9	21.7	21.7	: Absorption
40.2	23.7	20.2	12.2	4.4	-5.6	: Noise Level

40.4 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
22.4	22.4	22.4	22.4	22.4	22.4	: Wall Surface Area Factor
20.9	20.9	20.9	20.9	21.7	21.7	: Absorption
40.2	23.7	20.2	12.2	4.4	-5.6	: Noise Level

40.4 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 3 - Master Bedroom (Unit 14 Evaluated)

Wall 1 of 2

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	124	124	124	124	149	149	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**68.5**	**CNEL**	51.8	57.3	59.8	63.8	63.8	57.8	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**70.8**	**CNEL**	54.8	62.0	64.5	65.5	64.8	58.8	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	12.5	8.7	1	69.8	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	Y	6	6.5	1	39.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **14** ft

Overall Area: **108.75** ft²
Volume: **1523** ft³

Number of Impacted Walls: **2**

Windows Open
Interior Noise Level: **62.6** **CNEL**

Windows Closed
Interior Noise Level: **45.2** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.8	62.0	64.5	65.5	64.8	58.8	: Exterior Wall Noise Exposure
7.1	7.4	7.4	7.4	7.5	7.5	: Transmission Loss
20.4	20.4	20.4	20.4	20.4	20.4	: Wall Surface Area Factor
20.9	20.9	20.9	20.9	21.7	21.7	: Absorption
47.1	54.0	56.5	57.5	55.9	49.9	: Noise Level

62.6 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.8	62.0	64.5	65.5	64.8	58.8	: Exterior Wall Noise Exposure
16.8	24.6	28.4	26.4	34.4	33.5	: Transmission Loss
20.4	20.4	20.4	20.4	20.4	20.4	: Wall Surface Area Factor
20.9	20.9	20.9	20.9	21.7	21.7	: Absorption
37.4	36.9	35.5	38.5	29.0	23.9	: Noise Level

43.4 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 2**
Project # : B80709N1
Room Name: Plan 3 - Master Bedroom (Unit 14 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Roof B80709N1	N	14	12.5	1	175.0	13	38	44	50	54	58
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **175** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
22.4	22.4	22.4	22.4	22.4	22.4	: Wall Surface Area Factor
20.9	20.9	20.9	20.9	21.7	21.7	: Absorption
40.2	23.7	20.2	12.2	4.4	-5.6	: Noise Level
40.4	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
51.7	60.2	62.7	60.7	57.7	51.7	: Exterior Wall Noise Exposure
13.0	38.0	44.0	50.0	54.0	58.0	: Transmission Loss
22.4	22.4	22.4	22.4	22.4	22.4	: Wall Surface Area Factor
20.9	20.9	20.9	20.9	21.7	21.7	: Absorption
40.2	23.7	20.2	12.2	4.4	-5.6	: Noise Level
40.4	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 3 - Bedroom 2 (Unit 15 Evaluated)

Wall 1 of 1

Room Type : **Soft**	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	94	94	94	94	113	113	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**68.1**	**CNEL**	51.4	56.9	59.4	63.4	63.4	57.4	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**70.6**	**CNEL**	54.6	61.9	64.4	65.3	64.4	58.4	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	11.5	8	1	62.0	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	Y	5	6	1	30.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **12.5** ft

Overall Area: **92** ft²
Volume: **1150** ft³

Number of Impacted Walls: **1**

Windows Open		
Interior Noise Level:	**62.4**	**CNEL**
Windows Closed		
Interior Noise Level:	**43.4**	**CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.6	61.9	64.4	65.3	64.4	58.4	: Exterior Wall Noise Exposure
7.5	7.8	7.9	7.8	7.9	7.9	: Transmission Loss
19.6	19.6	19.6	19.6	19.6	19.6	: Wall Surface Area Factor
19.7	19.7	19.7	19.7	20.5	20.5	: Absorption
47.0	54.0	56.4	57.3	55.7	49.7	: Noise Level
62.4	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.6	61.9	64.4	65.3	64.4	58.4	: Exterior Wall Noise Exposure
17.1	24.9	28.8	26.9	34.9	33.9	: Transmission Loss
19.6	19.6	19.6	19.6	19.6	19.6	: Wall Surface Area Factor
19.7	19.7	19.7	19.7	20.5	20.5	: Absorption
37.4	36.9	35.5	38.3	28.7	23.7	: Noise Level
43.4	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 3 - Bedroom 3 (Unit 15 Evaluated)

Wall 1 of 2

Room Type : **Soft**

	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	103	103	103	103	124	124	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**67.9**	**CNEL**	51.2	56.7	59.2	63.2	63.2	57.2	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**70.5**	**CNEL**	54.5	61.8	64.3	65.2	64.3	58.3	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	14	8	1	92.0	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	N	5	2	2	20.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **11.3** ft

Overall Area: **112** ft²
Volume: **1266** ft³

Number of Impacted Walls: **2**

Windows Open
Interior Noise Level: **62.0** **CNEL**

Windows Closed
Interior Noise Level: **43.8** **CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.5	61.8	64.3	65.2	64.3	58.3	: Exterior Wall Noise Exposure
20.4	27.6	29.5	39.6	49.5	44.8	: Transmission Loss
20.5	20.5	20.5	20.5	20.5	20.5	: Wall Surface Area Factor
20.1	20.1	20.1	20.1	20.9	20.9	: Absorption
34.4	34.6	35.2	25.9	14.3	13.1	: Noise Level

39.7 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.5	61.8	64.3	65.2	64.3	58.3	: Exterior Wall Noise Exposure
20.4	27.6	29.5	39.6	49.5	44.8	: Transmission Loss
20.5	20.5	20.5	20.5	20.5	20.5	: Wall Surface Area Factor
20.1	20.1	20.1	20.1	20.9	20.9	: Absorption
34.4	34.6	35.2	25.9	14.3	13.1	: Noise Level

39.7 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C **Wall 2 of 2**
Project # : B80709N1
Room Name: Plan 3 - Bedroom 3 (Unit 15 Evaluated)

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**68.1**	**CNEL**	51.4	56.9	59.4	63.4	63.4	57.4	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**70.6**	**CNEL**	54.6	61.9	64.4	65.3	64.4	58.4	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	14	12.5	1	145.0	20	30	46	53	58	65
STC 28 1/2-inch Dual Insulating Window	Y	6	5	1	30.0	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: 175 ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.6	61.9	64.4	65.3	64.4	58.4	: Exterior Wall Noise Exposure
10.2	10.6	10.6	10.7	10.7	10.7	: Transmission Loss
22.4	22.4	22.4	22.4	22.4	22.4	: Wall Surface Area Factor
20.1	20.1	20.1	20.1	20.9	20.9	: Absorption
46.6	53.6	56.0	56.9	55.3	49.3	: Noise Level

62.0 **CNEL** WINDOWS OPEN

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.6	61.9	64.4	65.3	64.4	58.4	: Exterior Wall Noise Exposure
20.4	27.7	29.7	39.8	49.7	44.9	: Transmission Loss
22.4	22.4	22.4	22.4	22.4	22.4	: Wall Surface Area Factor
20.1	20.1	20.1	20.1	20.9	20.9	: Absorption
36.5	36.5	37.0	27.8	16.3	15.0	: Noise Level

41.7 **CNEL** WINDOWS CLOSED

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 3 - Bedroom 3 (Unit 12 Evaluated)

Wall 1 of 2

Room Type : **Soft**	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Reverberation Time (sec) :	0.6	0.6	0.6	0.6	0.5	0.5	: Highly Absorptive Room
Room Absorption (Sabins) :	103	103	103	103	124	124	

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**60.3**	**CNEL**	43.6	49.1	51.6	55.6	55.6	49.6	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**67.8**	**CNEL**	52.4	60.6	63.1	61.9	59.8	53.8	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	14	8	1	92.0	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	N	5	2	2	20.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
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<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **11.3** ft

Overall Area: **112** ft²

Volume: **1266** ft³

Number of Impacted Walls: **2**

Windows Open		
Interior Noise Level:	**61.5**	**CNEL**
Windows Closed		
Interior Noise Level:	**44.8**	**CNEL**

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.4	60.6	63.1	61.9	59.8	53.8	: Exterior Wall Noise Exposure
18.1	26.5	31.4	29.5	37.5	36.5	: Transmission Loss
20.5	20.5	20.5	20.5	20.5	20.5	: Wall Surface Area Factor
20.1	20.1	20.1	20.1	20.9	20.9	: Absorption
34.6	34.4	32.1	32.8	21.9	16.9	: Noise Level
39.7	**CNEL**	WINDOWS OPEN				

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
52.4	60.6	63.1	61.9	59.8	53.8	: Exterior Wall Noise Exposure
18.1	26.5	31.4	29.5	37.5	36.5	: Transmission Loss
20.5	20.5	20.5	20.5	20.5	20.5	: Wall Surface Area Factor
20.1	20.1	20.1	20.1	20.9	20.9	: Absorption
34.6	34.4	32.1	32.8	21.9	16.9	: Noise Level
39.7	**CNEL**	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: 32nd and C
Project # : B80709N1
Room Name: Plan 3 - Bedroom 3 (Unit 12 Evaluated)

Wall 2 of 2

		Noise Level		125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	**Traffic**	**67.1**	**CNEL**	50.4	55.9	58.4	62.4	62.4	56.4	: Traffic Spectrum
Source 2:	**Aircraft**	**67.0**	**CNEL**	51.7	60.2	62.7	60.7	57.7	51.7	: Aircraft Spectrum
Source 3:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	**<N/A>**	**0.0**	**CNEL**	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		**70.1**	**CNEL**	54.1	61.6	64.1	64.7	63.7	57.7	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
Exterior Wall B80709N1	N	14	12.5	1	145.0	20	30	46	53	58	65
STC 25 1/2-inch Dual Insulating Window	Y	6	5	1	30.0	14	21	24	22	30	29
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Overall Area: **175** ft²

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.1	61.6	64.1	64.7	63.7	57.7	: Exterior Wall Noise Exposure
10.1	10.6	10.7	10.6	10.7	10.7	: Transmission Loss
22.4	22.4	22.4	22.4	22.4	22.4	: Wall Surface Area Factor
20.1	20.1	20.1	20.1	20.9	20.9	: Absorption
46.3	53.3	55.7	56.3	54.5	48.5	: Noise Level
61.5	**CNEL**	WINDOWS OPEN				

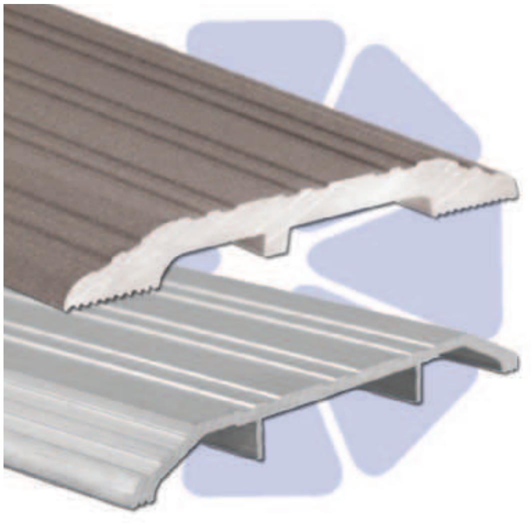
125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
54.1	61.6	64.1	64.7	63.7	57.7	: Exterior Wall Noise Exposure
18.2	26.6	31.5	29.6	37.6	36.7	: Transmission Loss
22.4	22.4	22.4	22.4	22.4	22.4	: Wall Surface Area Factor
20.1	20.1	20.1	20.1	20.9	20.9	: Absorption
38.2	37.3	34.9	37.3	27.6	22.5	: Noise Level
43.3	**CNEL**	WINDOWS CLOSED				

APPENDIX F

Recommended Products

08 71 00.17/PEM
BuyLine 5043

THRESHOLDS AND GASKETING

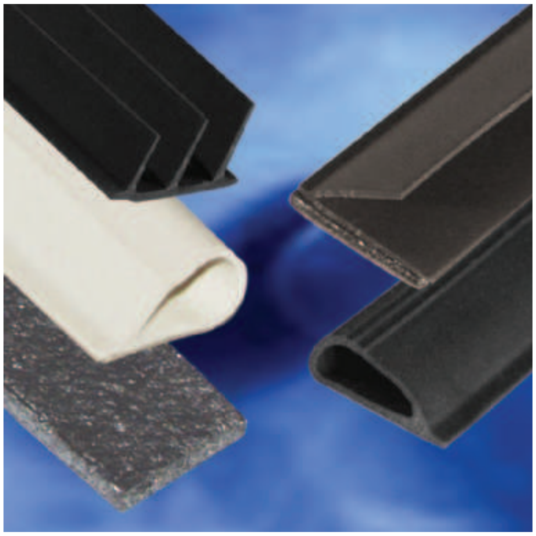


VENTURA, CA (USA)
P.O. Box 3780
Ventura, CA 93006
PH: 800.283.9988
FAX: 800.283.4050

MEMPHIS, TN (USA)
P.O. Box 18966
Memphis, TN 38181
PH: 800.824.3018
FAX: 800.243.3656

VANCOUVER, BC (CANADA)
103-2480 Mt. Lehman Rd.
Abbotsford, BC V2T 6W3 Canada
PH: 877.535.7888
FAX: 877.535.7444

TORONTO, ON (CANADA)
160 Four Valley Rd.
Concord, ON L4K 4T9 Canada
PH: 866.243.9816
FAX: 866.243.9817



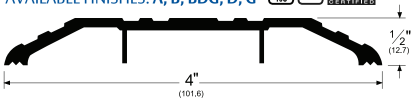
ASSA ABLOY is the global leader in door opening solutions, dedicated to satisfying end-user needs for security, safety and convenience.

COMMERCIAL THRESHOLDS

Saddle Thresholds

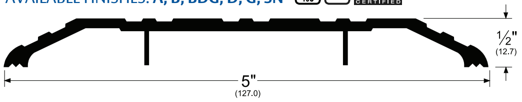
170_

AVAILABLE FINISHES: **A, B, BDG, D, G**



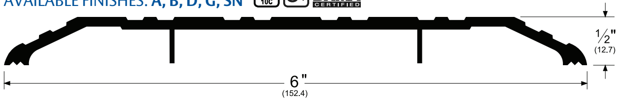
171_

AVAILABLE FINISHES: **A, B, BDG, D, G, SN**



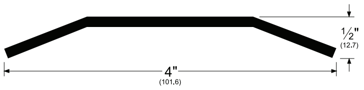
172_

AVAILABLE FINISHES: **A, B, D, G, SN**



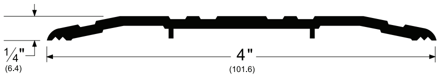
175SS_

AVAILABLE FINISH: **SS (#4 Finish)**



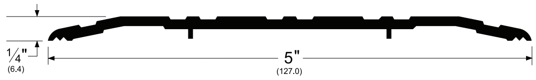
270_

AVAILABLE FINISHES: **A, B, D, G**



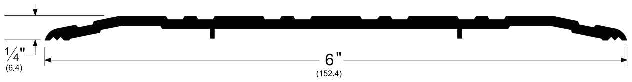
271_

AVAILABLE FINISHES: **A, B, D, G, SN**



272_

AVAILABLE FINISHES: **A, B, D, G, SN**

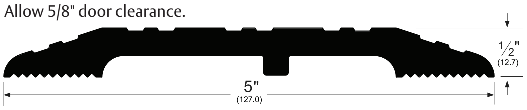


Heavy Duty Thresholds

1715_

AVAILABLE FINISHES: **A, AK, D**

Allow 5/8" door clearance.

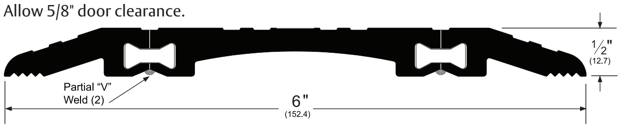


Modular Heavy Duty Thresholds

1716_

AVAILABLE FINISHES: **A, AK, D**

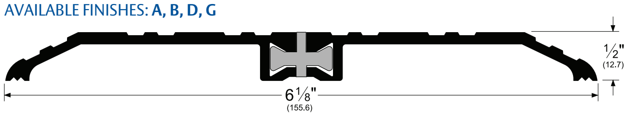
Allow 5/8" door clearance.



Thermal Barrier Thresholds

253X3_FG

AVAILABLE FINISHES: **A, B, D, G**



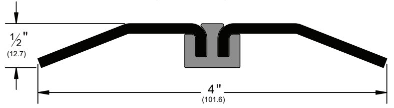
252SSx2FG_

AVAILABLE FINISH: **SS (#4 Finish)**

Also Available (Not Shown)

253SSx3FG_

252SSx3FG_

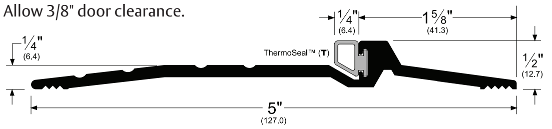


Latching Panic Exit Saddle Thresholds

2005_T

AVAILABLE FINISHES: **A, B, D, G**

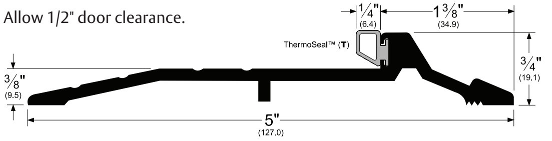
Allow 3/8" door clearance.



179_T

AVAILABLE FINISHES: **A, B, D, G**

Allow 1/2" door clearance.



ALTERNATE INSERTS

2005_P
179_P

pile (**P**)

2005_V
179_V

vinyl (**V**)

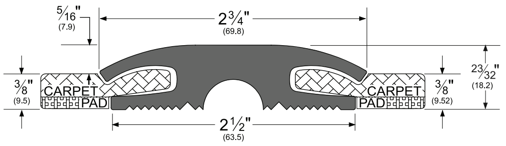
HOSPITALITY PRODUCTS

Vinyl Thresholds

V232_

AVAILABLE COLORS: **BL**

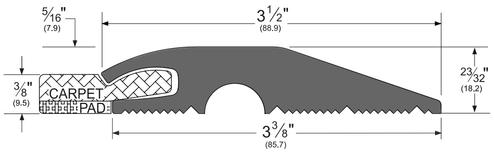
AVAILABLE LENGTHS: **36", 48", 73"**



V2320_

AVAILABLE COLORS: **BL**

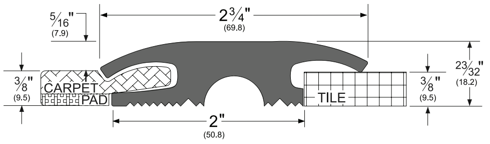
AVAILABLE LENGTHS: **36", 48", 73"**



V2325_

AVAILABLE COLORS: **BL**

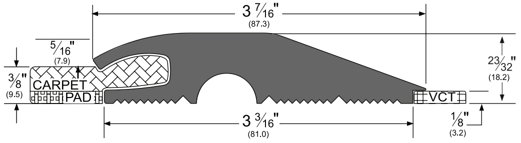
AVAILABLE LENGTHS: **36", 48", 73"**



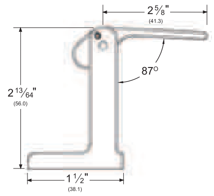
V2322_

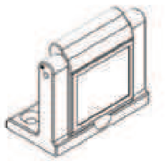
AVAILABLE COLORS: **BL**

AVAILABLE LENGTHS: **36", 48", 73"**



Privacy Door Latch





PDL_

AVAILABLE FINISHES:

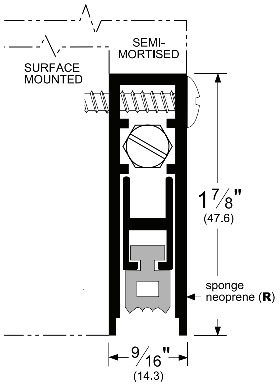
US3, 4, 26, 26D/15

DOOR BOTTOMS

Automatic Door Bottoms

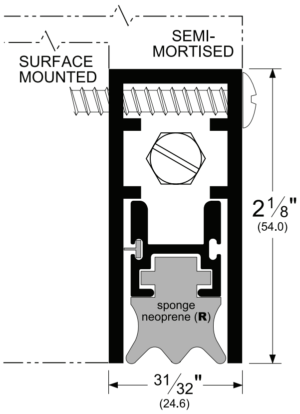
4131_RL

AVAILABLE FINISHES: **BDG, C, D, SN**



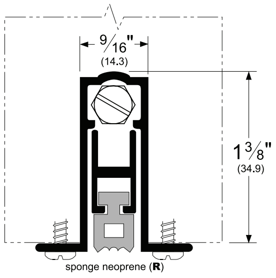
4301_RL

AVAILABLE FINISHES: **C, D**



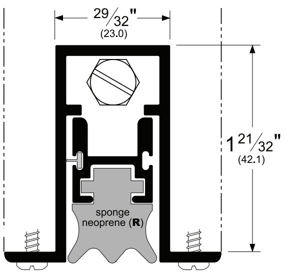
411_RL

AVAILABLE FINISHES: **A**

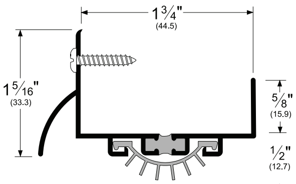


434_RL

AVAILABLE FINISHES: **A**

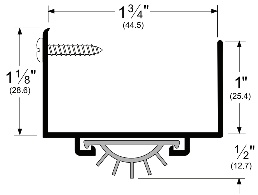


Door Shoes



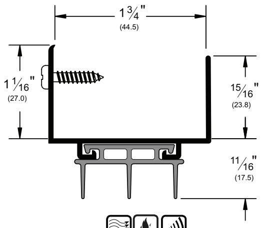
216_V
216_PK

AVAILABLE FINISHES:
A, B, BDG, D, G, PW, SN



217_V
217_PK

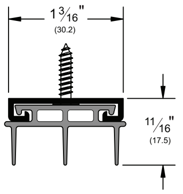
AVAILABLE FINISHES:
A, BDG, D, G, PW, SN



2173_V

AVAILABLE FINISHES:
A, BDG, D, PW

Also available unnotched:
2173_V36UN
2173_V48UN

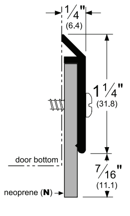


2343_V

AVAILABLE FINISHES:
A, D

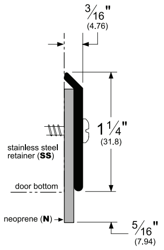
Also available unnotched:
2343_V36UN
2343_V48UN

Door Bottom Sweeps



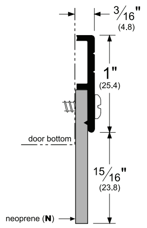
315_N

AVAILABLE FINISHES:
B, C, D, G, SN



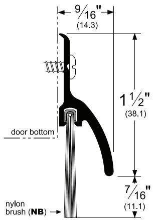
315SSN

AVAILABLE FINISH:
SS (#4 Finish)



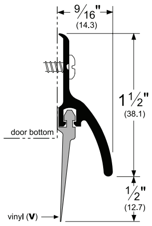
321_N

AVAILABLE FINISHES:
C, D, G



345_NB

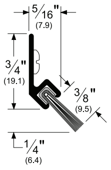
AVAILABLE FINISHES:
A, BDG, D, G, PW



345_V

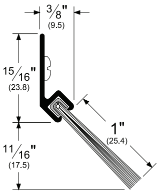
AVAILABLE FINISHES:
A, BDG, D, G, PW

BRUSH GASKETING



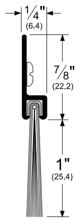
45041_NB

AVAILABLE FINISHES:
C, D, G, SN



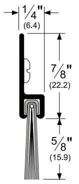
45100_NB

AVAILABLE FINISHES:
C, D, G, SN



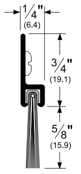
18100_NB

AVAILABLE FINISHES:
C, D, G, PW



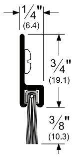
18062_NB

AVAILABLE FINISHES:
C, D, G, PW



18061_NB

AVAILABLE FINISHES:
C, D, G, SN

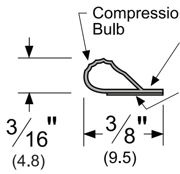


18041_NB

AVAILABLE FINISHES:
C, D, G, SN

NOTE: ALTERNATE INSERTS MAY CARRY DIFFERENT RATINGS. SEE FULL LINE CATALOG OR WEBSITE FOR MORE INFORMATION.

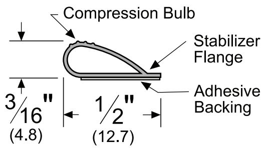
ADHESIVE GASKETING



PK33_

AVAILABLE FINISHES:
BL, D, W

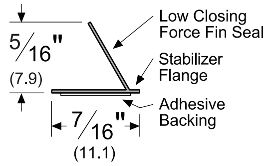
AVAILABLE LENGTHS:
17', 18', 20', 21', 25', 510'



PK55_

AVAILABLE FINISHES:
BL, D, W

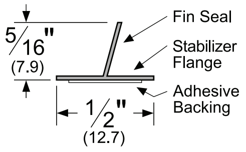
AVAILABLE LENGTHS:
17', 18', 20', 21', 25', 510'



S44_

AVAILABLE FINISHES:
BL, D, W

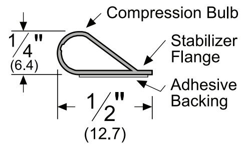
AVAILABLE LENGTHS:
17', 18', 20', 21', 25', 510'



S77_

AVAILABLE FINISHES:
C, D, W

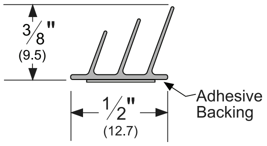
AVAILABLE LENGTHS:
17', 18', 20', 21', 25'



S88_

AVAILABLE FINISHES:
BL, C, D, GR, TAN, W

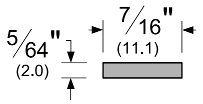
AVAILABLE LENGTHS:
17', 18', 20', 21', 25', 30', 204', 510'



S773_

AVAILABLE FINISHES: **D, W**

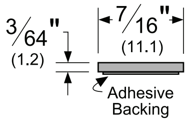
AVAILABLE LENGTHS: **17', 18', 20', 21', 25'**



HSS1000_

AVAILABLE FINISHES:
Graphite (no code), W

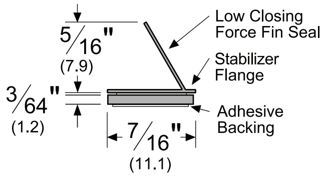
AVAILABLE LENGTHS:
7', 8', 10', 18', 21', 24'



HSS2000_

AVAILABLE FINISHES:
Graphite (no code), W

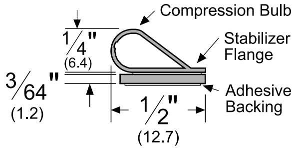
AVAILABLE LENGTHS:
7', 8', 10', 18', 21', 24'



HSS2000xS44_

AVAILABLE FINISHES:
BL, D, W

AVAILABLE LENGTHS:
18', 20', 21', 24'



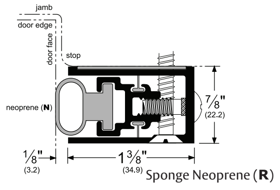
HSS2000xS88_

AVAILABLE FINISHES:
BL, C, D, GR, TAN, W

AVAILABLE LENGTHS:
18', 20', 21', 24'

PERIMETER GASKETING

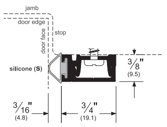
Adjustable Jamb Weatherstrip



322_SN

AVAILABLE FINISHES: **C, D, G**

Snap Cover - Concealed Fasteners

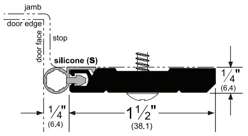


29310_S

AVAILABLE FINISHES: **C, D, G**

ADDITIONAL INSERTS: **P, PK, V**

Heavy Duty-Head Section

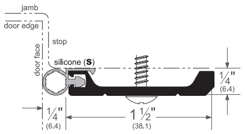


2891_S

AVAILABLE FINISHES: **A, D, G**

ADDITIONAL INSERTS: **PK, V**

Heavy Duty-Standard Jamb

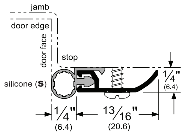


290_S

AVAILABLE FINISHES: **A, D, G**

ADDITIONAL INSERTS: **PK, V**

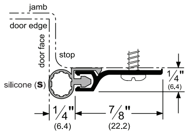
Standard Perimeter Gasketing



297_S

AVAILABLE FINISHES: **A, BDG, D, G, PW, SN**

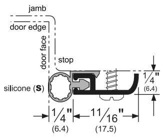
ADDITIONAL INSERTS: **PK, V**



303_S

AVAILABLE FINISHES: **A, BDG, D, G, PW, SN**

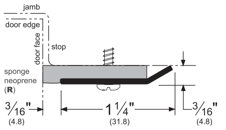
ADDITIONAL INSERTS: **PK, V**



316_S

AVAILABLE FINISHES: **A, BDG, D, G**

ADDITIONAL INSERTS: **PK, V**



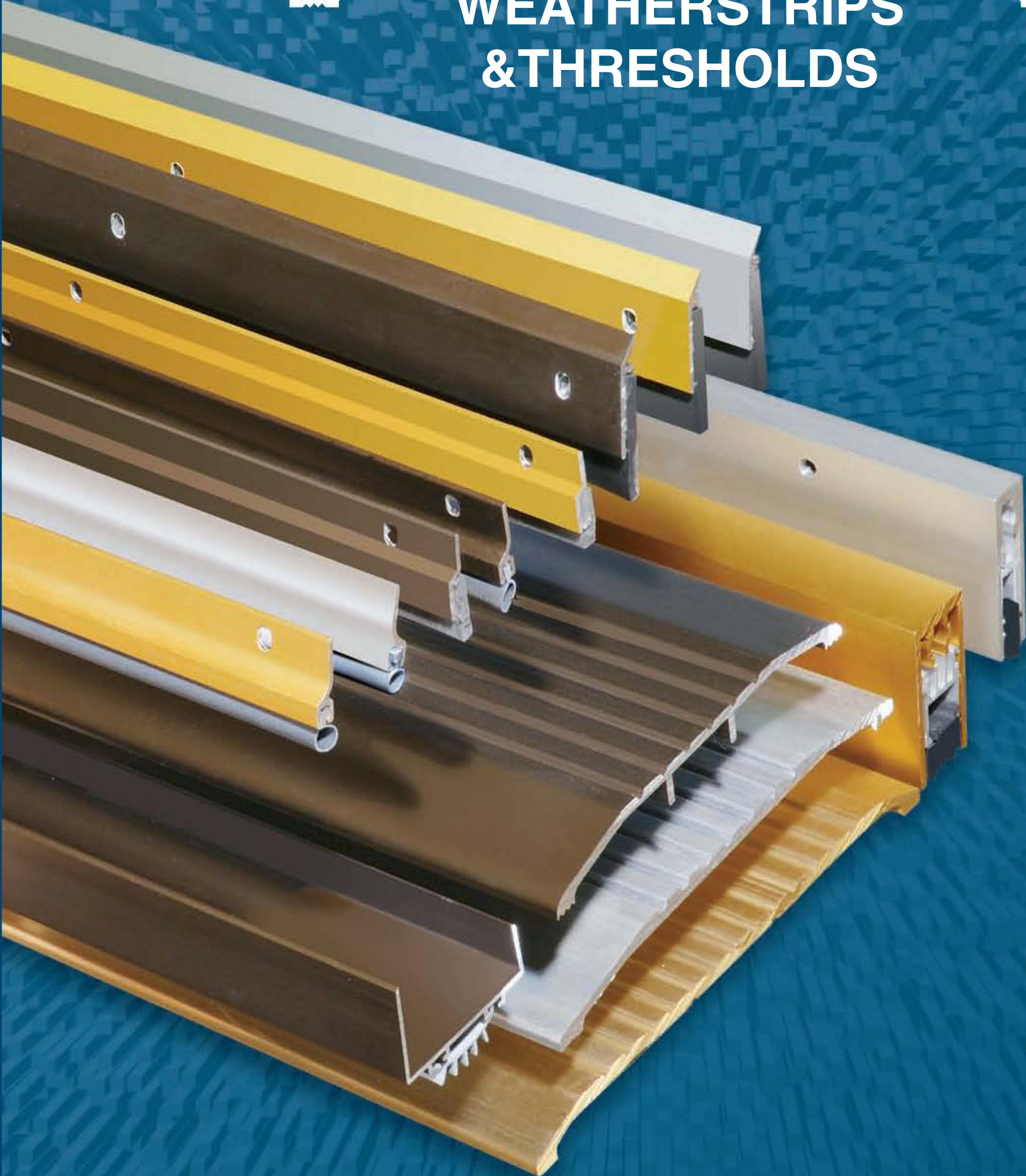
315SSR

AVAILABLE FINISH: **SS (#4 Finish)**

NOTE: ALTERNATE INSERTS MAY CARRY DIFFERENT RATINGS. SEE FULL LINE CATALOG OR WEBSITE FOR MORE INFORMATION.

Reese

WEATHERSTRIPS &THRESHOLDS

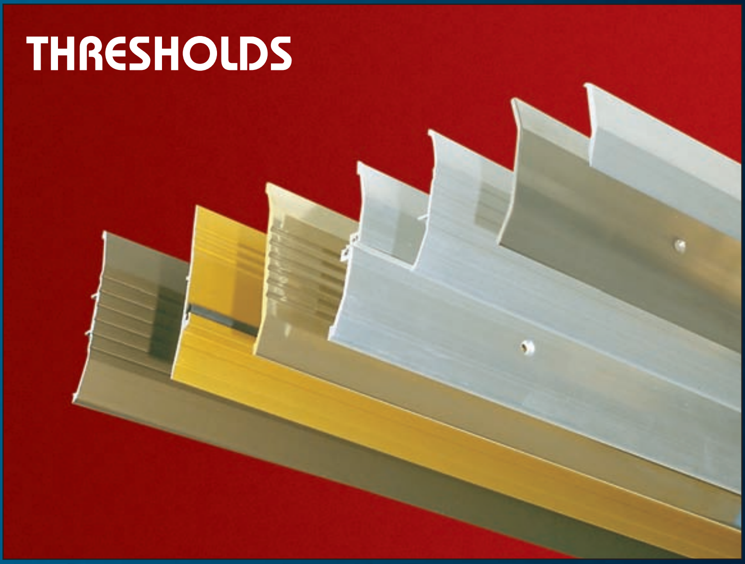


Phone 1-800-328-0953
Fax 1-800-334-8823
www.reeseusa.com

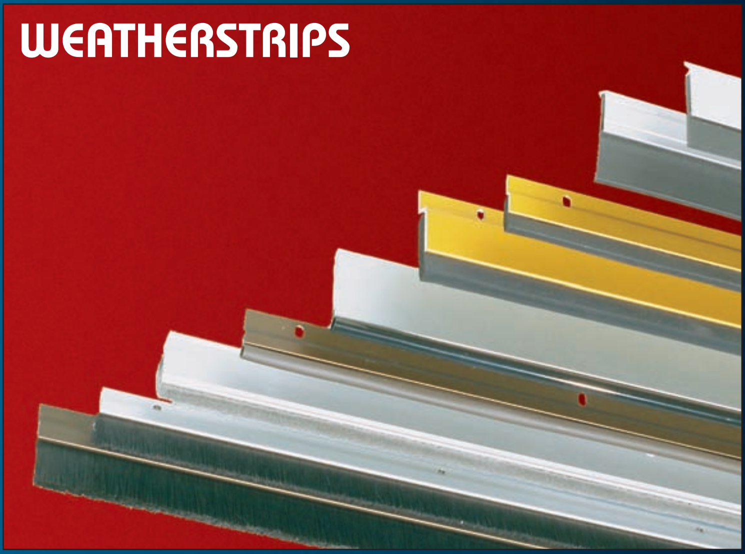
Continuous Service and Quality

Reese Enterprises, Inc. has more than 80 years experience in manufacturing weatherstrips along with many other door & floor products. During that time, we have devoted both time and dollars to product development, research and testing. Our highest valued asset, however, is you — our customer. That's why you'll talk to a pleasant, helpful person when you call Reese. No answering machines or recorded menus. Call us and hear for yourself.

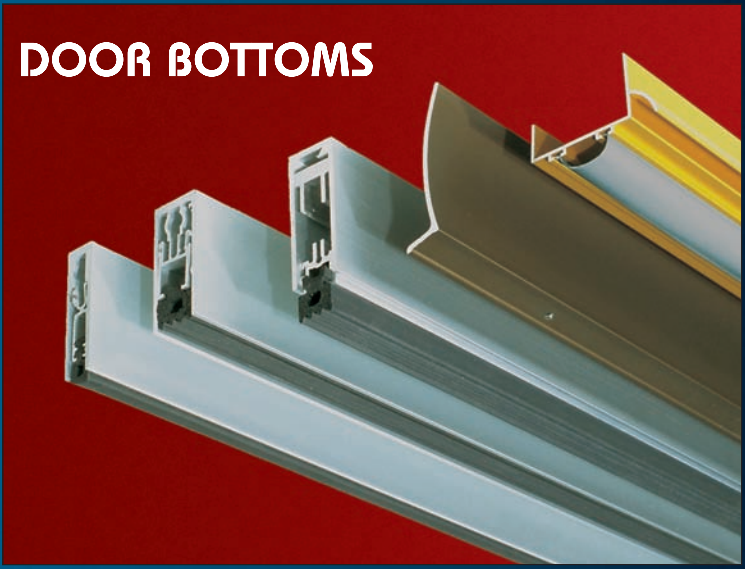
Reese
WEATHERSTRIPS
&THRESHOLDS



THRESHOLDS



WEATHERSTRIPS



DOOR BOTTOMS

TECHNICAL DATA

DRAFT & ACOUSTICAL
SOUND SEALANT

PHYSICAL PROPERTIES

Type	Synthetic Latex Rubber
Color	White
Solids by weight	75%
Toxicity	Toxic only if swallowed. Refer to MSDS.
Flammability	Nonflammable
Flash Point	200°F. TCC (minimum amount of solvent present)
Tooling/Open Time	15 minutes
Tack Free Time	30 minutes
Cure Time	2-7 days
Application Temperature	40°F minimum
Service Temperature	-5°F - 170°F
Freeze-Thaw Stability	3 cycles. Unaffected by freezing after curing
Shelf Life	1 year from date made at 75°F
Sag or Slump	Nil (ASTM D2202)
VOC Level	22g/l or <1% by wt.
Shore "A" Hardness	45 +/-5 (Cured 30 days @ room temp.)
Clean-up	Water and soap before curing
Accelerated Weathering	No cracks, discoloration or chalking: 1000 hrs. in Xenon Arc Weatherometer

OSI® Greenseries™ Draft & Acoustical Sound Sealant is a non-flammable, latex-based sealant specially designed to reduce sound transmissions and drafts in all types of wall systems where a sound-rated assembly is required. Its primary function is to achieve and maintain the specific STC (Sound Transmission Class) value of the system designed.

The paintable sealant remains flexible and adheres firmly to wood, metal studs, concrete, gypsum board and most other building materials. The easy-to-use sealant cleans up easily with soap and water.

FEATURES

- Permanently flexible
- Easy application and cleanup
- UL Classification – R9732; UL 723
- Easy water cleanup
- Low VOC, compliant formula
- Will not harden, crack or separate
- Non-staining & non-migrating
- High degree of adhesive and cohesive strength.

USES

Greenseries™ Draft & Acoustical was developed primarily for commercial construction utilizing light weight cavity walls and floor systems. Draft & Acoustical Sealant is used successfully in office buildings, hotels, apartment complexes, and other types of commercial & residential construction.

The sealant is used for exposed and unexposed applications at perimeter joints, floor and ceiling runners, cut outs in gypsum board, veneer plaster systems and other areas where a sound rated assembly is required. The sealant can also be applied or buttered around all electrical boxes and outlets, cold air returns, heating and air conditioning ducts, and other utility equipment penetrating wall surfaces for increased acoustical performance. Also works well for sealing sill and and base plates in residential construction.

SPECIFICATIONS

- UL Classified – 48S9 (R9732). Tested in accordance with and conforms to UL 723: U.B.C. Standard No. 42-1 Class I.
- ASTM E84: Surface Burning Characteristics of Building Materials.
- ASTM E90-85: Laboratory Measurement of Airborne-Sound Transmission Loss of Building Materials.
- ASTM D217: Testing Standard for Consistency.
- ASTM C919-79: Standard Practice for Use of Sealants in Acoustical Applications.
- SCAQMD Rule 1168 V.O.C.; CARB; and BAAQMD compliant
- GREENGUARD Certified
- Meets LEEDS requirements

LIMITATIONS

- Keep from freezing
- Do not use below 40°F. (5°C.).
- Not recommended for use on mirrors or underwater applications.
- Not recommended for exterior use.

PACKAGING

28 oz. cartridges – 12 per case (Item No. GS79928)

STORAGE

Store at 70°F. +/- 5° (21°C) for long shelf life and easy application. Do not store below 40°F. (5°C.).

COVERAGE

3/8" round bead size: approx. 40 lin. ft. per 28 oz. cartridge.
¼" round bead size: Approx. 89 lin. ft. / 28oz cartridge.

PERFORMANCE CHARACTERISTICS

1. Underwriters Laboratories Inc. Classified 48S9 (R9732) UL 723: Sealant tested for surface burning characteristics

	Applied to organic Reinforced Cement Board*
Flame Spread	5
Smoke Development	5

*Tested as applied in two 1/2in. beads, 8in. on center. The sealant covered 5.6 percent of the exposed sample area.

2. ASTM E90-85: STC Value – Effect of sealing the opening on a test wall partition.

APPLICATION PROCEEDURES

All surfaces must be clean and free of dust, dirt, oil, moisture and other foreign substances which could interfere with the bond of the sealant.

DIRECTIONS

1. Cut spout on tube to desired bead size (3/8" round bead recommended) and puncture seal inside spout.
2. Sealant should be applied as specified in the sound-rated system being installed (either wood or metal studs)

A. Bottom & Top Runners: Apply a continuous 3/8" round bead of sealant on runners before setting gypsum board. Gypsum board shall be set into sealant to form complete contact with adjacent materials. Fill joint on top runners to complete seal. Repeat procedure for double layer applications.

B. Cut-Outs and Perimeter Joints. Backs of electrical boxes, pipes, duct systems and other types of utility equipment penetrating wall surfaces shall be buttered with sealant. Seal all joints at perimeter edges including abutting surfaces and corner joints.

3. Maximum joint size should not exceed ⅝" x ½".
4. Clean tools and excess sealant immediately after application with soap and water.
5. If necessary, sealant can be painted as applicable to meet project requirements after 24 hours.

CAUTION! CONTAINS ETHYLENE GLYCOL , MINERAL SPIRITS and crystalline silica. Avoid eye contact. Do not take internally. If swallowed, may cause abdominal discomfort. Use with adequate ventilation. Refer to MSDS.

WARNING: This product contains a chemical known to the State of California to cause cancer.

KEEP OUT OF REACH OF CHILDREN

FIRST AID

Eye Contact: In case of eye contact, flush with clean water for at least 15 minutes. Skin Contact: Wash skin thoroughly with soap and water. Ingestion: DO NOT induce vomiting. Seek medical attention. If dizziness occurs, remove to fresh air.

NOTICE TO PURCHASER

Henkel Corporation warrants this product when used according to directions. If not satisfied with the product's performance when used as directed, return sales receipt and used container to Henkel Corporation, 32150 Just Imagine Drive, Avon OH, 44011 for product replacement or refund. User shall determine suitability of product for use and assumes all risk.

QUESTIONS?

For commercial use or other questions pertaining to this product, call Henkel Technical Service at 800-321-0253 M-F, 9am – 4pm. or visit our website at www.greenseries.com.

Test partition consisted of metal studs 24" O.C. with double layer gypsum board, Fire code "C" and attached with screws on both sides. Inside of partition was filled with sound insulation. Partition system was erected and shimmed out 4.75 mm (0.1875in.) at top, bottom and edges.

Results: Sound Transmission Class Value

1. Un-sealed partition – Arrows show sound travel around or through partitions.
   a. STC=15
2. Single bead of sealant used at top and bottom runners only – both sides of partition system.
   a. STC=24

Metal Stud Partition Door/Window frame in a hollow partition

3. Single bead of sealant used at top, bottom and perimeter joints – both sides of system.
   a. STC=45
4. Double bead of sealant used at top, bottom and perimeter joints – both sides of system.
   a. STC=55

OSI® GreenSeries™ Draft & Acoustical Sound Sealant is currently under going tested by GREENGUARD.
The GREENGUARD INDOOR AIR QUALITY CERTIFIED Mark is a registered certification mark used under license through the GREENGUARD Environmental Institute.

Henkel

Henkel Consumer Adhesives
Professional Adhesives & Sealants
32150 Just Imagine Drive
Avon, OH 44011
U.S.A.

Phone: (440) 937-7000
Fax: (440) 937-7092

AC-20 **FTR®**

(Fire & Temperature Rated) Acoustical & Insulation Sealant

Specification Data Sheet

PECORA
CORPORATION

BASIC USES

- AC-20 FTR® fire-rated systems are suitable for applications in schools, hospitals, churches, high-rise office buildings and hotels, prisons, sports arenas, and other public-use buildings to ensure a safe and orderly evacuation in the event of a fire.

2. MANUFACTURER

Pecora Corporation
165 Wambold Road
Harleysville, PA 19438

Phone:	215-723-6051
	800-523-6688
Fax:	215-721-0286
Website:	www.pecora.com

3. PRODUCT DESCRIPTION

AC-20 FTR® is a unique acrylic latex sealant that is UL® Classified in firestopping systems for expansion joints and through penetrations. When properly installed, these systems effectively contain fire, smoke, toxic fumes, and water within a given area surrounded by firewalls for a two, three, or four hour period, depending on the design specifications.

Other Uses: Excellent adhesive, flexibility and durability qualities make AC-20 FTR® ideal for insulating and weatherproofing around windows, doors, panels, siding, duct work, base plates, etc. It is compatible with all common building materials including specialties such as polystyrene, polyurethane, cork, vinyl, foamed and fibrous glass.

Used as an acoustical sealant, AC-20 FTR® reduces sound transmission in partition systems to achieve specific STC values by sealing spaces around cut-outs and at perimeters of partitions. The sealant cures to a tough rubber to form a long-lasting acoustical seal.

PACKAGING

- 30 fl. oz. (.887 liter) fiber cartridges
- 5-gallon (18.9 liter) pails

COLOR

- White, Beige-Gray
  Special colors available in 250-gallon (946 liter) batches.

4. TECHNICAL DATA

Applicable Standards: ASTM C-834-86 specification for latex sealing compounds.

Fire Rated System: Two-hour Fire and Temperature Rated wall and floor joint systems up to 7" (178mm) wide and four-hour systems up to 4" wide can be designed with AC-20 FTR® in conjunction with Ultra Block fire blocking material in fire-rated walls and floors. Reference: ANSI/UL 263, ASTM E-119, NFPA No. 251.

CLASSIFIED

UNDERWRITERS
LABORATORIES INC.®
CLASSIFIED
JOINT TREATMENT MATERIALS
FIRE RESISTANCE
CLASSIFICATION
DESIGNS J900H (FFS 0006) &U900 "O" (WWS 0010), J900Z (FFS 2002), U900Z-009 (WWS 2008), J900Z-007 (FFS 1010), U900Z-015 (WWS 1012)

AC-20 FTR® in conjunction with Ultra Block® achieves a 2-hour fire rating when sealing around steel or copper pipe and electrical metallic tubing or steel conduit in through penetration systems. Reference: ANSI/UL 1479, ASTM E-814.

FILL, VOID OR CAVITY MATERIALS
CLASSIFIED BY
UNDERWRITERS
LABORATORIES INC.
FOR USE IN
THROUGH-PENETRATION
FIRESTOP SYSTEM NO. CAJ 1093

In addition to its fire-blocking value, Ultra Block® is very efficient acoustically, having a noise reduction coefficient of .75 and sound transmission coefficient of .5 (Ultra Block® is a registered trademark of Backer Rod Mfg. and Supply Co., Denver, CO, USA.)

5. INSTALLATION

Surface Preparation: Surfaces must be free of all contamination. Sealant may be applied to damp, porous surfaces. No priming is required.

Application: Refer to Pecora Firestopping Manual 07270 and UL Fire Resistance Directory for installation details on fire-rated joint and through penetration systems. For insulating and weatherproofing purposes, fill all window, door, and panel perimeter joints using a resilient backer rod to control sealant depth to 1/2" (13mm) maximum. For best results, protect sealant from excessive low temperatures and apply above 40°F (4°C). For acoustical purposes, apply continuous

TYPICAL PHYSICAL PROPERTIES

Test Property	Value	Procedure
Modulus @ 100% (psi)	15-20	ASTM D412
Ultimate Tensile (psi)	30-40	ASTM D412
Ultimate Elongation (%)	400-500	ASTM D412
Movement Capability (%)	±7 1/2	ASTM D412
VOC Content	31 g/L	

beads of sealant to seal perimeters of all sound-rated partitions. Apply sealant in the angles formed by metal components or base-layer panels and abutting surfaces. Apply sealant around all openings formed for outlets; electrical, telephone, light fixtures, etc.

Tooling: Tool material flush with surfaces to allow for expected shrinkage and insure good contact and adhesion to the substrate.

Cleaning: Remove excess material with water or a damp cloth before it cures. Sealant may be painted within 30 minutes after application with a good grade of latex paint.

Shelf Life: AC-20 FTR® has a shelf life well in excess of one year when stored in unopened containers below 80° F (27°C).

Precautions: AC-20 FTR® is non-flammable, non-toxic, non-irritating and environmentally safe. However, do not take internally. Refer to Material Safety Data Sheet for additional information.

Ultra Block® is a non-carcinogenic processed continuous filament textile glass fiber that may cause skin, eye and respiratory irritation. When applying, wear long sleeves, gloves, cap, goggles or safety glasses and NIOSH/MSHA-approved dust respirator. After use bathe with soap and warm water. Wash clothes separately and rinse after use. Refer to Material Safety Data Sheet for additional information.

**FOR PROFESSIONAL USE ONLY.
KEEP OUT OF THE REACH
OF CHILDREN.**

6. AVAILABILITY AND COST

Pecora products are available from our stocking distributors in all major cities. For the name and telephone number of your nearest representative call one of our locations listed below or visit our website at www.pecora.com.

7. WARRANTY

Pecora Corporation warrants its products to be free of defects. Under this warranty, we will provide, at no charge, replacement materials for, or refund the purchase price of, any product proven to be defective when installed in accordance with our published recommendations and in applications considered by us as suitable from this product. This warranty in lieu of any and all other warranties expressed or implied, and in no case will Pecora be liable for incidental or consequential damages.

8. MAINTENANCE

If the sealant is damaged and the bond is intact, cut out the damaged area and recaulk. No primer is required. If the bond has been affected, remove the sealant, clean and prepare the joint in accordance with instructions under "Installation".

9. TECHNICAL SERVICES

Pecora representatives are available to assist you in selecting an appropriate product and to provide on-site application instructions or to conduct jobsite inspections. For further assistance call our Technical Service Department at 800-523-6688.

ISO 9001:2000
KEMA CERTIFICATE
Accredited by
ANSI-RAB NAP

APPENDIX G

Cadna Analysis Data and Results

Cadna Noise Model - Sound Levels - All Phases

Name	ID	Type	Weight	Oktave Spectrum (dB)										Source
				63	125	250	500	1000	2000	4000	8000	A	lin	
Excavator	S1	Lw (c)		108	116	101	104	101	99	94	88	107	117.2	DEFRA
Front End Loader	S2	Lw (c)		113	113	102	104	100	98	97	89	106.5	116.6	DEFRA
Dump Truck	S3	Lw (c)		119	115	106	104	106	103	99	91	110.2	120.9	DEFRA
Air Compressor	S4	Lw (c)		115	104	95	90	88	86	89	78	96.5	115.4	DEFRA
Telescopic Forklift	S5	Lw (c)		116	110	100	98	95	93	87	78	101.5	117.2	DEFRA
Concrete Mixer Truck	S6	Lw (c)		103	104	110	103	100	98	94	91	106.7	112.7	DEFRA
Concrete Pump Truck	S7	Lw (c)		113	113	103	102	100	99	93	85	105.9	116.6	DEFRA
Paver	S8	Lw (c)		109	108	103	103	102	100	93	87	106.6	113.2	DEFRA
Roller	S9	Lw (c)		122	117	119	114	109	104	96	88	115.6	125.1	FHWA

Cadna Noise Model - Point Sources - Phase 1, West

Name	ID	Result. PWL	Lw / Li		Operating Time (min)	Height	Coordinates		
		Day	Type	Value			X	Y	Z
		(dBA)				(m)	(m)	(m)	(m)
Excavator	S1	107.0	Lw	S1	24	1.52	580.40	449.50	54.02
Front End Loader	S2	106.5	Lw	S2	24	1.52	580.40	449.50	54.02
Dump Truck	S3	110.2	Lw	S3	24	1.52	580.40	449.50	54.02

Cadna Noise Model - Point Sources - Phase 1, East

Name	ID	Result. PWL	Lw / Li		Operating Time (min)	Height	Coordinates		
		Day	Type	Value			X	Y	Z
		(dBA)				(m)	(m)	(m)	(m)
Excavator	S1	107.0	Lw	S1	24	1.52	626.20	449.50	50.29
Front End Loader	S2	106.5	Lw	S2	24	1.52	626.20	449.50	50.29
Dump Truck	S3	110.2	Lw	S3	24	1.52	626.20	449.50	50.29

Cadna Noise Model - Point Sources - Phase 2, West

Name	ID	Result. PWL	Lw / Li		Operating Time (min)	Height	Coordinates		
		Day	Type	Value			X	Y	Z
		(dBA)				(m)	(m)	(m)	(m)
Air Compressor	S4	96.5	Lw	S4	24	1.52	580.4	449.5	54.02
Telescopic Forkilft	S5	101.5	Lw	S5	24	1.52	580.4	449.5	54.02
Concrete Mixer Truck	S6	106.7	Lw	S6	24	1.52	580.4	449.5	54.02
Concrete Pump Truck	S7	105.9	Lw	S7	12	1.52	580.4	449.5	54.02
Paver	S8	106.6	Lw	S8	30	1.52	580.4	449.5	54.02
Roller	S9	115.6	Lw	S9	12	1.52	580.4	449.5	54.02

Cadna Noise Model - Point Sources - Phase 2, West

Name	ID	Result. PWL	Lw / Li		Operating Time (min)	Height	Coordinates		
		Day	Type	Value			X	Y	Z
		(dBA)				(m)	(m)	(m)	(m)
Air Compressor	S4	96.5	Lw	S4	24	1.52	626.20	449.50	50.29
Telescopic Forkilft	S5	101.5	Lw	S5	24	1.52	626.20	449.50	50.29
Concrete Mixer Truck	S6	106.7	Lw	S6	24	1.52	626.20	449.50	50.29
Concrete Pump Truck	S7	105.9	Lw	S7	12	1.52	626.20	449.50	50.29
Paver	S8	106.6	Lw	S8	30	1.52	626.20	449.50	50.29
Roller	S9	115.6	Lw	S9	12	1.52	626.20	449.50	50.29

Cadna Noise Model - Terrain Contours - All Phases

Contour Line	Coordinates		
	X	Y	Z
	(m)	(m)	(m)
120.1	763.67	363.23	36.58
	755.01	363.23	36.58
	700.66	342.90	36.58
	671.66	341.90	36.58
	681.00	373.24	36.58
	680.33	413.24	36.58
	695.66	427.91	36.58
	706.00	454.58	36.58
	710.67	450.25	36.58
	721.00	429.91	36.58
	755.01	423.24	36.58
	771.67	409.91	36.58
	793.68	420.91	36.58
	837.35	404.91	36.58
	1038.71	477.58	36.58
	1122.05	724.28	36.58
120.2	471.36	151.44	36.58
	486.06	206.46	36.58
	506.64	213.18	36.58
	535.20	207.72	36.58
	672.55	273.25	36.58
	718.34	295.09	36.58
140.1	592.00	656.30	42.67
	625.07	508.39	42.67
	640.42	491.72	42.67
140.2	635.20	653.57	42.67
	712.83	541.53	42.67
	731.63	544.10	42.67
	745.91	527.30	42.67
	768.17	497.90	42.67
	785.81	489.07	42.67
140.3	648.04	474.37	42.67
	653.08	450.01	42.67
	653.50	424.81	42.67
	660.22	392.05	42.67
	645.94	374.41	42.67
	625.78	363.91	42.67
	619.06	348.79	42.67
	565.30	317.49	42.67
140.9	792.05	473.76	42.67
	828.56	463.17	42.67
	891.01	455.24	42.67
	932.29	477.46	42.67
140.10	945.52	493.87	42.67
	978.86	525.09	42.67
160.1	570.69	656.49	48.77
	583.91	607.54	48.77
	588.94	564.15	48.77
	574.65	543.77	48.77
	594.76	522.61	48.77
	599.00	493.50	48.77

Cadna Noise Model - Terrain Contours - All Phases

Contour Line	Coordinates		
	X	Y	Z
	(m)	(m)	(m)
160.2	613.98	473.89	48.77
	638.93	467.76	48.77
	639.91	414.10	48.77
	621.91	399.28	48.77
	590.16	409.07	48.77
	572.17	395.84	48.77
	561.06	353.24	48.77
	542.01	333.66	48.77
	465.01	349.54	48.77
	447.02	348.21	48.77
	434.58	364.35	48.77
	399.66	336.04	48.77
	356.79	352.45	48.77
160.3	352.62	313.73	48.77
	358.70	299.97	48.77
	394.16	275.10	48.77
	410.83	248.91	48.77
	410.30	235.94	48.77
	343.62	207.10	48.77
180.1	545.42	656.99	54.86
	559.44	613.86	54.86
	570.29	599.30	54.86
	559.97	572.05	54.86
	561.56	493.73	54.86
180.2	563.11	472.34	54.86
	560.73	438.47	54.86
180.3	548.56	433.97	54.86
	520.25	353.01	54.86
	454.89	362.80	54.86
	445.37	404.60	54.86
	392.19	360.15	54.86
	366.26	368.62	54.86
	354.35	408.04	54.86
	351.70	455.67	54.86
	333.45	458.58	54.86
	298.79	377.88	54.86
200.1	528.45	655.35	60.96
	524.45	617.68	60.96
	536.11	580.34	60.96
	523.11	563.34	60.96
	519.11	536.00	60.96
	527.11	521.67	60.96
	525.45	508.00	60.96
	510.78	488.66	60.96
200.2	513.45	472.66	60.96
	479.44	404.65	60.96
	466.11	407.32	60.96
	442.77	453.99	60.96
	429.44	416.32	60.96
	408.10	412.99	60.96
	384.43	397.65	60.96
	377.10	427.66	60.96
	382.43	472.00	60.96
233.1	169.87	651.07	71.00
	171.46	608.21	71.00

Cadna Noise Model - Noise Levels at Receivers - Phase 1, West					
Name	**Level Lr**	**Height**	**Coordinates**		
	Day		**X**	**Y**	**Z**
	(dBA)	**(m)**	**(m)**	**(m)**	**(m)**
R1-1	65.3	1.52	543.45	449.46	57.73
R2-1	64.2	1.52	580.42	491.35	53.34
R3-1	50.7	1.52	650.36	449.50	45.40
R1-2	66.4	4.57	543.45	449.46	60.78
R2-2	65.3	4.57	580.42	491.35	56.39
R3-2	58.2	4.57	650.36	449.50	48.44

Cadna Noise Model - Noise Levels at Receivers - Phase 1, East					
Name	**Level Lr**	**Height**	**Coordinates**		
	Day		**X**	**Y**	**Z**
	(dBA)	**(m)**	**(m)**	**(m)**	**(m)**
R1-1	57.7	1.52	543.45	449.46	57.73
R2-1	61.3	1.52	580.42	491.35	53.34
R3-1	61.4	1.52	650.36	449.50	45.40
R1-2	58.8	4.57	543.45	449.46	60.78
R2-2	61.6	4.57	580.42	491.35	56.39
R3-2	68.3	4.57	650.36	449.50	48.44

Cadna Noise Model - Noise Levels at Receivers - Phase 2, West					
Name	**Level Lr**	**Height**	**Coordinates**		
	Day		**X**	**Y**	**Z**
	(dBA)	**(m)**	**(m)**	**(m)**	**(m)**
R1-1	66.8	1.52	543.45	449.46	57.73
R2-1	65.6	1.52	580.42	491.35	53.34
R3-1	53.6	1.52	650.36	449.50	45.40
R1-2	68.0	4.57	543.45	449.46	60.78
R2-2	66.9	4.57	580.42	491.35	56.39
R3-2	59.9	4.57	650.36	449.50	48.44

Cadna Noise Model - Noise Levels at Receivers - Phase 2, East					
Name	**Level Lr**	**Height**	**Coordinates**		
	Day		**X**	**Y**	**Z**
	(dBA)	**(m)**	**(m)**	**(m)**	**(m)**
R1-1	58.8	1.52	543.45	449.46	57.73
R2-1	62.3	1.52	580.42	491.35	53.34
R3-1	64.2	1.52	650.36	449.50	45.40
R1-2	60.3	4.57	543.45	449.46	60.78
R2-2	63.1	4.57	580.42	491.35	56.39
R3-2	69.8	4.57	650.36	449.50	48.44

605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 F 760.632.0164

January 9, 2019 11224

CityMark Communities LLC
Attn. Russ Haley
3818 Park Boulevard
San Diego, California 92103

Subject: ***Biological Resources Letter Report for the Proposed 32nd Street and C Street VTM/NDP Project, Project Tracking System No. 595288, City of San Diego, California***

Dear Mr. Haley:

This letter report provides an update of the previous biological study conducted by BonTerra Psomas (March 22, 2016) and analysis of potential biological resource impacts associated with the proposed 32nd Street and C Street Project located in the City of San Diego, California.

In accordance with the current San Diego Land Development Code Biology Guidelines (City of San Diego 2012), this survey letter report provides an introduction, a summary of the pertinent biological resource regulations, a project description, the survey methods, existing biological resources, special-status biological resources, project impacts (direct and indirect), and project mitigation. The project impacts, avoidance, and mitigation measures, as required, are discussed in accordance with the California Environmental Quality Act, Clean Water Act, Migratory Bird Treaty Act, California Fish and Wildlife Code, the *City of San Diego Final Multiple Species Conservation Program (MSCP) Subarea Plan* (City MSCP Subarea Plan) (City of San Diego 1997), and the City of San Diego's (City's) Environmentally Sensitive Lands regulations.

Introduction

The purpose of the biological survey discussed in this letter report was to identify the biological resources within the proposed 32nd Street and C Street Project (Figures 1 and 2). The purpose of this biological letter report is to document and report the existing vegetation and identify those plant and wildlife species recognized as sensitive by local, state, or federal wildlife agencies that a have a moderate to high potential to occur in the proposed project study area (study area) and to provide an analysis of impacts associated with the proposed project implementation.

The proposed project site is currently a vacant property of approximately 0.97 gross acres. The project proposes the development of 19 two- and three- story 3- bedroom multi-family condominium dwelling units (Figure 3). Additionally, 43 on-site parking spaces will be provided.

Project entitlements requested include 1) a vesting tentative map for condominium purposes; and 2) a neighborhood development permit.

The proposed on-site site improvements include grading, the installation of private sewer, water and storm drain utilities and construction of private sidewalks and driveways. Off-site improvements include the construction of public street and alley improvements, which include grading, paving and curb gutter, sidewalk and walls.

The biological survey discussed in this letter report concentrated on identifying biological resources that may be subject to regulation under the City MSCP Subarea Plan and other potential special-status biological resources in the study area. This report identifies these sensitive species that have a moderate to high potential to occur within the study area and also provides an analysis of impacts associated with the proposed project implementation. A biological survey of the study area, the approximately 1-acre parcel as well as any off-site impact areas, was conducted by Dudek Biologist Erin Bergman on June 22, 2018. The survey included vegetation mapping and a survey for special-status plant and wildlife species.

Project Location

The project is located north of State Route 94 (Figure 1). It is south of C Street and east of 32nd Street in the greater Golden Hills Community Planning Area of the City of San Diego, California (Figure 2). East and west of the survey area are residential developments. North of C Street is both residential development and an open space preserve. South of the survey area is undeveloped land next to State Route 94 (Figure 2). The project site is located on the U.S. Geological Survey's National City 7.5-minute topographic quadrangle.

Topography and Land Uses

Within the study area, the topography remains relatively flat, with a slight slope eastward (<10%). The study area ranges in elevation from approximately 140 feet to 180 feet above mean sea level. No part of the study area is located within or adjacent to the Multi-Habitat Planning Area (MHPA). The proposed project is not within the Coastal Zone (City of San Diego 2008).

Soils

According to the San Diego County Soil Survey, one soil type is mapped within the study area: urban land (Bowman 1973).

Methods

Prior to conducting the field investigations, a review of the existing biological resources within the vicinity of the project site was conducted using the California Natural Diversity Database (CDFW 2015). The purpose of this review was to determine if sensitive plant and wildlife species were known to occur within the study area, or in the nearby vicinity, and what constraints these occurrences might have on the property. The MSCP and the City's Biology Guidelines (City of San Diego 2012) were reviewed for constraints to development based on the regional plan and conditions or mitigation that may be required.

The biological constraints letter by BonTerra Psomas (Appendix A) was also reviewed and surveys were conducted for rare plants to address any plants with the potential to occur. Specifically, surveys were conducted for Dean's milkvetch (*Astragalus deanei*), which is more likely to occur east of Jamul, San Diego goldenstar (*Bloomeria clevelandii*) and Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*). San Diego goldenstar and *Astragalus* species were in full bloom at the time surveys were conducted within the survey area.

A reconnaissance-level field survey of the study area was conducted on June 22, 2018, by Dudek Biologist Ms. Bergman. Conditions for this survey are provided in Table 1.

Table 1. Survey Conditions

Date	Time	Personnel	Survey Conditions
June 22, 2018	9:05 a.m.–11:50 a.m.	Erin Bergman	Clear skies; 0–3 mph winds; 71–76˚F
June 27, 2018	8:30 a.m.–11:30 a.m.	Erin Bergman	Clear skies; 0–3 mph winds; 70–73˚F

The study area was surveyed on foot, and potential constraints were noted. The site was evaluated for general vegetation communities and the potential to support special-status wildlife and plant species.

Vegetation community classifications follow the City MSCP Subarea Plan and Biology Guidelines, which are derived primarily from Holland (1986).

Resource Mapping

Biological resources were mapped in the field directly onto a 100-scale (1 inch = 100 feet) color digital orthographic map of the property with topographic overlay, which was used to map the vegetation communities and record any special-status biological resources directly in the field. Observable biological resources were recorded on the field map, where applicable, including perennial plants and conspicuous wildlife (i.e., birds and some reptiles) commonly accepted as regionally special status by the California Native Plant Society (CNPS), California Department of Fish and Wildlife, and U.S. Fish and Wildlife Service. Additionally, an assessment and determination of potential for locally recognized special-status species (i.e., Narrow Endemic and Covered Species listed in the City MSCP Subarea Plan) to occur on site was conducted. The information recorded onto the field map (e.g., vegetation communities and plant/animal species locations) was subsequently digitized into a GIS format.

The vegetation community and land cover mapping follows the classifications described by Holland (1986), as adopted in the City's Biology Guidelines (City of San Diego 2012). In some cases, Oberbauer et al. (2008) was also used as a reference, especially with regard to land cover types. Vegetation community and land cover mapping was conducted for the entire study area.

Following completion of the field work, Dudek GIS Technician Curtis Battle digitized the mapped findings using ArcGIS and calculated coverage acreages using ArcCAD.

Flora and Fauna

The plant species encountered during the field survey were identified and recorded directly into Dudek Kerata forms. A compiled list of plant species observed in the study area is presented in Appendix B.

Wildlife species detected during the field survey by sight, calls, tracks, scat, or other signs were recorded directly onto Dudek Kerata forms. Binoculars (8.5x42 magnification) were used to aid in the identification of wildlife. In addition to species actually detected during the surveys, expected wildlife use of the site was determined by known habitat preferences of local species and knowledge of their relative distributions in the area. A list of wildlife species observed in the study area is presented in Appendix C.

Latin and common names of animals follow Crother (2008) for reptiles and amphibians, American Ornithologists' Union (AOU 2012) for birds, Wilson and Reeder (2005) for mammals, and North American Butterfly Association (NABA 2001) and San Diego Natural History Museum (SDNHM 2002) for butterflies.

Latin and common names for plant species with a California Rare Plant Rank (CRPR) (formerly CNPS List) follow the CNPS Online Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2014). For plant species without a CRPR, Latin names follow the Jepson Interchange List of Currently Accepted Names of Native and Naturalized Plants of California (Jepson Flora Project 2013), and common names follow the USDA NRCS Plants Database (USDA 2013).

Results

Vegetation Communities/Land Cover Types

One land cover type was identified within the study area: disturbed habitat. This land cover type is described in detail in the following text, the acreage is presented in Table 2, and the spatial distribution is presented on the existing biological resources map (Figure 4). Table 2 also includes the designation of vegetation community sensitivity based on rarity and ecological importance as identified by the City MSCP Subarea Plan tiers (City of San Diego 1997).

Table 2. Vegetation Communities and Land Cover Types in the Project Area

Vegetation Community	Tier*	Acreage Outside the MHPA	
		On Site	Off Site
Non-Native Upland Land Cover			
Disturbed Habitat	Tier IV	0.97 acres	0.47 acres
	Total	**0.97 acres**	**0.47 acres**

Notes: MHPA = Multi-Habitat Planning Area.
* Vegetation tiers are defined by the City's Biology Guidelines (City of San Diego 2012).

Disturbed Habitat

According to Oberbauer et al. (2008), disturbed habitat consists of the areas that have had physical anthropogenic disturbance and, as a result, cannot be identified as a native or naturalized vegetation association. However, these areas do have a recognizable soil substrate. The existing vegetation is typically composed of non-native ornamental or exotic species. There can also be impacts from animal uses, grading, or repeated clearing for fuel management on disturbed habitat.

The study area consists entirely of disturbed habitat with a few individual native plants. Soils are disturbed throughout the site, and sections of the site have been graded or highly disturbed. Approximately 78% of the site consists of non-native or invasive plant species. Crown daisy (*Glebionis coronaria*), an invasive plant species, dominates the study area. Less abundant non-native plant species within the study area include redstem stork's bill (*Erodium cicutarium*), prickly lettuce (*Lactuca serriola*), nettleleaf goosefoot (*Chenopodium murale*), Maltese star-thistle (*Centaurea melitensis*), and cheeseweed mallow (*Malva parviflora*).

Plants and Animals

In all, 47 species of vascular plants, 10 native and 36 non-native, were recorded during the biological survey (Appendix B). The diversity of native plant species is low due to the extent of existing development and urban setting of the study area. Native plant species found within the survey area were lone individuals. One remnant rare plant, Nuttall's scrub oak (*Quercus dumosa*) a CNPS 1B.1, is present on the boundary of the project area, and a few are visible just outside the study area (approximately 30 feet away) but are not present within the study area.

In all, seven wildlife species, six native and one non-native, were recorded in the study area during the survey (Appendix C). The wildlife species observed are common, disturbance-adapted species typically found in urban and suburban settings, such as American crow (*Corvus brachyrhynchos*), house sparrow (*Passer domesticus*), and northern mockingbird (*Mimus polyglottos*). No mammal, amphibian, or reptile species were observed in the study area. There is minimal suitable habitat for small wildlife species (e.g., reptiles, amphibians, and small mammals) within the study area due to the disturbed nature of the site, proximity to residential/urban land cover, and limited connectivity of the surrounding habitat to larger expanses native lands. Overall, the diversity of wildlife species in the study area is low due to the extent of surrounding existing development and the disturbed setting of the study area.

Special-Status Plants and Animals

No federally or state-listed species were observed during the survey. One remnant Nuttall's scrub oak, a CNPS 1B.1 plant species, was present near the boundary of the study area (Figure 4). There is no potential for Dean's milk-vetch, San Diego goldenstar, or Coulter's goldfields due to the highly disturbed soils present within the study area and the abundance of invasive species. Due to the generally disturbed nature of the site and proximity of urban development, the site conditions limit the potential for special-status plants and other special-status animal species to occur on site.

The potential for the MSCP narrow endemic species was reviewed during the site visit. Table 3 provides the summary of the results and conclusion for the potential for narrow endemic species to occur. There is no potential for any of the narrow endemic species to occur on site or within the off-site impact area of the project.

Table 3. Potential to Occur Analysis for the Proposed Project for MSCP Narrow Endemic Species

Scientific Name	Common Name	Status¹ (Federal/State/ CRPR/MSCP)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Acanthomintha ilicifolia	San Diego thorn-mint	FT/CE/1B.1/ Covered	Chaparral, coastal scrub, valley and foothill grassland, vernal pools; clay, openings/annual herb/Apr–June/33–3150	Not expected to occur. No suitable soil, vegetation, or vernal pools present.

Table 3. Potential to Occur Analysis for the Proposed Project for MSCP Narrow Endemic Species

Scientific Name	Common Name	Status¹ (Federal/State/ CRPR/MSCP)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Agave shawii var. *shawii*	Shaw's agave	None/None/ 2B.1/Covered	Coastal bluff scrub, coastal scrub/perennial leaf succulent/ Sep–May/33–394	Not expected to occur. This conspicuous perennial species was not detected during focused surveys. No suitable vegetation present.
Ambrosia pumila	San Diego ambrosia	FE/None/1B.1 /Covered	Chaparral, coastal scrub, valley and foothill grassland, vernal pools; sandy loam or clay, often in disturbed areas, sometimes alkaline/perennial rhizomatous herb/Apr–Oct/66–1362	Not expected to occur. No suitable vegetation or vernal pools present.
Aphanisma blitoides	aphanisma	None/None/ 1B.2/Covered	Coastal bluff scrub, coastal dunes, coastal scrub; sandy or gravelly/annual herb/Mar–June/ 3–1001	Not expected to occur. No suitable vegetation present.
Astragalus tener var. *titi*	coastal dune milkvetch	FE/CE/1B.1/ Covered	Coastal bluff scrub (sandy), coastal dunes, coastal prairie (mesic); often vernally mesic areas/annual herb/ Mar–May/3–164	Not expected to occur. No suitable vegetation present.
Baccharis vanessae	Encinitas baccharis	FT/CE/1B.1/ Covered	Chaparral (maritime), cismontane woodland; sandstone/perennial deciduous shrub/Aug–Nov/ 197–2362	Not expected to occur. No suitable soil or vegetation present.
Cylindropuntia californica var. *californica* (formerly *Opuntia parryi* var. *serpentine)*	snake cholla	None/None/ 1B.1/None	Chaparral, coastal scrub/perennial stem succulent/Apr–May/98–492	Not expected to occur. This conspicuous perennial species was not detected during focused surveys. No suitable vegetation present
Deinandra conjugens (formerly *Hemizonia conjugens)*	Otay tarplant	FT/CE/1B.1/ None	Coastal scrub, valley and foothill grassland; clay/annual herb/ May–June/82–984	Not expected to occur. No suitable soil or vegetation present.
Dudleya brevifolia (formerly *D. blochmaniae* ssp. *Brevifolia)*	short-leaved dudleya	None/CE/1B.1/ None	Chaparral (maritime, openings), coastal scrub; Torrey sandstone/perennial herb/ Apr–May/98–820	Not expected to occur. No suitable vegetation present.

Table 3. Potential to Occur Analysis for the Proposed Project for MSCP Narrow Endemic Species

Scientific Name	Common Name	Status[1] (Federal/State/ CRPR/MSCP)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Dudleya variegata	variegated dudleya	None/None/ 1B.2/Covered	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland, vernal pools; clay/perennial herb/Apr–June/ 10–1903	Not expected to occur. No suitable soil, vegetation, or vernal pools present.
Eryngium aristulatum var. *parishii*	San Diego button-celery	FE/CE/1B.1/ Covered	Coastal scrub, valley and foothill grassland, vernal pools; mesic/annual / perennial herb/ Apr–June/66–2034	Not expected to occur. No suitable vegetation or vernal pools present.
Navarretia fossalis	spreading navarretia	FT/None/1B.1/ Covered	Chenopod scrub, marshes and swamps (assorted shallow freshwater), playas, vernal pools/annual herb/Apr–June/ 98–2149	Not expected to occur. No suitable vegetation present.
Orcuttia californica	California Orcutt grass	FE/CE/1B.1/ Covered	Vernal pools/annual herb/ Apr–Aug/49–2165	Not expected to occur. No suitable vegetation or vernal pools present.
Pogogyne abramsii	San Diego mesa mint	FE/CE/1B.1/ Covered	Vernal pools/annual herb/ Mar–July/295–656	Not expected to occur. No suitable vegetation or vernal pools present.
Pogogyne nudiuscula	Otay Mesa mint	FE/CE/1B.1/ Covered	Vernal pools/annual herb/ May–July/295–820	Not expected to occur. No suitable vegetation or vernal pools present.

Notes: MSCP = Multiple Species Conservation Program; CRPR = California Rare Plant Rank.

[1] **Status Legend:**

Federal
FE: Federally listed as endangered
FT: Federally listed as threatened
FC: Federal Candidate for listing

State
SE: State listed as endangered
ST: State listed as threatened
SR: State Rare

CRPR
CRPR 1A: Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
CRPR 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere
CRPR 2A: Plants Presumed Extirpated in California, But More Common Elsewhere
CRPR 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
CRPR 3: Plants About Which More Information is Needed - A Review List
CRPR 4: Plants of Limited Distribution - A Watch List
.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Moderately threatened in California (20%–80% occurrences threatened / moderate degree and immediacy of threat)
.3 Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Multiple Habitat Conservation Program (MSCP) City of San Diego Subarea Plan
Covered: MSCP species occurring or potentially occurring in the City of San Diego

Wildlife Corridor and Linkage

There are no native vegetation communities on site, and wildlife movement within the study area is unlikely to occur. The areas within and surrounding the study area are primarily residential and urban development, and there are no MHPA lands adjacent to or within the study area.

Regional Resource Planning Context

The MSCP is a long-term regional conservation plan established to protect special-status species and habitats in San Diego County. The MSCP is divided into subarea plans that are implemented separately from one another. The study area is within the City MSCP Subarea Plan. This subarea encompasses 206,124 acres and is generally characterized by urban land use. The City MHPA is a preserve planning area developed by the City in cooperation with the wildlife agencies, property owners, developers, and environmental groups. The MHPA identifies biological core resource areas and corridors targeted for conservation in which only limited development may occur (City of San Diego 1997).

For planning purposes, the City MSCP Subarea Plan has been divided into five distinct areas: Southern Area; Eastern Area; Urban Areas; Northern Area; and Cornerstone Lands and San Pasqual Valley. The study area is not adjacent to or within MHPA lands (impacts are more than 100 feet from the nearest MHPA boundary). As such, the proposed project is not required to conform to the City's Land Use Adjacency Guidelines (Section 1.4.3 of the City MSCP Subarea Plan) or to provide compatible land use or planning policy/design guidelines conformance (Sections 1.4.1 and 1.4.2 of the City MSCP Subarea Plan) (City of San Diego 1997).

Impact Analysis

Direct Impacts include both the permanent loss of on-site habitat and the plant and wildlife species it contains and the temporary loss of on-site habitat. Direct impacts were quantified by overlaying the proposed project footprint onto the biological resources map. Direct impacts include the following:

- **Permanent Impact:** Residential development (20 housing structures)
- **Temporary Impact**: Remainder of the project area

Indirect Impacts refer to off-site and on-site effects that are short-term impacts (i.e., temporary) due to the proposed project construction or long-term (i.e., permanent) design of the proposed project and the effects it may have to adjacent resources. For this proposed project, it is assumed that the potential short-term indirect impacts resulting from construction activities may include dust, noise, and general human presence that may temporarily disrupt species and habitat vitality and construction-related soil erosion and runoff. With respect to these latter factors, however, the proposed project grading will be subject to the typical restrictions (e.g., best management practices) and requirements that address erosion and runoff, including the federal Clean Water Act, National Pollution Discharge Elimination System, and preparation of a Water Pollution Control Plan. Long-term indirect impacts for this project would be related to the potential effects of future maintenance. No long-term adverse indirect impacts are expected to occur as result of the proposed project.

Cumulative Impacts refer to incremental, individual environmental effects of two or more projects when considered together. These impacts taken individually may be minor but are collectively significant as they occur over a period of time.

Direct Impacts

Construction of the proposed project would include the project site and off-site areas (i.e., the study area) (Figure 5). As described previously, the study area consists entirely of disturbed habitat and is adjacent to development. A total impact of 1.44 acre of disturbed habitat will occur including 0.97 acre on-site and 0.47 acre off-site. Since all impacts would occur outside of the MHPA and are limited to a Tier IV vegetation type (i.e., disturbed habitat), these impacts are not considered significant (City of San Diego 2012), and no mitigation is needed.

Special-Status Plants

One special-status plant species Nuttall's scrub oak was detected near the boundary of the project site. There are no other special-status plant species with a moderate or high potential to occur within the project site, and given the lack of native habitats, disturbance in the study area, extensive existing development nearby, and lack of native soils, special-status plant species are not expected to occur. Therefore, no significant impacts to special-status plants are anticipated. The one Nuttall's scrub oak will be removed by the implementation of the project. Impacts to the one Nuttall's scrub oak are less than significant based on the location outside of and not adjacent to other preserve areas or MHPA, the presence of substantial populations in other preserve locations and the location of the plant in disturbed habitat.

Special-Status Wildlife

No special-status wildlife species were detected during the 2016 field assessments on site, and none were detected during the current visit. Due to the location of the site within an exceedingly developed urban environment having functionally limited native vegetation and limited opportunities for foraging, nesting, and/or roosting, virtually no special-status wildlife, including raptors, are expected to occur and/or nest within the proposed project boundary. Cooper's hawk (*Accipiter cooperii*) is the only special-status wildlife species with moderate potential to occur on site; however, the impacts to a few ornamental trees from the proposed project activities would be minimal. Based on this information, significant, direct impacts to special-status wildlife species are not expected to occur.

The proposed project will comply with federal, state, and local regulations including the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) and the California Fish and Game Code which provides protection for birds of prey (Section 3503.5) and non-raptor native birds under Section 3503.

Indirect Impacts

Vegetation Communities

Short-term indirect impacts to on-site land covers related to construction are expected to be minimal based on the fact that these areas are already located in an urbanized setting and subject to typical edge effects, including noise, lighting, and human presence. With implementation of required construction discharge water quality best management practices, other standard construction best management practices (including dust control, use of trash receptacles, no night work, and more), and adherence to the limits of work, short-term indirect impacts are not expected to substantially change the existing vegetation communities in terms of species composition or function. As such, no significant short-term indirect impacts are expected to occur to these communities, and no significant long-term indirect impacts would occur.

Special-Status Plants

There are no vegetation communities that have the potential to support special-status plant species within the project site. Only one remnant Nuttall's scrub oak plant is present on the boundary of the project site. This individual plant will be removed however there is no scrub oak chaparral habitat present; removal of the one plant is less than significant. Therefore, no indirect impacts to on-site and off-site special-status plant species are expected to occur.

Special-Status Wildlife

Most of the indirect impacts to vegetation communities and special-status plants previously described can also affect special-status wildlife. These effects are minimal in terms of potential changes to habitat quality as a result of the proposed project. Wildlife may be indirectly affected in the short-term by construction-related noise, which can disrupt normal activities and subject wildlife to higher predation risks. This impact is considered significant during the bird-breeding season, when those effects can result in the disruption of foraging, nesting, and reproductive activities. Work within the proposed project will include nesting bird avoidance measures. Adequate measures to protect identified nesting species within and adjacent to the project area will be implemented and thus, the project will comply with the MBTA and the California Fish and Game Code. Because the project site is not located within or adjacent to the MHPA, focused protocol surveys and noise protection for potential California coastal gnatcatcher (*Polioptila californica californica*) or other special-status wildlife species occurrences are not necessary.

Cumulative Impacts

The MSCP is a long-term regional conservation plan established to protect sensitive species and habitats in San Diego County. The MSCP is divided into subarea plans that are implemented separately from one another. The project site is within the City MSCP Subarea Plan.

In an effort to eliminate cumulative impacts to sensitive biological resources throughout San Diego, the City is participating in a regional conservation planning effort—the City's MSCP. This planning effort is designed to address cumulative impacts through development of a regional plan that addresses impacts to covered species and habitats in a manner that assures their conservation despite impacts of cumulative project over the long term. The ultimate goal of this plan is the establishment of biological reserve areas in conformance with the State of California Natural Community Conservation Plan Act.

As previously discussed, the project site lies within the City's MSCP boundary. Preservation of habitat and planning in accordance with the biological resource conservation goals of the MSCP and the limitation of impacts in accordance with the MSCP are intended to mitigate cumulative biological resource impacts. The proposed project is consistent with the MSCP, and cumulative impacts to uplands and sensitive plants will be mitigated through implementation of the MSCP. No mitigation for cumulative impacts is required for sensitive wildlife.

Consistency with the MSCP

The proposed project is consistent with the MSCP, because permanent impacts associated with the proposed project are to developed and disturbed land cover types, and the proposed project will not negatively impact the goals and objectives of the City MSCP Subarea Plan. Thus, the proposed project is consistent with the guidelines and policies of the MSCP.

No compensatory habitat mitigation is required for this project due to the impact to Tier IV habitat, which requires no mitigation.

Mitigation

Per the City's Biology Guidelines, lands containing Tier I, II, IIIa and IIIb [(see Table 3 of the City's Biology Guidelines] and all wetlands [see Tables 2a and/or 2b of the City's Biology Guidelines] are considered sensitive and declining habitats. As such, impacts to these resources may be considered significant. Lands designated as Tier IV are not considered to have significant habitat value and impacts would not be considered significant.

The proposed project will result in impacts to Tier IV habitat only which is not considered a significant impact. Because no significant impacts were identified in this report, mitigation measures necessary to reduce impacts to a level that is less than significant are not required.

If you have any questions or comments, please do not hesitate to contact me at 760.274.3927 or via email at ebergman@dudek.com.

Sincerely,

Erin Bergman, MS
Biologist

Att.: Figures 1–5
Appendix A, BonTerra Psomas Biological Constraints Report for the Golden Hill Parcel Project, City of San Diego, San Diego County, California, March 22, 2016.
Appendix B, List of Plant Species Observed within the Study Area
Appendix C, List of Wildlife Species Observed within the Study Area

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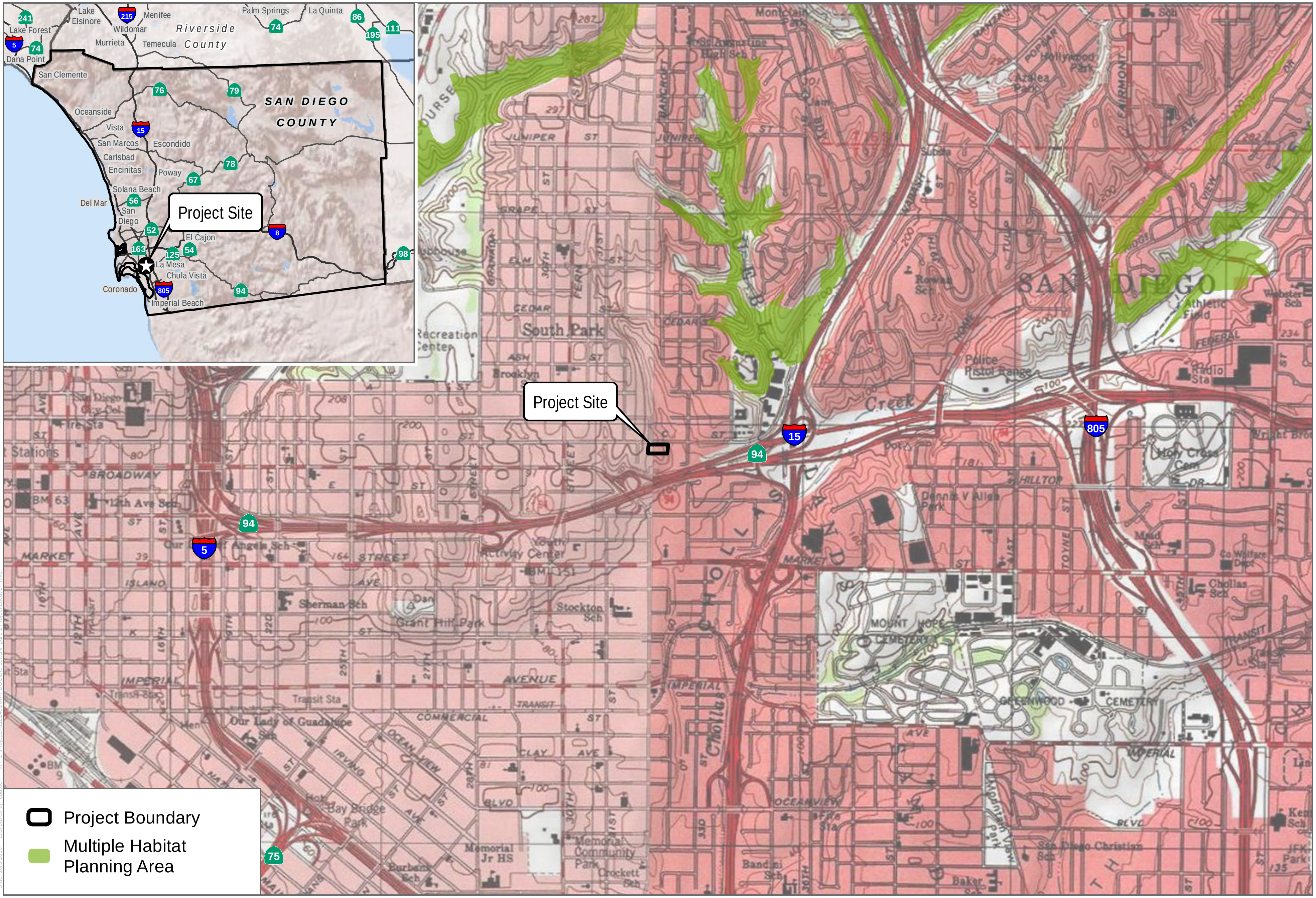


SOURCE: USGS 7.5-Minute Series National City Quadrangle

DUDEK

N

0 1,000 2,000 Feet

FIGURE 1

Project Location

Biological Report Letter - 32nd and C

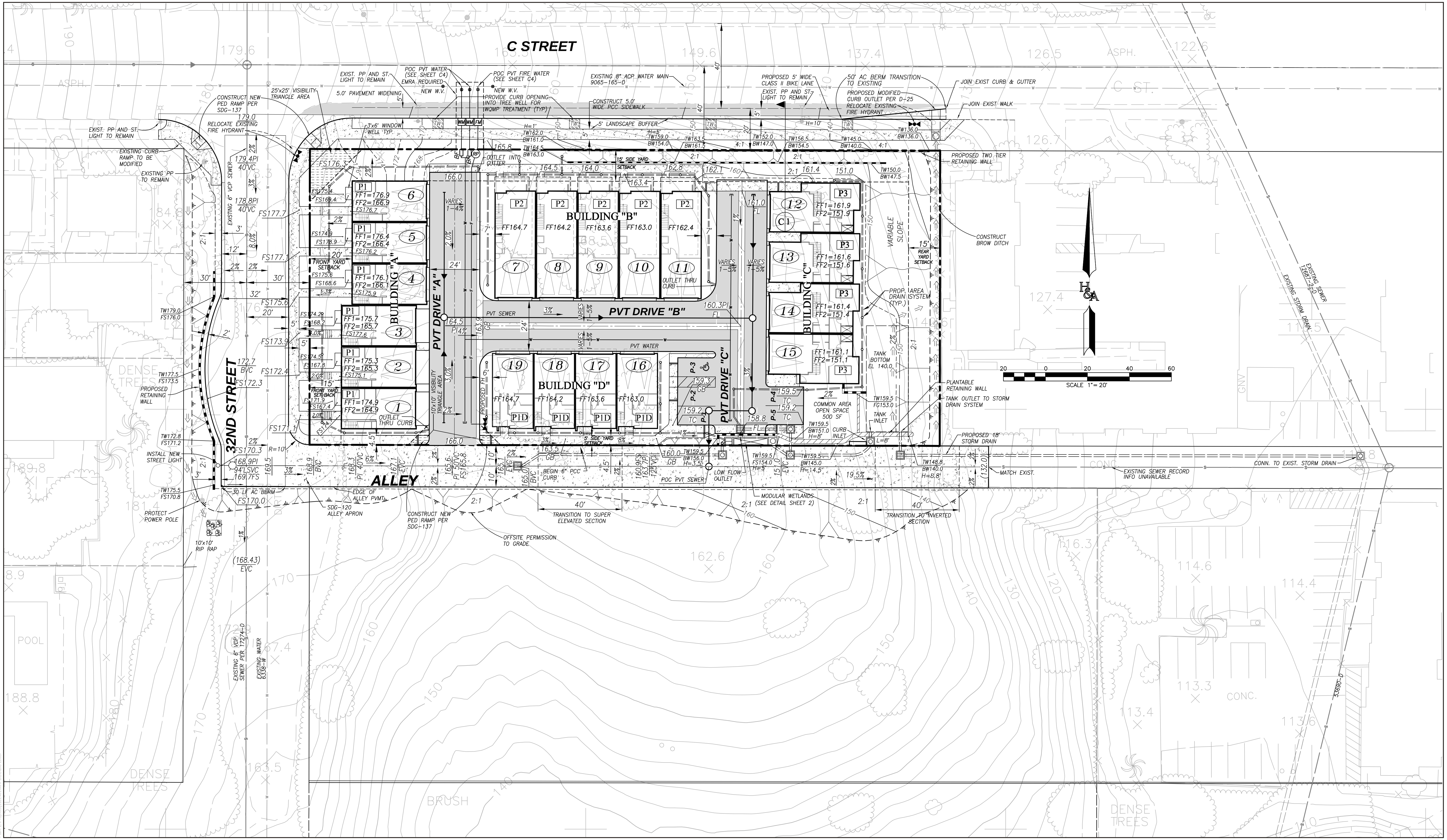
SOURCE: Hunsaker & Associates 2018; SANGIS 2017

DUDEK

FIGURE 2

Aerial

Biological Report Letter - 32nd and C



SOURCE: Hunsaker & Associates 2018

FIGURE 3

Site Plan

DUDEK

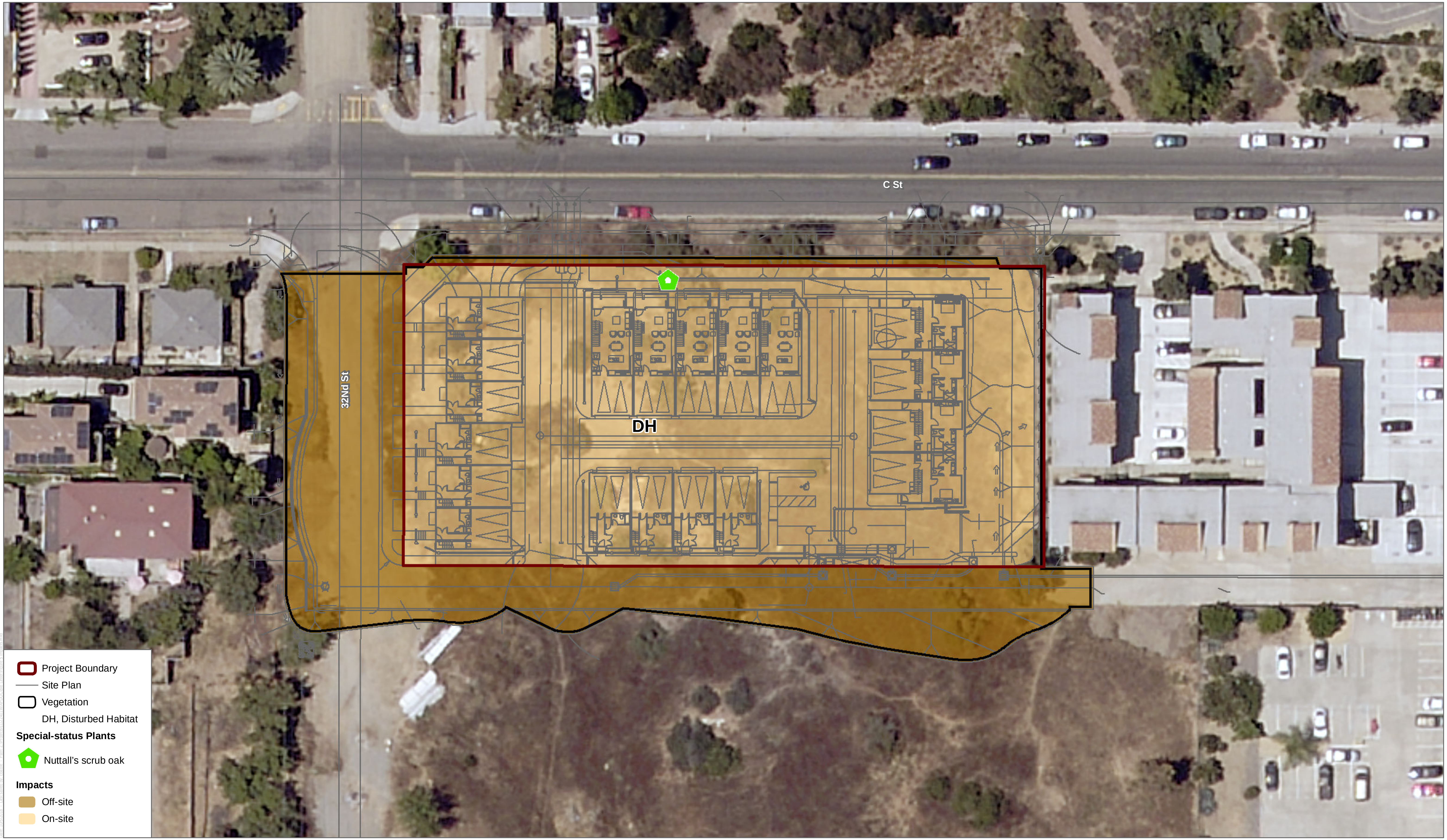
SOURCE: SANGIS 2017

DUDEK

FIGURE 4

Existing Biological Resources

Biological Report Letter - 32nd and C



SOURCE: Hunsaker & Associates 2018; SANGIS 2017

FIGURE 5

Impacts

Biological Report Letter - 32nd and C

Appendix A

BonTerra Psomas Biological Constraints Report for the Golden Hill Parcel Project, City of San Diego, San Diego County, California, March 22, 2016

BonTerra
PSOMAS

Balancing the Natural and Built Environment

March 22, 2016

Ken Benson
Intracorp Companies
4041 MacArthur Boulevard, Suite 250
Newport Beach, California 92660

VIA EMAIL
KBenson@intracorpcompanies.com

Subject: Biological Constraints Report for the Golden Hill Parcel Project, City of San Diego, San Diego County, California

Dear Mr. Benson:

This Letter Report presents the findings of a biological constraints survey for the Golden Hill Parcel Project (hereinafter referred to as the “project site”) located in the City of San Diego in San Diego County, California (Exhibit 1). The purpose of the survey was to evaluate potential biological constraints on development of the project site.

PROJECT LOCATION AND DESCRIPTION

The project site is located just north of State Route (SR) 94 and southeast of the intersection of C Street and 32nd Street in the City of San Diego in San Diego County, California (Exhibit 2). The project site is located on the U.S. Geological Survey’s (USGS’) National City 7.5-minute topographic quadrangle. Topography on the project site is gently sloped downward to the east; elevations range from approximately 140 to 180 feet above mean sea level. The project site is located in a relatively developed landscape with residential development to the east and west; undeveloped areas are located immediately to the south and across C Street to the north. The proposed project includes the development of 20 single-family residential homes on an approximately one-acre lot.

The project site is within the City of San Diego’s Multiple Species Conservation Plan (MSCP) Subarea Plan (City of San Diego 1997). The MSCP is a comprehensive, long-term habitat conservation planning program that covers approximately 900 square miles (582,243 acres) in southwestern San Diego County pursuant to the federal and California Endangered Species Acts and the California Natural Community Conservation Planning Act. It has been developed cooperatively by participating jurisdictions/special districts in partnership with federal/State wildlife agencies, property owners, and representatives of the development industry and environmental groups.

The MSCP is designed to preserve native habitat for multiple species rather than focusing efforts on one species at a time. This is accomplished by identifying areas for directed development and areas to be conserved in perpetuity (referred to as Multi-Habitat Planning Areas [MHPAs]). Within the MHPA, development will be limited to ensure the long-term viability and recovery of 85 "covered" species. Through this strategy, the MSCP will preserve a network of habitat and open space, protecting biodiversity and enhancing the region's quality of life, while at the same time providing an economic benefit by streamlining compliance with federal and State wildlife laws.

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www.Psomas.com

The MHPA Land Use Adjacency Guidelines will be addressed on a project-by-project basis during either the planning (new development) or management (new and existing development) stages to minimize land use impacts and maintain the function of the MHPA. These guidelines are located in Section 1.4.3 of the City's MSCP Subarea Plan (March 1997) and include the following issue areas: (1) drainage, (2) toxics, (3) lighting, (4) noise, (5) barriers, (6) invasive species, (7) brush management, and (8) grading/land development. For premises that are located within or adjacent to the City's MHPA, the project must demonstrate compliance with the MHPA Land Use Adjacency Guidelines to address potential indirect effects to the MHPA through features incorporated into the project and/or permit conditions. The project site is not located within or immediately adjacent to the City's MHPA.

SURVEY METHODS

BonTerra Psomas Biologist Jonathan Aguayo conducted a general plant and wildlife survey on the project site on March 13, 2016. The purpose of the survey was to document existing conditions on the project site and to evaluate potential biological constraints to future development of the project site. Prior to the surveys, a literature review was conducted. The California Native Plant Society's (CNPS') Electronic Inventory of Rare and Endangered Vascular Plants of California and the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CNDDB) were reviewed to identify special status plants, wildlife, and habitats reported to occur in the vicinity of the project site. Database searches included the USGS' National City and Point Loma 7.5-minute quadrangle maps. These databases contain records of reported occurrences of federally or State-listed Endangered or Threatened species or proposed Endangered or Threatened species; CDFW Species of Special Concern; or otherwise special status species or habitats that occur in the project region. Special status plant and wildlife species potentially occurring within the project vicinity were determined using these database searches. Representative photographs of the project site are provided in Attachment A.

Plant species were identified in the field or collected for later identification. Plants were identified using taxonomic keys in Baldwin et al. (2012), Hickman (1993), and Munz (1974). Taxonomy follows the Baldwin et al. (2012), Hickman (1993), or current scientific journals for scientific and common names.

All wildlife species detected during the course of the surveys were documented in field notes. Active searches for reptiles and amphibians included lifting, overturning, and carefully replacing objects such as rocks, boards, and debris. Birds were identified by visual and auditory recognition. Mammals were identified by visual recognition or evidence of diagnostic sign, including scat, footprints, scratch-outs, dust bowls, burrows, and trails. Taxonomy and nomenclature for wildlife generally follows Collins and Taggart (2009) for amphibians and reptiles, American Ornithologists' Union (2013) for birds, and Smithsonian National Museum of Natural History (2011) for mammals.

SURVEY RESULTS

Vegetation Types

The project site consists of undeveloped land (Exhibit 3). The western portion of the project site is dominated by non-native crown daisy (*Glebionis coronaria*) with scattered native shrubs (e.g., laurel sumac [*Malosma laurina*]) and non-native shrubs (e.g., acacia [*Acacia* sp.]). Three small ornamental trees (e.g., gum trees [*Eucalyptus* sp.]) are present within the portion of the project site dominated by crown daisy. The understory is comprised of mulch and additional ornamental species, such as sea fig (*Carpobrotus chilensis*), and non-native weeds, such as radish (*Raphanus sativus*), horehound (*Marrubium vulgare*), Bermuda buttercup (*Oxalis pes-caprae*), and cheeseweed (*Malva parviflora*).

The eastern portion of the project site is dominated by non-native redstem filaree (*Erodium cicutarium*) with scattered native and non-native shrubs. Additionally, a young oak tree (*Quercus* sp.) and lemonade berry (*Rhus integrifolia*) are found within this portion of the site.

Wildlife Habitat

Due to the surrounding urban nature of the project site, only urban-tolerant wildlife is expected to occur. Bird species observed included rock pigeon (*Columba livia*), black phoebe (*Sayornis nigricans*), western scrub-jay (*Aphelocoma californica*), American crow (*Corvus brachyrhynchos*), bushtit (*Psaltriparus minimus*), house finch (*Carpodacus mexicanus*), lesser goldfinch (*Spinus psaltria*), and house sparrow (*Passer domesticus*).

No amphibians were observed during the survey and none would be expected based on the lack of suitable habitat. No reptiles were observed during the survey. Reptile species that may occur on the project site include side-blotched lizard (*Uta stansburiana*), western fence lizard (*Sceloporus occidentalis*), and alligator lizard (*Elgaria multicarinata*).

No mammals were observed during the survey. Mammal species that are expected to occur on the project site include the Virginia opossum (*Didelphis virginiana*), California ground squirrel (*Otospemophilus beecheyi*), common raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*).

Wildlife Movement

Within large open space areas where there are few or no man-made or naturally occurring physical constraints to wildlife movement, wildlife corridors may not yet exist. However, once open space areas become constrained and/or fragmented as a result of urban development or the construction of physical obstacles (e.g., roads and highways), the remaining landscape features or travel routes that connect the larger open space areas become corridors as long as they provide adequate space, cover, food, and water and do not contain obstacles or distractions (e.g., man-made noise, lighting) that would generally hinder wildlife movement.

Urbanization, including residential and commercial development, generally surrounds the project site. An isolated area of undeveloped open space occurs across C Street to the north. However, this open space area is relatively small and is not connected to larger tracts of habitat. Therefore, due to the highly urban nature surrounding the project site and the lack of connectivity to large areas of habitat, the project site is not expected to serve as a regional corridor for wildlife. Local wildlife would be expected to use the site for movement through the immediate area.

Special Status Resources

Special Status Vegetation Types

Vegetation types may be considered special status by federal and State resource agencies, academic institutions, and various conservation groups (CNPS 2016, CDFW 2016). Special status vegetation is ranked on a global and statewide basis according to its degree of imperilment. Local jurisdictions may also protect special status vegetation types through ordinances, codes, regulations, or planning policies. No special status vegetation types occur on the project site.

Jurisdictional Areas

Drainages, which may include wetlands and “waters of the U.S.”, are protected under Section 404 of the Clean Water Act and are under the jurisdiction of the U.S. Army Corps of Engineers (USACE). “Waters of the U.S.” include navigable coastal and inland waters, lakes, rivers, streams and their tributaries; interstate waters and their tributaries; wetlands adjacent to such waters; intermittent streams; and other waters that could affect interstate commerce.

In addition, if drainages on site meet the criteria established by Section 1600 of the *California Fish and Game Code,* the CDFW may require a Streambed Alteration Agreement prior to any modification of the bed, bank, or channel of a streambed.

No drainages or wetlands under the jurisdiction of the USACE, the CDFW, and/or the Regional Water Quality Control Board (RWQCB) (Section 401 of the Clean Water Act) were observed on the project site.

Special Status Plant and Wildlife Species

Plants or wildlife may be considered to have "special status" due to declining populations, vulnerability to habitat change, or restricted distributions. Certain special status species have been listed as Threatened or Endangered under federal and/or State Endangered Species Acts. Those species included in the Incidental Take Authorization issued to the City by the federal or State government as part of the City's MSCP Subarea Plan are considered "covered species". The term "non-covered species" is sometimes used to identify species not included in the Incidental Take Authorization. "Narrow endemic" species have been adopted by the City Council and are considered sensitive biological resources.

Special Status Plants

Several special status plant species have been reported in the vicinity of the project site (CNPS 2016; CDFW 2016). The following federally and/or State-listed Endangered or Threatened species have been reported from the vicinity of the project site: San Diego thorn-mint (*Acanthomintha ilicifolia*), San Diego ambrosia (*Ambrosia pumila*), coastal dunes milk-vetch (*Astragalus tener* var. *titi*), salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum*), Orcutt's spineflower (*Chorizanthe orcuttiana*), Otay tarplant (*Deinandra conjugens*), San Diego button-celery (*Eryngium aristulatum* var. *parishii*), willowy monardella (*Monardella viminea*), San Diego mesa mint (*Pogogyne abramsii*), and Otay Mesa mint (*Pogogyne nudiuscula*). There is marginally suitable habitat present on the project site for one species—San Diego ambrosia; therefore, this species has a low potential to occur. San Diego ambrosia is a narrow endemic species and a covered species; impacts on this species are fully covered by the City's participation in the MSCP. The remaining species are not expected to occur on the project site due to lack of suitable habitat.

In addition to species formally listed by the resource agencies, species reported in the vicinity of the project site with a California Rare Plant Rank (CRPR) of 1B or 2 may be considered constraints on development per Section 15380 of the California Environmental Quality Act (CEQA). These include the following: Nuttall's acmispon (*Acmispon prostratus*), California adolphia (*Adolphia californica*), Shaw's agave (*Agave shawii* var. *shawii*), San Diego bur-sage (*Ambrosia chenopodiifolia*), singlewhorl burrobrush (*Ambrosia monogyra*), aphanisma (*Aphanisma blitoides*), Dean's milk-vetch (*Astragalus deanei*), Coulter's saltbush (*Atriplex coulteri*), south coast saltscale (*Atriplex pacifica*), golden-spined cereus (*Bergerocactus emoryi*), San Diego goldenstar (*Bloomeria clevelandii*), round-leaved filaree (*California macrophylla*), wart-stemmed ceanothus (*Ceanothus verrucosus*), Orcutt's pincushion (*Chaenactis glabriuscula* var. *orcuttiana*), long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*), San Diego sand aster (*Corethrogyne filaginifolia* var. *incana*), snake cholla (*Cylindropuntia californica* var. *californica*), Orcutt's bird's-beak (*Dicranostegia orcuttiana*), variegated dudleya (*Dudleya variegata*), sticky dudleya (*Dudleya viscida*), Palmer's goldenbush (*Ericameria palmeri* var. *palmeri*), cliff spurge (*Euphorbia misera*), San Diego barrel cactus (*Ferocactus viridescens*), Palmer's frankenia (*Frankenia palmeri*), Campbell's liverwort (*Geothallus tuberosus*), San Diego gumplant (*Grindelia hallii*), beach goldenaster (*Heterotheca sessiliflora* ssp. *sessiliflora*), decumbent goldenbush (*Isocoma menziesii* var. *decumbens*), San Diego marsh elder (*Iva hayesiana*), Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), sea dahlia (*Leptosyne maritima*), mud nama (*Nama stenocarpum*), prostrate vernal pool navarretia (*Navarretia prostrata*), coast woolly-heads (*Nemacaulis denudata* var. *denudata*), slender cottonheads (*Nemacaulis denudata* var. *gracilis*), Brand's star phacelia (*Phacelia stellaris*), Nuttall's scrub oak (*Quercus dumosa*), Munz's sage (*Salvia munzii*), chaparral ragwort (*Senecio* *aphanactis*), bottle liverwort (*Sphaerocarpos drewei*), purple stemodia (*Stemodia antillarum browni*), oil neststraw (*Stylocline citroleum*), estuary seablite (*Suaeda esteroa*), and Parry's tetracoccus (*Tetracoccus dioicus*).

One wart-stemmed ceanothus and one Nuttall’s scrub oak were observed along the southern boundary of the project site. In addition, there is marginally suitable habitat present on the project site for four species: Dean’s milk-vetch, San Diego goldenstar, Palmer’s goldenbush, and Coulter’s goldfields; therefore, these species have a low potential to occur. These species are not narrow endemics. The wart-stemmed ceanothus and Palmer’s goldenbush are covered under the MSCP and impacts on these species would be fully covered by the City’s participation in the MSCP. Impacts on one individual Nuttall’s scrub oak would not be considered a constraint on development because the loss of one individual would not substantially affect the regional population of the species. Impacts on Dean’s milk-vetch, San Diego goldenstar, and Coulter’s goldfields would potentially be a constraint on development, depending on the size of the impacted population, if present. The remaining species are not expected to occur on the project site due to lack of suitable habitat.

Although several species with a CRPR of 3 and 4 are also known from the vicinity, these species are not typically considered constraints to development.

Special Status Wildlife

Several special status wildlife species have been reported from the project vicinity (CDFW 2016). The following federally and/or State-listed Endangered or Threatened species have been reported from the vicinity of the project site: San Diego fairy shrimp (*Branchinecta sandiegonensis*), western snowy plover (*Charadrius alexandrinus nivosus*), Swainson’s hawk (*Buteo swainsoni*), California least tern (*Sternula antillarum browni*), California black rail (*Laterallus jamaicensis coturniculus*), light-footed clapper rail (*Rallus longirostris levipes*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), coastal California gnatcatcher (*Polioptila californica californica*), least Bell’s vireo (*Vireo bellii pusillus*), and Belding’s savannah sparrow (*Passerculus sandwichensis beldingi*). These species are not expected to occur on the project site due to lack of suitable habitat.

In addition to species formally listed by the resource agencies, special status species are known to occur in the vicinity of the project site. These species include the following: coast horned lizard (*Phrynosoma blainvillii*), orangethroat whiptail (*Aspidoscelis hyperythra*), two-striped garter snake (*Thamnophis hammondii*), burrowing owl (*Athene cunicularia*), coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*), tricolored blackbird (*Agelaius tricolor*), northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*), San Diego desert woodrat (*Neotoma lepida intermedia*), San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), western mastiff bat (*Eumops perotis californicus*), Mexican long-tongued bat (*Choeronycteris mexicana*), pocketed free-tailed bat (*Nyctinomops femorosaccus*), big free-tailed bat (*Nyctinomops macrotis*), western red bat (*Lasiurus blossevillii*), western yellow bat (*Lasiurus xanthinus*), pallid bat (*Antrozous pallidus*), and American badger (*Taxidea taxus*). There is marginally suitable roosting habitat present on the project site for one bat species—western red bat; therefore, this species has a low potential to occur. However, the project site is not likely to support a maternal roost. Impacts on a day roost would not substantially affect the regional population of the species and would not represent a constraint on development. The remaining species are not expected to occur on the project site due to lack of suitable habitat.

Other Considerations

Migratory Bird Treaty Act

The project site has the potential to support birds subject to the Migratory Bird Treaty Act (MBTA). The MBTA prohibits activities that result in the direct take (defined as killing or possession) of a migratory bird. This includes the nests of all native bird species, including common species such as mourning dove (*Zenaida macroura*) and house finch.

Nesting Raptors

The *California Fish and Game Code* protects active nests of raptor species, including both direct and indirect disturbance to the nests. The project site is located in a highly urban area. Due to the high amount of human activity and the limited amount of suitable foraging habitat in the project vicinity, raptors would have only a limited potential to nest in the off-site ornamental trees along SR-94. The trees on site are small in stature and are not expected to be used for nesting by raptors.

RECOMMENDATIONS

The following is a list of recommendations to ensure that the project is consistent with regulations protecting biological resources:

1. The project site supports marginally suitable habitat for Dean's milk-vetch, San Diego goldenstar, and Coulter's goldfields. Prior to construction in areas that contain suitable habitat, focused surveys for these species should be conducted during the appropriate blooming period for the species. If found on site within potential impact areas, additional avoidance, minimization, or mitigation, such as seed collection and/or transplantation, may be necessary depending on the size of the population found.
2. In order to avoid impacts on nesting birds, vegetation removal shall not be scheduled during the breeding season (i.e., March 1–September 15) to the extent feasible. If vegetation clearing for construction must be conducted during the breeding season, pre-construction surveys shall be conducted by a qualified Biologist for nesting birds prior to disturbance to confirm the absence of active nests within the work area. If no active nests are found, vegetation removal can proceed. If the Biologist finds an active nest within or adjacent to the construction area and determines that the nest may be impacted, the Biologist shall identify an appropriate buffer zone around the nest depending on the sensitivity of the species, location of the nest, the existing level of human activity, and the nature of the construction activity.

Thank you for the opportunity to prepare this Letter Report. If you have any questions or comments, please contact Stacie Tennant at (714) 751-7373.

Sincerely,
BonTerra Psomas

Ann M. Johnston

Ann M. Johnston
Vice President, Resources Management

Stacie A. Tennant
Senior Project Manager

Attachments: Exhibits 1, 2, and 3
A – Site Photographs

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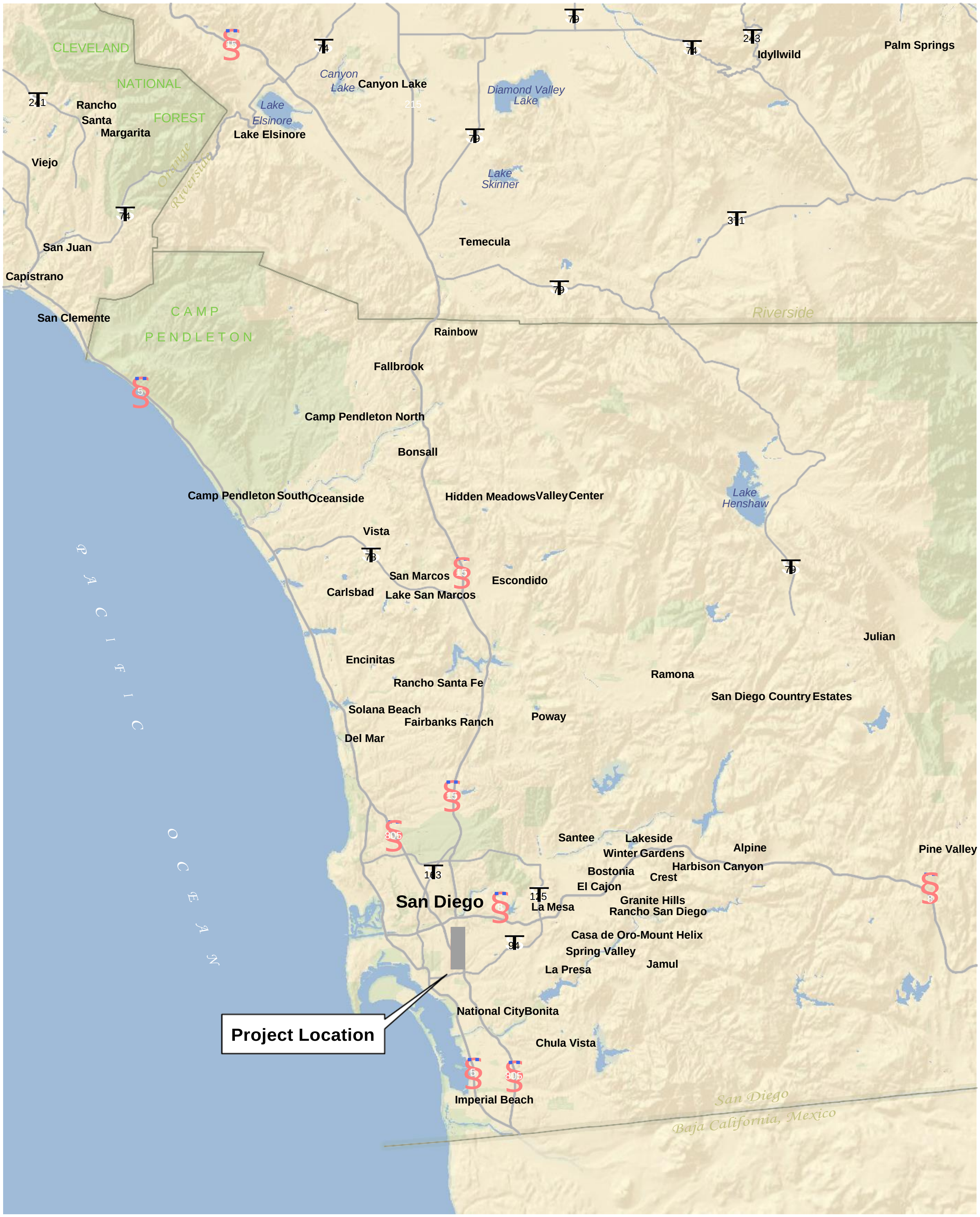

Regional Location

Exhibit 1

Golden Hill Parcel Project

2

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Miles

BonTerra
PSOMAS

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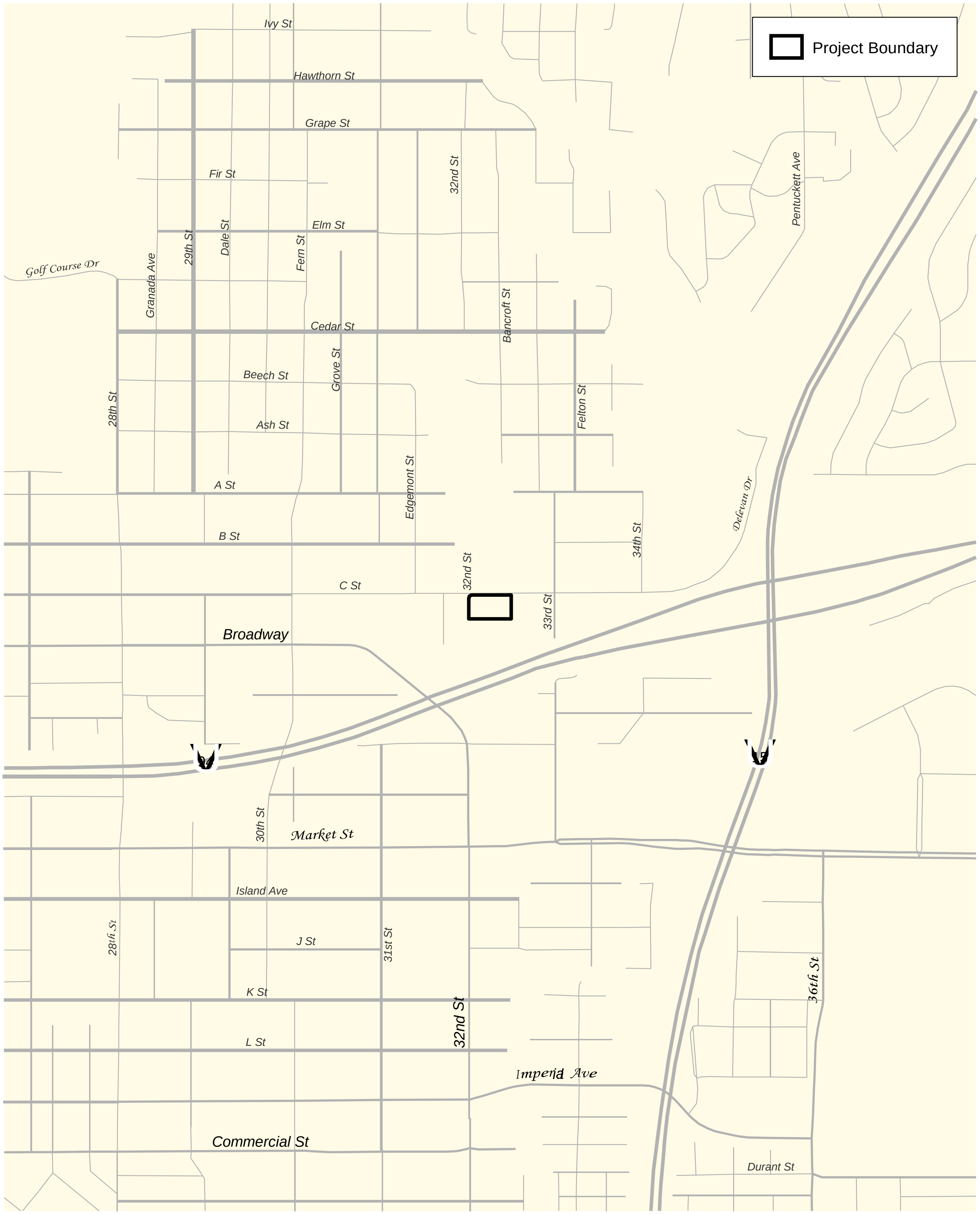

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Local Vicinity

Exhibit 2

Golden Hill Parcel Project

2

1,000 500 0 1,000

Feet

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Aerial Photograph

Exhibit 3

Golden Hill Parcel Project

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Feet

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ATTACHMENT A

SITE PHOTOGRAPHS

View of the western portion of the project site.

View of the eastern portion of the project site.

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Site Photographs

Attachment A

Golden Hill Parcel Project

BonTerra PSOMAS

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Appendix B

List of Plant Species Observed within the Study Area

APPENDIX B
List of Plant Species Observed within the Study Area

EUDICOTS

VASCULAR SPECIES

AIZOACEAE—FIG-MARIGOLD FAMILY

* *Carpobrotus edulis*—ice plant
* *Carpobrotus chilensis*–seafig

ANACARDIACEAE—SUMAC OR CASHEW FAMILY

Malosma laurina—laurel sumac
Rhus integrifolia—lemonade berry

ASTERACEAE—SUNFLOWER FAMILY

Baccharis sarothroides—desertbroom
* *Centaurea melitensis*—Maltese star-thistle
Encelia californica—California brittle bush
* *Glebionis coronaria*—crowndaisy
Isocoma menziesii var. *menziesii*—Menzies' goldenbush
* *Lactuca serriola*—prickly lettuce
* *Sonchus asper*—spiny sowthistle
* *Sonchus oleraceus*—common sowthistle

BRASSICACEAE—MUSTARD FAMILY

* *Raphanus sativus*—cultivated radish

CARYOPHYLLACEAE—PINK FAMILY

* *Polycarpon tetraphyllum*—fourleaf manyseed

CHENOPODIACEAE—GOOSEFOOT FAMILY

* *Chenopodium album*—lambsquarters
* *Chenopodium murale*—nettleleaf goosefoot
* *Salsola tragus*—prickly Russian thistle

CUCURBITACEAE—GOURD FAMILY

Marah macrocarpa—Cucamonga manroot

ERICACEAE—HEATH FAMILY

Xylococcus bicolor—mission manzanita

EUPHORBIACEAE—SPURGE FAMILY

* *Euphorbia maculata*—spotted sandmat
* *Ricinus communis*—castorbean

FABACEAE—LEGUME FAMILY

* *Acacia longifolia*—Sydney golden wattle
* *Acacia melanoxylon*—blackwood
* *Acacia redolens*—bank catclaw
Acmispon glaber var. *glaber*—common deerweed
* *Medicago polymorpha*—burclover

FAGACEAE—OAK FAMILY

Quercus dumosa—Nuttall's scrub oak

GERANIACEAE—GERANIUM FAMILY

* *Erodium botrys*—longbeak stork's bill
* *Erodium cicutarium*—redstem stork's bill
* *Erodium moschatum*—musky stork's bill

MALVACEAE—MALLOW FAMILY

* *Malva parviflora*—cheeseweed mallow

MYRTACEAE—MYRTLE FAMILY

* *Eucalyptus camaldulensis*—river redgum

POLYGONACEAE—BUCKWHEAT FAMILY

* *Polygonum aviculare*—prostrate knotweed

PORTULACACEAE—PURSLANE FAMILY

* *Portulaca oleracea*—little hogweed

ROSACEAE—ROSE FAMILY

Adenostoma fasciculatum—chamise

MONOCOTS

VASCULAR SPECIES

ARECACEAE—PALM FAMILY

* *Washingtonia robusta*—Washington fan palm

ASPARAGACEAE—ASPARAGUS FAMILY

* *Asparagus asparagoides*—African asparagus fern

POACEAE—GRASS FAMILY

* *Avena barbata*—slender oat
* *Brachypodium distachyon*—purple false brome
* *Bromus catharticus*—rescuegrass
* *Bromus diandrus*—ripgut brome
* *Bromus madritensis* ssp. *madritensis*—compact brome
* *Cynodon dactylon*—Bermudagrass
* *Festuca perennis*—perennial rye grass
* *Paspalum dilatatum*—dallisgrass
* *Pennisetum setaceum*—fountain grass
* *Stipa miliacea* var. *miliacea*—smilograss

* signifies introduced (non-native) species

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Appendix C

List of Wildlife Species Observed within the Study Area

APPENDIX C
List of Wildlife Species Observed within the Study Area

BIRD

BLACKBIRDS, ORIOLES & ALLIES

ICTERIDAE—BLACKBIRDS

Icterus cucullatus—hooded oriole

FINCHES

FRINGILLIDAE—FRINGILLINE & CARDUELINE FINCHES & ALLIES

Haemorhous mexicanus—house finch

FLYCATCHERS

TYRANNIDAE—TYRANT FLYCATCHERS

Sayornis nigricans—black phoebe
Tyrannus vociferans—Cassin's kingbird

JAYS, MAGPIES & CROWS

CORVIDAE—CROWS & JAYS

Corvus brachyrhynchos—American crow

MOCKINGBIRDS & THRASHERS

MIMIDAE—MOCKINGBIRDS & THRASHERS

Mimus polyglottos—northern mockingbird

OLD WORLD SPARROWS

PASSERIDAE—OLD WORLD SPARROWS

* *Passer domesticus*—house sparrow

* signifies introduced (non-native) species

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Cultural Resources Inventory Report
for the
32nd and C Street Project, City of San Diego, San Diego County, California
Dudek Project No. 11330

Prepared for:

CityMark Golden Hill, LLC
3818 Park Blvd
San Diego, California 92103
Contact: Russ Haley

Prepared by:

Matthew DeCarlo, MA
and Micah J. Hale, PhD, RPA

DUDEK
605 Third Street
Encinitas, California 92024

JANUARY 2019

NATIONAL ARCHAEOLOGICAL DATABASE (NADB) INFORMATION

Authors:	Matthew DeCarlo, MA and Micah J. Hale, PhD, RPA
Firm:	Dudek
Project Proponent:	CityMark Golden Hill, LLC
Report Date:	January 2019
Report Title:	Cultural Resources Inventory Report for the 32nd and C Street Project, City of San Diego, San Diego County, California
Type of Study:	Cultural Resources Inventory
Resources:	None
USGS Quads:	National City and Point Loma
Acreage:	1.6 acres
Permit Numbers:	N/A
Keywords:	Golden Hill; intensive pedestrian survey; Kumeyaay; prehistoric, isolate, historic address

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TABLE OF CONTENTS

Section **Page No.**

APPENDICES

MANAGEMENT SUMMARY

This cultural resources inventory was conducted for the 32nd and C Street Project (Project), a residential development in the Community of Golden Hill in the City of San Diego, California. The City of San Diego is the lead agency responsible for overseeing compliance with the California Environmental Quality Act (CEQA) and City guidelines. The area of potential effects (APE) includes the footprint of the proposed developments and the temporary off-site impacts.

This inventory included a records search of data obtained from the South Coastal Information Center at San Diego State University. The records search found that 167 studies have been previously conducted within 1 mile of the Project, five of which intersect the APE. These previous studies have identified 410 cultural resources and historic addresses within 1 mile of the Project APE, none of which are located within the APE.

Dudek reviewed historic aerial images to determine the possible development and land use of the Project APE in the past. The historic aerial imagery shows that the APE was unaltered in 1953, however, aerials from following years show that the APE had been subject to varying levels of grading or vegetation removal. In support of the Project, a geotechnical investigation was conducted for the Project APE (Nova 2018). The investigation revealed that two stratigraphic units are present within the Project area: an artificial fill which overlays a sandstone stratum.

A search of the NAHC Sacred Lands File indicated that Native American cultural sites are present. Dudek contacted the Kumeyaay Cultural Repatriation as directed by the NAHC. The representative indicated that he was not aware of any cultural sites on the surface of the Project APE, but suggested that archaeological and Tribal monitoring would ensure that any buried resources would be identified. The NAHC response letter included a list of Native American group representatives whom should be contacted. Dudek mailed outreach letters to all Native American group representatives included on the NAHC contact list. Three responses have been received but none included information about specific resources located within the Project APE.

A Dudek archaeologist and a Red Tail Native American monitor conducted a pedestrian survey of the Project APE. Though it is largely undeveloped, the APE shows signs of previous grading and land alterations. The APE has been subject to extensive dumping activities, obscuring ground visibility. The pedestrian survey did not identify any cultural or built-environment resources within the Project APE.

Due to the negative SCIC records search, negative pedestrian survey, aerial photographs that show continued disturbance of the Project APE, and a geotechnical investigation that revealed low cultural sensitivity, Dudek does not recommend cultural monitoring during construction.

1 PROJECT DESCRIPTION AND LOCATION

The 32nd and C Street Project (Project) consists of a residential development in the Community of Golden Hill in the City of San Diego, California. CityMark Golden Hill, LLC hired Dudek to conduct a cultural resources inventory in compliance with the California Environmental Quality Act (CEQA), and the City of San Diego Historical Resource Guidelines.

The proposed Project site is currently a vacant property. The Project proposes the development of 19 two- and three- story 3- bedroom multi-family condominium dwelling units. Additionally, 43 onsite parking spaces will be provided. The proposed onsite improvements include grading, the installation of private sewer, water and storm drain utilities and construction of private sidewalks and driveways. Offsite improvements include the construction of public street and alley improvements, which include grading, paving and curb gutter, sidewalk and walls.

The Project is located north of State Route 94, south of C Street, and east of 32nd Street in the Community of Golden Hill in City of San Diego, California (Figure 1: Project Location). The undeveloped project area is surrounded by residential developments. The project site is located on the U.S. Geological Survey's National City and Point Loma 7.5-minute topographic quadrangles. The current APE includes the footprint of the proposed developments and the temporary off-site impacts (Figure 2: APE Map). The entire 1.6-acre APE was subject to pedestrian survey.

This report documents the results of the archaeological and built environment resources inventory including a records search, pedestrian survey, resource documentation, and Native American participation. The goal of this inventory is to provide data to the City to aid in the management of cultural resources during the implementation of the Project.

1.1 Regulatory Context

The proposed Project is subject to state and local regulations regarding cultural resources. The following section provides a summary of the applicable regulations, policies, and guidelines relating to the proper management of cultural resources for the Project.

1.1.1 California Register of Historical Resources (California Public Resources Code Section 5020 et seq.)

In California, the term "cultural resource" includes but is not limited to "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (California Public Resources Code Section 5020.1(j)). In 1992, the California legislature established the California Register of Historical Resources (CRHR) "to be used by state and local agencies, private groups, and citizens to identify the state's cultural resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (California Public Resources Code Section 5024.1(a)). A resource is eligible for listing in the CRHR if the State Cultural Resources Commission determines that it is a significant resource and that it meets any of the following NRHP criteria (California Public Resources Code Section 5024.1(c)):

1. Associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. Associated with the lives of persons important in our past.
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
4. Has yielded, or may be likely to yield, information important in prehistory or history.

Resources less than 50 years old are not considered for listing in the CRHR, but may be considered if it can be demonstrated that sufficient time has passed to understand the historical importance of the resource (see 14 CCR, Section 4852(d)(2)).

The CRHR protects cultural resources by requiring evaluations of the significance of prehistoric and historic resources. The criteria for the CRHR are nearly identical to those for the NRHP, and properties listed or formally designated as eligible for listing on the NRHP are automatically listed on the CRHR, as are the state landmarks and points of interest. The CRHR also includes properties designated under local ordinances or identified through local cultural resource surveys. The SHPO maintains the CRHR.

1.1.2 Native American Historic Cultural Sites (California Public Resources Code Section 5097 et seq.)

The Native American Historic Resources Protection Act (Public Resources Code Section 5097, et seq.) addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and establishes the NAHC to resolve disputes regarding the disposition of such remains. In addition, the Native American Historic Resources Protection Act makes it a misdemeanor punishable by up to 1 year in jail to deface or destroy an Indian historic or cultural site that is listed or may be eligible for listing in the CRHR.

1.1.3 California Native American Graves Protection and Repatriation Act

The California Native American Graves Protection and Repatriation Act (California Repatriation Act), enacted in 2001, requires all state agencies and museums that receive state funding and that have possession or control over collections of human remains or cultural items, as defined, to complete an inventory and summary of these remains and items on or before January 1, 2003, with certain exceptions. The California Repatriation Act also provides a process for the identification and repatriation of these items to the appropriate tribes.

1.1.4 California Health and Safety Code Section 7050.5

California law protects Native American burials, skeletal remains, and associated grave goods, regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains. California Health and Safety Code Section 7050.5 requires that if human remains are discovered in any place other than a dedicated cemetery, no further disturbance or excavation of the site or nearby area reasonably suspected to contain human remains shall occur until the County coroner has examined the remains (California Health and Safety Code Section 7050.5b). If the coroner determines or has reason to believe the remains are those of a Native American, the coroner must contact the Native American Heritage Commission (NAHC) within 24 hours (California Health and Safety Code Section 7050.5c). The NAHC will notify the Most Likely Descendant (MLD). With the permission of the landowner, the MLD may inspect the site of discovery. The inspection must be completed within 24 hours of notification of the MLD by the NAHC. The MLD may recommend means of treating or disposing of, with appropriate dignity, the human remains and items associated with Native Americans.

1.1.5 California Environmental Quality Act

As described further below, the following CEQA statutes and CEQA Guidelines are relevant to the analysis of archaeological and historic resources:

1. California Public Resources Code Section 21083.2(g): Defines “unique archaeological resource.”
2. California Public Resources Code Section 21084.1 and CEQA Guidelines Section 15064.5(a): Defines cultural resources. In addition, CEQA Guidelines Section 15064.5(b) defines the phrase “substantial adverse change” in the significance of a cultural resource. It also defines the circumstances when a project would materially impair the significance of a cultural resource.
3. California Public Resources Code Section 21074 (a): defines “Tribal cultural resources” and Section 21074(b): defines a “cultural landscape.”

4. California Public Resources Code Section 5097.98 and CEQA Guidelines Section 15064.5(e): These statutes set forth standards and steps to be employed following the accidental discovery of human remains in any location other than a dedicated ceremony.
5. California Public Resources Code sections 21083.2(b)-(c) and CEQA Guidelines Section 15126.4: These statutes and regulations provide information regarding the mitigation framework for archaeological and historic resources, including options of preservation-in-place mitigation measures; identifies preservation-in-place as the preferred manner of mitigating impacts to significant archaeological sites.

Under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an [sic] cultural resource" (California Public Resources Code Section 21084.1; CEQA Guidelines Section 15064.5(b)). A "cultural resource" is any site listed or eligible for listing in the CRHR. The CRHR listing criteria are intended to examine whether the resource in question: (a) is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; (b) is associated with the lives of persons important in our past; (c) embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or (d) has yielded, or may be likely to yield, information important in pre-history or history.

The term "cultural resource" also includes any site described in a local register of historic resources, or identified as significant in a cultural resources survey (meeting the requirements of California Public Resources Code Section 5024.1(q)).

CEQA also applies to "unique archaeological resources." California Public Resources Code Section 21083.2(g) defines a "unique archaeological resource" as any archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

In 2014, CEQA was amended through Assembly Bill 52 to apply to "tribal culture resources" as well. Specifically, California Public Resources Code Section 21074 provides guidance for defining tribal cultural resources as either of the following:

6. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following: (A) Included or determined to be eligible for inclusion in the California Register of Cultural Resources. (B) Included in a local register of cultural resources as defined in subdivision (k) of §5020.1.
7. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of §5024.1. In applying the criteria set forth in subdivision (c) of §5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe. (b) A cultural landscape that meets the criteria of subdivision (a) is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.

All cultural resources and unique archaeological resources – as defined by statute – are presumed to be historically or culturally significant for purposes of CEQA (California Public Resources Code Section 21084.1; 14 CCR 15064.5(a)). The lead agency is not precluded from determining that a resource is a cultural resource even if it does not fall within this presumption (California Public Resources Code Section 21084.1; 14 CCR 15064.5(a)). A site or resource that does not meet the definition of “cultural resource” or “unique archaeological resource” is not considered significant under CEQA and need not be analyzed further (California Public Resources Code Section 21083.2(a); 14 CCR 15064.5(c)(4)).

Under CEQA and significant cultural impact results from a “substantial adverse change in the significance of an [sic] cultural resource [including a unique archaeological resource]” due to the “physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an cultural resource would be materially impaired” (14 CCR 15064.5(b)(1); California Public Resources Code Section 5020.1(q)). In turn, according to 14 CCR 15064.5(b)(2), the significance of a cultural resource is materially impaired when a project:

1. Demolishes or materially alters in an adverse manner those physical characteristics of an cultural resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register; or
2. Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of cultural resources pursuant to Section 5020.1(k) of the Public Resources Code or its identification in an cultural resources survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

3. Demolishes or materially alters in an adverse manner those physical characteristics of a cultural resource that convey its historical significance and that justify its eligibility for inclusion in the California Register as determined by a lead agency for purposes of CEQA.

Pursuant to these sections, the CEQA first evaluates evaluating whether a project site contains any "cultural resources," then assesses whether that project will cause a substantial adverse change in the significance of a cultural resource such that the resource's historical significance is materially impaired.

When a project significantly affects a unique archaeological resource, CEQA imposes special mitigation requirements. Specifically, California Public Resources Code Sections 21083.2(b)(1)–21083.2(b)(4) states:

> [i]f it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts to be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. Examples of that treatment, in no order of preference, may include, but are not limited to, any of the following:
>
> 1. Planning construction to avoid archaeological sites.
> 2. Deeding archaeological sites into permanent conservation easements.
> 3. Capping or covering archaeological sites with a layer of soil before building on the sites.
> 4. Planning parks, greenspace, or other open space to incorporate archaeological sites.

If these "preservation in place" options are not feasible, mitigation may be accomplished through data recovery (California Public Resources Code Section 21083.2(d); 14 CCR 15126.4(b)(3)(C)). California Public Resources Code Section 21083.2(d) states that:

> [e]xcavation as mitigation shall be restricted to those parts of the unique archaeological resource that would be damaged or destroyed by the project. Excavation as mitigation shall not be required for a unique archaeological resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the resource, if this determination is documented in the environmental impact report.

These same requirements are set forth in slightly greater detail in CEQA Guidelines Section 15126.4(b)(3), as follows:

> A. Preservation in place is the preferred manner of mitigating impacts to archaeological sites. Preservation in place maintains the relationship between artifacts and the archaeological context. Preservation may also avoid conflict with religious or cultural values of groups associated with the site.
>
> B. Preservation in place may be accomplished by, but is not limited to, the following:
>
> 1. Planning construction to avoid archaeological sites;
> 2. Incorporation of sites within parks, greenspace, or other open space;
> 3. Covering the archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site[; and]
> 4. Deeding the site into a permanent conservation easement.
>
> C. When data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provision for adequately recovering the scientifically consequential information from and about the cultural resource, shall be prepared and adopted prior to any excavation being undertaken.

Note that, when conducting data recovery, "[i]f an artifact must be removed during project excavation or testing, curation may be an appropriate mitigation." (14 CCR 15126.4(b)(3)) However, "[d]ata recovery shall not be required for an cultural resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historic resource, provided that determination is documented in the EIR and that the studies are deposited with the California Cultural resources Regional Information Center" (14 CCR 15126.4(b)(3)(D)).

Finally, CEQA Guidelines Section 15064.5 assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are set forth in California Public Resources Code Section 5097.98.

1.1.6 City of San Diego Significance Determination Thresholds

As lead agency, the City implements its *California Environmental Quality Act (CEQA) Significance Determination Thresholds* (City of San Diego 2016) to assess whether a proposed project may have a significant effect on the environment under Section 21082.2 of CEQA. Included in this document are the Initial Study Checklist Questions and Significance Thresholds.

Initial Study Checklist Questions

1. An alteration, including the adverse physical or aesthetic effects and/or the destruction of a prehistoric or historic building (including an architecturally significant building), structure, or object or site?
2. Any impact to existing religious or sacred uses within the potential impact area?
3. The disturbance of any human remains, including those interred outside of formal cemeteries?

Significance Thresholds

Federal, state and local criteria have been established for the determination of historical resource significance. The Historical Resources Regulations of the Land Development Code pertain only to historical resources that meet the definitions contained in Chapter 11, Article 3, Division 1 of the code and may differ from the definition of historical resources in these Guidelines and from a determination of significance under CEQA.

1.1.7 City of San Diego Historic Resource Regulations

The City of San Diego Historical Resources Guidelines (City of San Diego 2001) outlines its purpose as follows:

> The purpose of this document is to provide property owners, the development community, consultants and the general public with explicit guidelines for the management of historical resources located within the jurisdiction of the City of San Diego. These guidelines are designed to implement the City's Historical Resources Regulations contained in the Land Development Code (Chapter 14, Division 3, Article 2) in compliance with applicable local, state and federal policies and mandates, including, but not limited to, the City's Progress Guide and General Plan, the California Environmental Quality Act of 1970, and Section 106 of the National Historic Preservation Act of 1966. The intent of the guidelines is to ensure consistency in the management of the City's historical resources, including identification, evaluation, preservation/mitigation and development.

The City’s Historical Resources Guidelines (City of San Diego 2001) observe that:

> Historical resources include all properties (historic, archaeological, landscapes, traditional, etc.) eligible or potentially eligible for the National Register of Historic Places, as well as those that may be significant pursuant to state and local laws and registration programs such as the California Register of Historical

> Resources or the City of San Diego Historical Resources Register. "Historical resource" means site improvements, buildings, structures, historic districts, signs, features (including significant trees or other landscaping), places, place names, interior elements and fixtures designated in conjunction with a property, or other objects of historical, archaeological, scientific, educational, cultural, architectural, aesthetic, or traditional significance to the citizens of the City. They include buildings, structures, objects, archaeological sites, districts or landscapes possessing physical evidence of human activities that are typically over 45 years old, regardless of whether they have been altered or continue to be used. Historical resources also include traditional cultural properties. The following definitions are based, for the most part, on California's Office of Historic Preservation's (OHP) Instructions for Recording Historical Resources and are used to categorize different types of historical resources when they are recorded

The purpose and intent of the Historical Resources Regulation of the Land Development Code (Chapter 14, Division 3, Article 2; City of San Diego 2001) is outlined as follows:

> To protect, preserve and, where, damaged, restore the cultural resources of San Diego. The regulations apply to all development within the City of San Diego when cultural resources are present within the premises regardless of the requirement to obtain Neighborhood Development Permit or Site Development Permit.

The City’s General Plan Program EIR states the following:

> The Historical Resources Regulations require that designated cultural resources and traditional cultural properties be preserved unless deviation findings can be made by the decision maker as part of a discretionary permit. Minor alterations consistent with the U.S. Secretary of the Interior’s Standards are exempt from the requirement to obtain a separate permit but must comply with the regulations and associated cultural resources guidelines. Limited development may encroach into important archaeological sites if adequate mitigation measures are provided as a condition of approval.
>
> Historical Resources Guidelines, located in the Land Development Manual, provide property owners, the development community, consultants and the general public explicit guidance for the management of cultural resources located within the City’s jurisdiction. These guidelines are designed to implement the cultural resources regulations and guide the development review process from the need for a survey and how impacts are assessed to available mitigation strategies and report requirements and include appropriate methodologies for treating cultural resources located in the City.

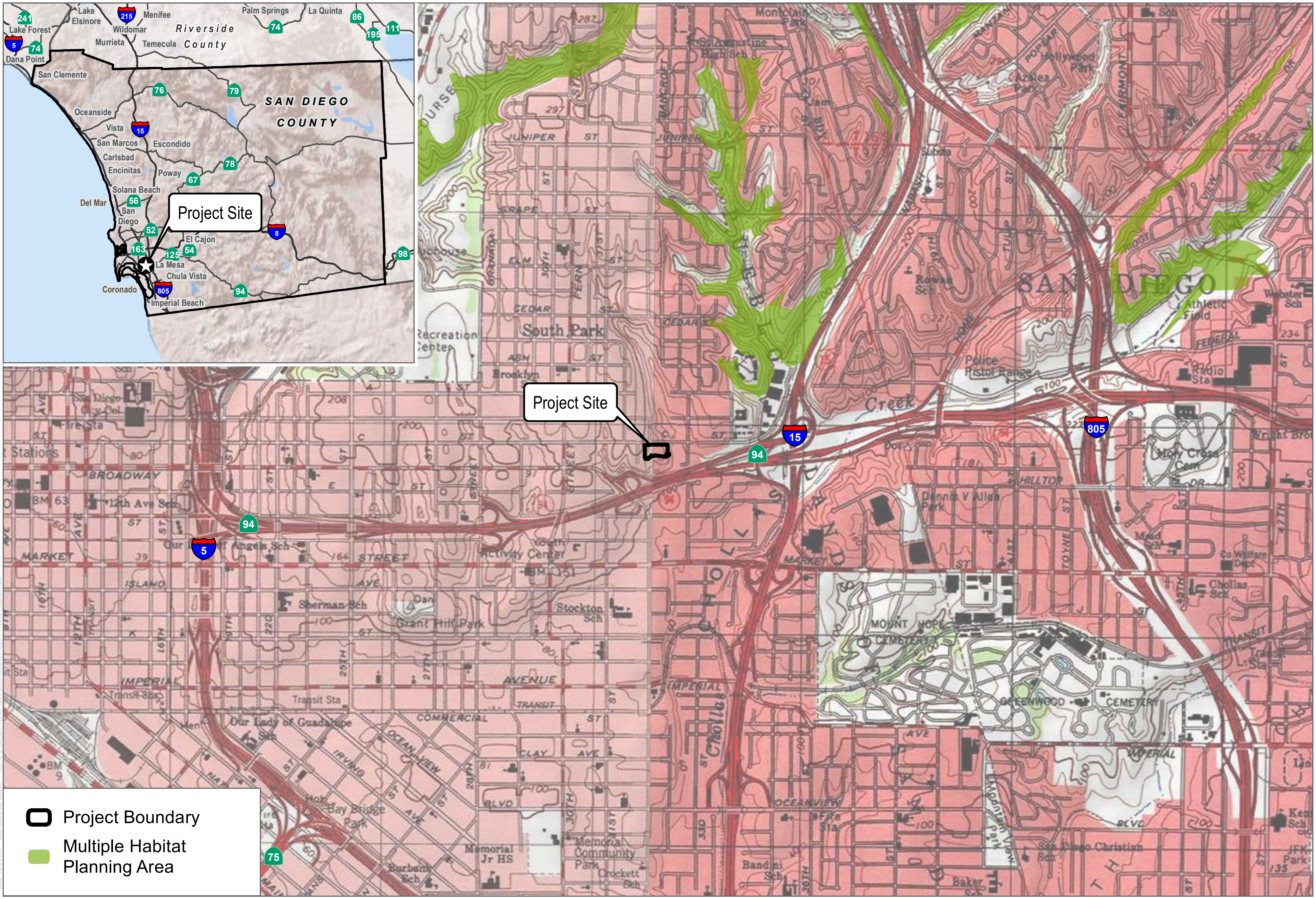
In general, the City's cultural resources regulations build on federal and state cultural resources laws and guidelines in an attempt to streamline the process of considering impacts to cultural resources within the City's jurisdiction, while maintaining that some resources not significant under federal or state law may be considered historical under the City's guidelines. In order to apply the criteria and determine the significance of potential project impacts to a cultural resource, the APE of the project must be defined for both direct impacts and indirect impacts. Indirect impacts can include increased public access to an archaeological site, or visual impairment of a historically significant view shed related to a historic building or structure.

1.2 Project Personnel

Micah Hale, PhD, RPA, served as Principal Investigator and co-authored the technical report. Matthew DeCarlo, MA, served as project manager, field director, and co-authored the technical report (Appendix A). Nick Ruiz from Red Tail Environmental Inc. participated in the survey as Native American monitor.

1.3 Report Structure

Following this introduction, an environmental and cultural context is provided for characterizing cultural resources. Next, survey methods are reviewed. The results of the survey is then followed by management considerations. Two sets of appendices (confidential and non-confidential) are attached. The non-confidential appendices include Appendix A: Project Personnel Qualifications and Appendix C: NAHC Sacred Lands File Search and Tribal Correspondence. The confidential appendices includes Appendix B: Records Search Documents.



SOURCE: USGS 7.5-Minute Series National City Quadrangle

DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location

32nd and C Street Project

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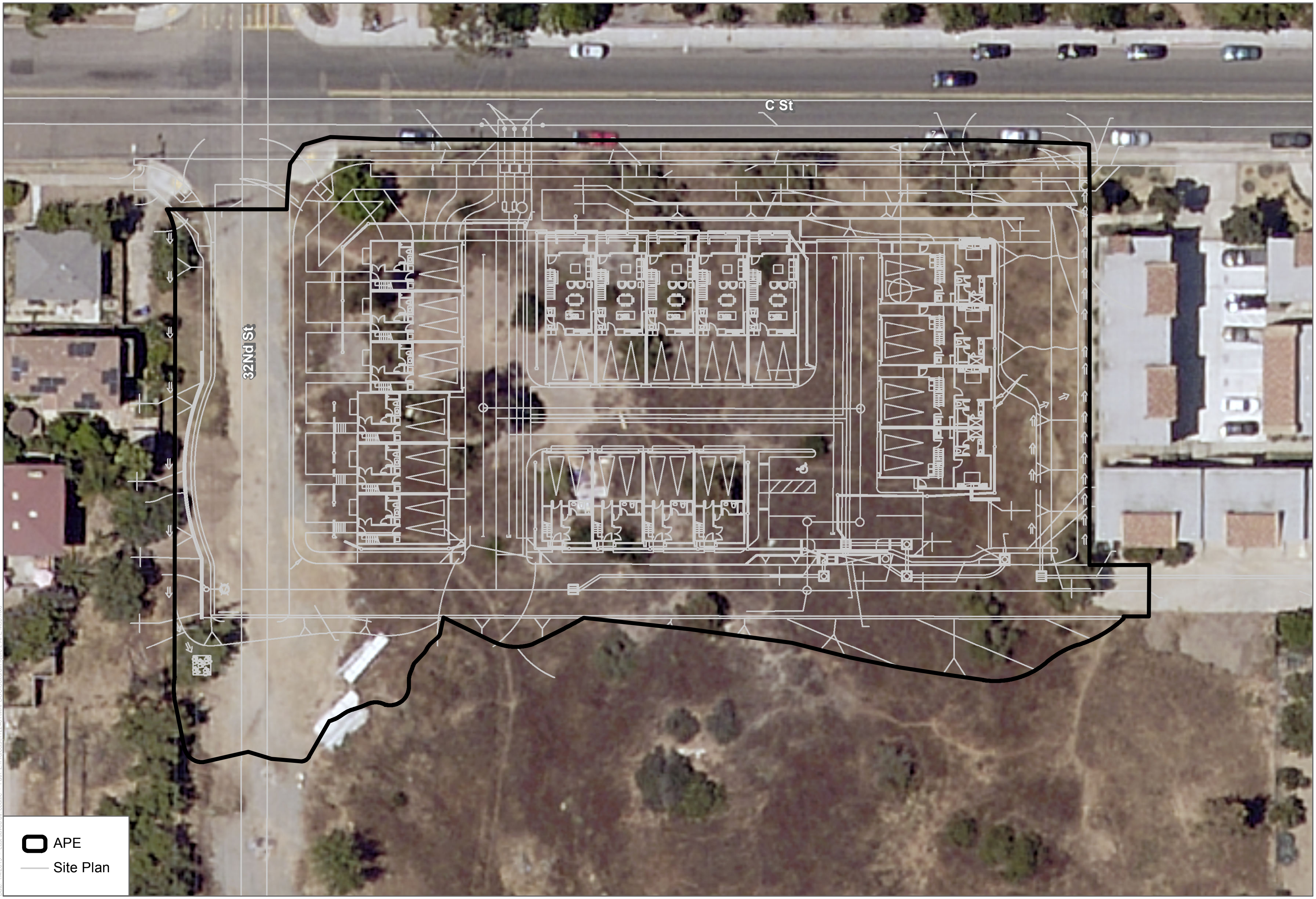

Date: 1/4/2019 - Last saved by: cbattle - Path: Z:\Projects\j1122401\MAPDOC\Cultural\Figure 2 APE Map.mxd

SOURCE: SANGIS 2017

DUDEK

0 25 50 Feet

FIGURE 2

APE

32nd and C Street Project

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2 SETTING

2.1 Natural Setting

The topography of the project area remains relatively flat, with a slight slope eastward and southward. The study area ranges in elevation from approximately 140 feet to 180 feet above mean sea level. The area has been previously disturbed and is undeveloped. Grasses, brush, and illegally dumped waste cover much of the ground surface.

For detailed discussion relating to the environmental context of this area, please consult the biological technical study prepared for the Project (Bergman 2018).

2.2 Cultural Setting

Evidence for continuous human occupation in the San Diego region spans the last 10,000 years. Various attempts to parse out variability in archaeological assemblages over this broad time frame have led to the development of several cultural chronologies; some of these are based on geologic time, most are based on temporal trends in archaeological assemblages, and others are interpretive reconstructions. Each of these reconstructions describes essentially similar trends in assemblage composition in more or less detail. This research employs a common set of generalized terms used to describe chronological trends in assemblage composition: Paleoindian (pre-5500 BC), Archaic (8000 BC.–AD 500), Late Prehistoric (AD 500–1769), and Ethnohistoric (post-AD 1769).

2.2.1 Paleoindian (pre-5500 BC)

Evidence for Paleoindian occupation in coastal Southern California is tenuous, especially considering the fact that the oldest dated archaeological assemblages look nothing like the Paleoindian artifacts from the Great Basin. One of the earliest dated archaeological assemblages in coastal Southern California (excluding the Channel Islands) derives from SDI-4669/W-12, in La Jolla. A human burial from SDI-4669 was radiocarbon dated to 9,590–9,920 years before present (95.4% probability) (Hector 2007). The burial is part of a larger site complex that contained more than 29 human burials associated with an assemblage that fits the Archaic profile (i.e., large amounts of groundstone, battered cobbles, and expedient flake tools). In contrast, typical Paleoindian assemblages include large stemmed projectile points, high proportions of formal lithic tools, bifacial lithic reduction strategies, and relatively small proportions of groundstone tools. Prime examples of this pattern are sites that were studied by Emma Lou Davis (1978) on China Lake Naval Air Weapons Station near Ridgecrest, California. These sites contained fluted and unfluted stemmed points and large numbers of formal flake tools (e.g., shaped scrapers, blades). Other typical Paleoindian sites include the

Komodo site (MNO-679)—a multicomponent fluted point site, and MNO-680—a single component Great Basined Stemmed point site (Basgall et al. 2002). At MNO-679 and MNO-680, groundstone tools were rare while finely made projectile points were common.

Turning back to coastal Southern California, the fact that some of the earliest dated assemblages are dominated by processing tools runs counter to traditional notions of mobile hunter–gatherers traversing the landscape for highly valued prey. Evidence for the latter—that is, typical Paleoindian assemblages—may have been located along the coastal margin at one time, prior to glacial desiccation and a rapid rise in sea level during the early Holocene (pre-7500 BP) that submerged as much as 1.8 km of the San Diego coastline. If this were true, however, it would also be expected that such sites would be located on older landforms near the current coastline. Some sites, such as SDI-210 along Agua Hedionda Lagoon, contained stemmed points similar in form to Silver Lake and Lake Mojave projectile points (pre-8000 BP) that are commonly found at sites in California's high desert (Basgall and Hall 1990). SDI-210 yielded one corrected radiocarbon date of 8520–9520 BP (Warren et al. 2004). However, sites of this nature are extremely rare and cannot be separated from large numbers of milling tools that intermingle with old projectile point forms.

Warren et al. (2004) claimed that a biface manufacturing tradition present at the Harris site complex (SDI-149) is representative of typical Paleoindian occupation in the San Diego region that possibly dates between 10,365 and 8200 BC (Warren et al. 2004, p. 26). Termed San Dieguito (Rogers 1945), assemblages at the Harris site are qualitatively distinct from most others in the San Diego region because the site has large numbers of finely made bifaces (including projectile points), formal flake tools, a biface reduction trajectory, and relatively small amounts of processing tools (Warren 1964, 1968). Despite the unique assemblage composition, the definition of San Dieguito as a separate cultural tradition is hotly debated. Gallegos (1987) suggested that the San Dieguito pattern is simply an inland manifestation of a broader economic pattern. Gallegos' interpretation of San Dieguito has been widely accepted in recent years, in part because of the difficulty in distinguishing San Dieguito components from other assemblage constituents. In other words, it is easier to ignore San Dieguito as a distinct socioeconomic pattern than it is to draw it out of mixed assemblages.

The large number of finished bifaces (i.e., projectile points and non-projectile blades), along with large numbers of formal flake tools at the Harris site complex, is very different than nearly all other assemblages throughout the San Diego region, regardless of age. Warren et al. (2004) made this point, tabulating basic assemblage constituents for key early Holocene sites. Producing finely made bifaces and formal flake tools implies that relatively large amounts of time were spent for tool manufacture. Such a strategy contrasts with the expedient flake-based tools and cobble-core reduction strategy that typifies non-San Dieguito Archaic sites. It can be inferred from the uniquely high degree of San Dieguito assemblage formality that the Harris site complex represents a distinct economic strategy from non-San Dieguito assemblages.

If San Dieguito truly represents a distinct socioeconomic strategy from the non-San Dieguito Archaic processing regime, its rarity implies that it was not only short-lived, but that it was not as economically successful as the Archaic strategy. Such a conclusion would fit with other trends in southern California deserts, wherein hunting-related tools are replaced by processing tools during the early Holocene (Basgall and Hall 1993).

2.2.2 Archaic (8000 BC–AD 500)

The more than 1500-year overlap between the presumed age of Paleoindian occupations and the Archaic period highlights the difficulty in defining a cultural chronology in the San Diego region. If San Dieguito is the only recognized Paleoindian component in the San Diego region, then the dominance of hunting tools implies that it derives from Great Basin adaptive strategies and is not necessarily a local adaptation. Warren et al. (2004) admitted as much, citing strong desert connections with San Dieguito. Thus, the Archaic pattern is the earliest local socioeconomic adaptation in the San Diego region (Hale 2001, 2009).

The Archaic pattern is relatively easy to define with assemblages that consist primarily of processing tools: millingstones, handstones, battered cobbles, heavy crude scrapers, incipient flake-based tools, and cobble-core reduction. These assemblages occur in all environments across the San Diego region, with little variability in tool composition. Low assemblage variability over time and space among Archaic sites has been equated with cultural conservatism (Byrd and Reddy 2002; Warren 1968; Warren et al. 2004). Despite enormous amounts of archaeological work at Archaic sites, little change in assemblage composition occurs until the bow and arrow is adopted at around AD 500, as well as ceramics at approximately the same time (Griset 1996; Hale 2009). Even then, assemblage formality remains low. After the bow is adopted, small arrow points appear in large quantities and already low amounts of formal flake tools are replaced by increasing amounts of expedient flake tools. Similarly, shaped millingstones and handstones decrease in proportion relative to expedient, unshaped groundstone tools (Hale 2009). Thus, the terminus of the Archaic period is equally as hard to define as its beginning because basic assemblage constituents and patterns of manufacturing investment remain stable, complimented only by the addition of the bow and ceramics.

2.2.3 Late Prehistoric (AD 500–1769)

The period of time following the Archaic and prior to Ethnohistoric times (AD 1769) is commonly referred to as the Late Prehistoric (M. Rogers 1945; Wallace 1955; Warren et al. 2004). However, several other subdivisions continue to be used to describe various shifts in assemblage composition, including the addition of ceramics and cremation practices. In northern San Diego County, the post-AD 1450 period is called the San Luis Rey Complex (True 1980), while the same period in southern San Diego County is called the Cuyamaca Complex and is thought to extend from AD 500 until Ethnohistoric times (Meighan 1959). Rogers (1929) also subdivided the last 1,000 years into the Yuman II and III cultures, based on the distribution of ceramics. Despite these regional complexes, each is defined by the addition of arrow points and ceramics, and the widespread use of bedrock mortars. Vagaries in the appearance of the bow and arrow and ceramics make the temporal resolution of the San Luis Rey and Cuyamaca complexes difficult. For this reason, the term Late Prehistoric is well-suited to describe the last 1,500 years of prehistory in the San Diego region.

Temporal trends in socioeconomic adaptations during the Late Prehistoric period are poorly understood. This is partly due to the fact that the fundamental Late Prehistoric assemblage is very similar to the Archaic pattern, but includes arrow points and large quantities of fine debitage from producing arrow points, ceramics, and cremations. The appearance of mortars and pestles is difficult to place in time because most mortars are on bedrock surfaces; bowl mortars are actually rare in the San Diego region. Some argue that the Ethnohistoric intensive acorn economy extends as far back as AD 500 (Bean and Shipek 1978). However, there is no substantial evidence that reliance on acorns, and the accompanying use of mortars and pestles, occurred prior to AD 1400. True (1980) argued that acorn processing and ceramic use in the northern San Diego region did not occur until the San Luis Rey pattern emerged after approximately AD 1450. For southern San Diego County, the picture is less clear. The Cuyamaca Complex is the southern counterpart to the San Luis Rey pattern, however, and is most recognizable after AD 1450 (Hector 1984). Similar to True (1980), Hale (2009) argued that an acorn economy did not appear in the southern San Diego region until just prior to Ethnohistoric times, and that when it did occur, a major shift in social organization followed.

2.2.4 Ethnohistoric (post-AD 1769)

The history of the Native American communities prior to the mid-1700s has largely been reconstructed through later mission-period and early ethnographic accounts. The first records of the Native American inhabitants of the San Diego region come predominantly from European merchants, missionaries, military personnel, and explorers. These brief, and generally peripheral, accounts were prepared with the intent of furthering respective colonial and economic aims and were combined with observations of the landscape. They were not intended to be unbiased accounts regarding the cultural structures and community practices of the newly encountered cultural groups. The establishment of the missions in the San Diego region brought more extensive documentation of Native American communities, though these groups did not become the focus of formal and in-depth ethnographic study until the early twentieth century (Boscana 1846; Fages 1937; Geiger and Meighan 1976; Harrington 1934; Laylander 2000). The principal intent of these researchers was to record the precontact, culturally specific practices, ideologies, and languages that had survived the destabilizing effects of missionization and colonialism. This research, often understood as "salvage ethnography," was driven by the understanding that traditional knowledge was being lost due to the impacts of modernization and cultural assimilation. Alfred Kroeber applied his “memory culture” approach (Lightfoot 2005, p. 32) by recording languages and oral histories within the San Diego region. Kroeber’s 1925 assessment of the impacts of Spanish missionization on local Native American populations supported Kumeyaay traditional cultural continuity:

> San Diego was the first mission founded in upper California; but the geographical limits of its influence were the narrowest of any, and its effects on the natives comparatively light. There seem to be two reasons for this: first, the stubbornly resisting temper of the natives; and second, a failure of the rigorous concentration policy enforced elsewhere (Kroeber 1925, p. 711).

In some ways this interpretation led to the belief that many California Native American groups simply escaped the harmful effects of contact and colonization all together. This, of course, is untrue. Ethnographic research by Dubois, Kroeber, Harrington, Spier, and others during the early twentieth century seemed to indicate that traditional cultural practices and beliefs survived among local Native American communities. These accounts supported, and were supported by, previous governmental decisions which made San Diego County the location of more federally recognized tribes than anywhere else in the United States: 18 tribes on 18 reservations that cover more than 116,000 acres (CSP 2009).

The traditional cultural boundaries between the Luiseño and Kumeyaay Native American tribal groups have been well defined by anthropologist Florence C. Shipek:

> In 1769, the Kumeyaay national territory started at the coast about 100 miles south of the Mexican border (below Santo Tomas), thence north to the coast at the drainage divide south of the San Luis Rey River including its tributaries. Using the U.S. Geological Survey topographic maps, the boundary with the Luiseño then follows that divide inland. The boundary continues on the divide separating Valley Center from Escondido and then up along Bear Ridge to the 2240 contour line and then north across the divide between Valley Center and Woods Valley up to the 1880-foot peak, then curving around east along the divide above Woods Valley (Shipek 1993, as summarized in County of San Diego 2007, p. 6).

Based on ethnographic information, it is believed that at least 88 different languages were spoken from Baja California Sur to the southern Oregon state border at the time of Spanish contact (Johnson and Lorenz 2006, p. 34). The distribution of recorded Native American languages has been dispersed as a geographic mosaic across California through six primary language families (Golla 2007, p. 71). Based on the project location, the Native American inhabitants of the region would have likely spoken both the Ipai and Tipai language subgroup of the Yuman language group. Ipai and Tipai, spoken respectively by the northern and southern Kumeyaay communities, are mutually intelligible. For this reason, these two are often treated as dialects of a larger Kumeyaay tribal group rather than as distinctive languages, though this has been debated (Luomala 1978; Laylander 2010).

Victor Golla has contended that one can interpret the amount of variability within specific language groups as being associated with the relative "time depth" of the speaking populations (Golla 2007, p. 80) A large amount of variation within the language of a group represents a greater time depth then a group's language with less internal diversity. One method that he has employed is by drawing comparisons with historically documented changes in Germanic and Romantic language groups. Golla has observed that the "absolute chronology of the internal diversification within a language family" can be correlated with archaeological dates (Golla 2007, p. 71). This type of interpretation is modeled on concepts of genetic drift and gene flows that are associated with migration and population isolation in the biological sciences.

Golla suggested that there are two language families associated with Native American groups who traditionally lived throughout the San Diego County region. The northern San Diego tribes have traditionally spoken Takic languages that may be assigned to the larger Uto–Aztecan family (Golla 2007, p. 74). These groups include the Luiseño, Cupeño, and Cahuilla. Golla has interpreted the amount of internal diversity within these language-speaking communities to reflect a time depth of approximately 2,000 years. Other researchers have contended that Takic may have diverged from Uto–Aztecan ca. 2600 BC–AD 1, which was later followed by the diversification within the Takic speaking San Diego tribes, occurring approximately 1500 BC–AD 1000 (Laylander 2010). The majority of Native American tribal groups in southern San Diego region have traditionally spoken Yuman languages, a subgroup of the Hokan Phylum. Golla has suggested that the time depth of Hokan is approximately 8,000 years (Golla 2007, p. 74). The Kumeyaay tribal communities share a common language group with the Cocopa, Quechan, Maricopa, Mojave, and others to east, and the Kiliwa to the south. The time depth for both the Ipai (north of the San Diego River, from Escondido to Lake Henshaw) and the Tipai (south of the San Diego River, the Laguna Mountains through Ensenada) is approximated to be 2,000 years at the most. Laylander has contended that previous research indicates a divergence between Ipai and Tipai to have occurred approximately AD 600–1200 (Laylander 1985). Despite the distinct linguistic differences between the Takic-speaking tribes to the north, the Ipai-speaking communities in central San Diego, and the Tipai southern Kumeyaay, attempts to illustrate the distinctions between these groups based solely on cultural material alone have had only limited success (Pigniolo 2004; True 1966).

The Kumeyaay generally lived in smaller family subgroups that would inhabit two or more locations over the course of the year. While less common, there is sufficient evidence that there were also permanently occupied villages, and that some members may have remained at these locations throughout the year (Owen 1965; Shipek 1982; Shipek 1985; Spier 1923). Each autonomous triblet was internally socially stratified, commonly including higher status individuals such as a tribal head (Kwaaypay), shaman (Kuseyaay), and general members with various responsibilities and skills (Shipek 1982). Higher-status individuals tended to have greater rights to land resources, and owned more goods, such as shell money and beads, decorative items, and clothing. To some degree, titles were passed along family lines; however, tangible goods were generally ceremonially burned or destroyed following the deaths of their owners (Luomala 1978). Remains were cremated over a pyre and then relocated to a cremation ceramic vessel that was placed in a removed or hidden location. A broken metate was commonly placed at the location of the cremated remains, with the intent of providing aid and further use after death. At maturity, tribal members often left to other bands in order to find a partner. The families formed networks of communication and exchange around such partnerships.

Areas or regions, identified by known physical landmarks, could be recognized as band-specific territories that might be violently defended against use by other members of the Kumeyaay. Other areas or resources, such as water sources and other locations that were rich in natural resources, were generally understood as communal land to be shared amongst all the Kumeyaay (Luomala 1978). The coastal Kumeyaay exchanged a number of local goods, such as seafood, coastal plants, and various types of shell for items including acorns, agave, mesquite beans, gourds, and other more interior plants of use (Luomala 1978). Shellfish would have been procured from three primary environments, including the sandy open coast, bay and lagoon, and rocky open coast. The availability of these marine resources changed with the rising sea levels, siltation of lagoon and bay environments, changing climatic conditions, and intensity of use by humans and animals (Gallegos and Kyle 1988; Pigniolo 2005; Warren 1964). Shellfish from sandy environments included *Donax*, *Saxidomus*, *Tivela*, and others. Rocky coast shellfish dietary contributions consisted of *Pseudochama*, *Megastraea*, *Saxidomus*, *Protothaca*, *Megathura*, *Mytilus*, and others. Lastly, the bay environment would have provided *Argopecten*, *Chione*, *Ostrea*, *Neverita*, *Macoma*, *Tagelus*, and others. Although marine resources were obviously consumed, terrestrial animals and other resources likely provided a large portion of sustenance. Game animals consisted of rabbits, hares (Leporidae), birds, ground squirrels, woodrats (*Neotoma* sp.), deer, bears, mountain lions (*Puma concolor*), bobcats (*Lynx rufus*), coyotes (*Canis latrans*), and others. In lesser numbers, reptiles and amphibians may have been consumed.

A number of local plants were used for food and medicine. These were exploited seasonally, and were both traded between regional groups and gathered as a single triblet moved between habitation areas. Some of the more common of these that might have been procured locally or as higher elevation varieties would have included buckwheat (*Eriogonum fasciculatum*), *Agave*, *Yucca*, lemonade sumac (*Rhus integrifolia*), sugarbush (*Rhus ovata*), sage scrub (*Artemisia californica*), yerba santa (*Eriodictyon* sp.), sage (*Salvia* sp.), *Ephedra*, prickly pear (*Opuntia* sp.), mulefat (*Baccharis salicifolia*), chamise (*Adenostoma fasciculatum*), elderberry (*Sambucus nigra*), oak (*Quercus* sp.), willow (*Salix* sp.), and *Juncus* grass among many others (Wilken 2012).

2.2.5 Historic Period (post-AD 1542)

San Diego history can be divided into the Spanish Period (1769–1821), Mexican Period (1821–1846) and American Period (1846–Present). European activity in the region began as early as AD 1542, when Juan Rodríguez Cabrillo landed in San Diego Bay. Sebastián Vizcaíno returned in 1602, and it is possible that there were subsequent contacts that went unrecorded. These brief encounters made the local native people aware of the existence of other cultures that were technologically more complex than their own. Epidemic diseases may also have been introduced into the region at an early date, either by direct contacts with the infrequent European visitors or through waves of diffusion emanating from native peoples farther to the east or south (Preston 2002). It is possible, but as yet unproven, that the precipitous demographic decline of native peoples had already begun prior to the arrival of Gaspar de Portolá and Junípero Serra in 1769.

The Spanish colonization of Alta California began in 1769 with the founding of Mission San Diego de Alcalá by Father Junípero Serra. Concerns over Russian and English interests in California motivated the Spanish government to send an expedition of soldiers, settlers and missionaries to occupy and secure the northwestern borderlands of New Spain through the establishment of a Presidio, Mission, and Pueblo. The Spanish explorers first camped on the shore of the bay in the area that is now downtown San Diego. Lack of water at this location, however, led to moving the camp on May 14, 1769, to a small hill closer to the San Diego River and near the Kumeyaay village of Cosoy. Father Junípero Serra arrived in July of the same year to find the Presidio serving mostly as a hospital. The Spanish built a primitive mission and presidio structure on the hill near the river.

Bad feelings soon developed between the native Kumeyaay and the soldiers, resulting in construction of a stockade which, by 1772, included barracks for the soldiers, a storehouse for supplies, a house for the missionaries and the chapel, which had been improved. The log and brush huts were gradually replaced with buildings made of adobe bricks. Flat earthen roofs were eventually replaced by pitched roofs with rounded roof tiles. Clay floors were eventually lined with fired brick.

In August, 1774 the Spanish missionaries moved the Mission San Diego de Alcalá to its present location 6 miles up the San Diego River valley (modern Mission Valley) near the Kumeyaay village of Nipaguay. Begun as a thatched chapel and compound built of willow poles, logs and tules, the new Mission was sacked and burned in the Kumeyaay uprising of November 5, 1775. The first adobe chapel was completed in October 1776 and the present church was begun the following year. A succession of building programs through 1813 resulted in the final rectilinear plan that included the church, bell tower, sacristy, courtyard, residential complex, workshops, corrals, gardens and cemetery. Orchards, reservoirs and other agricultural installations were built to the south on the lower San Diego River alluvial terrace and were irrigated by a dam and aqueduct system. The initial Spanish occupation and mission system brought about profound changes in the lives of the Kumeyaay people. Substantial numbers of the coastal Kumeyaay were forcibly brought into the mission or died from introduced diseases.

As early as 1791, presidio commandants in California were given the authority to grant small house lots and garden plots to soldiers and their families and sometime after 1800, soldiers and their families began to move down the hill near the San Diego River. Historian William Smythe noted that Don Blas Aguilar, who was born in 1811, remembered at least 15 such grants below Presidio Hill by 1821, of which only five of these grant lands within the boundaries of what would become Old Town had houses in 1821. These included the retired commandant Francisco Ruiz Adobe (now known as the Carrillo Adobe), another building later owned by Henry Fitch on Calhoun Street, the Ybanes and Serrano houses on Juan Street near Washington Street, and a small adobe house on the main plaza owned by Juan Jose Maria Marron.

In 1822 the political situation changed as Mexico won its independence from Spain and San Diego became part of the Mexican Republic. The Mexican Government opened California to foreign trade; began issuing private land grants in the early 1820s, creating the rancho system of large agricultural estates; secularized the Spanish missions in 1833; and oversaw the rise of the civilian pueblo. By 1827, as many as 30 homes existed around the central plaza and in 1835, Mexico granted San Diego official pueblo (town) status. At this time the town had a population of nearly 500 residents, later reaching a peak of roughly 600. By 1835 the presidio, once the center of life in Spanish San Diego, had been abandoned and lay in ruins. Mission San Diego de Alcalá fared little better. The town and the ship landing area at La Playa were now the centers of activity in Mexican San Diego. However, the new Pueblo of San Diego did not prosper as did some other California towns during the Mexican Period.

The secularization in San Diego County triggered increased Native American hostilities against the Californios during the late 1830s. The attacks on outlying ranchos, along with unstable political and economic factors helped San Diego's population decline to around 150 permanent residents by 1840. San Diego's official Pueblo status was removed by 1838 and it was made a subprefecture of the Los Angeles Pueblo. When the Americans took over after 1846, the situation had stabilized somewhat, and the population had increased to roughly 350 non-Native American residents. The Native American population continued to decline, as Mexican occupation brought about continued displacement and acculturation of Native American populations.

The American Period began in 1846 when United States military forces occupied San Diego and this period continues today. When United States military forces occupied San Diego in July 1846, the town's residents split on their course of action. Many of the town's leaders sided with the Americans, while other prominent families opposed the United States invasion. In December 1846, a group of Californios under Andres Pico engaged United States Army forces under General Stephen Kearney at the Battle of San Pasqual and inflicted many casualties. However, the Californio resistance was defeated in two small battles near Los Angeles and effectively ended by January 1847. The Americans assumed formal control with the Treaty of Guadalupe-Hidalgo in 1848 and introduced Anglo culture and society, American political institutions and especially American entrepreneurial commerce. In 1850, the Americanization of San Diego began to develop rapidly.

On February 18, 1850, the California State Legislature formally organized San Diego County. The first elections were held at San Diego and La Playa on April 1, 1850, for county officers. San Diego grew slowly during the next decade. San Diegans attempted to develop the town's interests through a transcontinental railroad plan and the development of a new town closer to the bay. The failure of these plans, added to a severe drought which crippled ranching and the onset of the Civil War, left San Diego as a remote frontier town. The troubles led to an actual drop in the town's population from 650 in 1850 to 539 in 1860. Not until land speculator and developer Alonzo Horton arrived in 1867 did San Diego begin to develop fully into an active American town.

Alonzo Horton's development of a New San Diego (modern downtown) in 1867 began to swing the community focus away from Old Town and began the urbanization of San Diego. Expansion of trade brought an increase in the availability of building materials. Wood buildings gradually replaced adobe structures. Some of the earliest buildings to be erected in the American Period were "pre-fab" houses that were built on the east coast of the United States and shipped in sections around Cape Horn and reassembled in San Diego. Development spread from downtown based on a variety of factors, including the availability of potable water and transportation corridors. Factors such as views and access to public facilities affected land values, which in turn affected the character of neighborhoods that developed. During the Victorian Era of the late 1800s and early 1900s, the areas of Golden Hill, Uptown, Banker's Hill and Sherman Heights were developed. Examples of the Victorian Era architectural styles remain in these communities, as well as in Little Italy, which developed at the same time. At the time downtown was being built, there began to be summer cottage/retreat development in what are now the Beach communities and La Jolla area. The early structures in these areas were not of substantial construction; they were primarily for temporary vacation housing.

The historic context of the current project area has been thoroughly discussed in the Golden Hill Community Plan (2016). The information provided below has been cited directly[1] from this previous study.

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[1] Accordingly, citations within this section are secondary references.

Prior to the completion of the California Southern Railroad in 1885, development of the Golden Hill area consisted largely of *rancherias*. Though subdivided, little construction had taken place until the population boom following the completion of the railroad. In 1887, developers Daniel Schuyler and Erastus Bartlett campaigned to officially name the neighborhood “Golden Hill”. By 1895, many of San Diego’s prominent citizens constructed homes within Golden Hill, many with Victorian principles. The area appealed primarily to the civic elite, as well as middle class merchants and professionals.

In 1906, the Bartlett Estate Company financed the construction of and electric streetcar, better connecting the quasi-rural community of Golden Hill to the City’s established districts. This was a catalyst for further residential development of the area. The preparations for and commencement of the Panama California Exposition further encouraged the growth of the adjacent area. By the 1920, only a limited number of vacant parcels remained in the northeastern section of Golden Hill, the majority being single-family homes and a few small-scale apartment buildings.

The Great Depression stunted the development of Golden Hill and the community began to physically decline, evidenced by poor maintenance, physical distress, and vandalism. The influx of workers required to support the Second World War industry prompted the City Council to encourage density throughout the City, including Golden Hill. Moderate- and large-scale apartment complexes became prevalent. The demographic of Golden Hill shifted to include a greater number of working class people. Absentee landlords conducted little maintenance to the neighborhood’s aging structures and the condition of the community’s physical appearance declined.

2.3 South Coastal Information Center Records Search

An examination of existing maps, records, and reports was conducted by Dudek to determine if the Project could potentially impact previously recorded cultural resources. Dudek conducted a records search on July 26, 2018 of data obtained from the South Coastal Information Center (SCIC) at San Diego State University. The search encompassed the APE and a 1-mile buffer around the APE. The purpose of the records search is to identify any previously recorded resources that may be located in or adjacent to the project area and to identify previous studies in the project vicinity. In addition to a review of previously prepared site records and reports, the records search also reviewed historical maps of the project area, ethnographies, the NRHP, the CRHR, the California Historic Property Data File, and the lists of California State Historical Landmarks, California Points of Historical Interest, and Archaeological Determinations of Eligibility.

The records search identified 410 cultural resources within one mile of the APE, but none of these resources are located within the APE (Confidential Appendix B). The nearest resource, P-37-036067, consists of a single-family historic residence located 150 feet west of the Project on an adjacent street. The records search also identified 167 previous archaeological studies that have been conducted within one mile of the APE. Of the 167 studies, five studies cover portions of the APE (Confidential Appendix B).

2.4 Historic Aerial Photograph Analysis

In addition to the SCIC records search, Dudek conducted an on-line review of historic aerial images of the Project APE and general vicinity, to help determine the possible development and land use of the Project APE in the past. The historic aerial imagery available from the website HistoricAerials.com by the Nationwide Environmental Title Research, LLC, demonstrates that no structures were ever constructed within the Project APE (NETR 2018). An aerial photograph from 1953 shows that the APE was unaltered, though the surrounding area had several residences and dirt roads adjacent to the APE. By 1964, construction of CA 94 had been completed and the area immediately south of the APE had been excavated, likely causing the southern sloping terrain of the APE. Aerial photographs from 1966, 1972, 1981, 1989, 1994, 1996, 2002, 2003, 2005, 2009, 2010, 2012, 2014, 2017, and 2018 show that the APE had been subject to varying levels of grading or vegetation removal.

2.5 Geotechnical Analysis

In support of the Project, a geotechnical investigation was conducted for the Project APE (Nova 2018). The investigation consisted of an examination of the Project area's surface and seven exploratory trenches. The exploratory trenches revealed that two stratigraphic units are present within the Project area. Unit 1 consists of a thin artificial fill consisting primarily of sandy mixed soils of a medium dense consistency. This stratum reached depths of 2 to 4.5 feet. Unit 2 consists of silty and sandy soils and sandstones of the San Diego Formation and is located immediately under Unit 1. It is impossible that any cultural resources are present within the sandstone and unlikely that undisturbed cultural deposits are located within the undocumented fill.

2.6 NAHC Sacred Lands File Search

A search of the NAHC Sacred Lands File was requested for the Project APE on July 24, 2018 (Appendix C). A search of this type requires NAHC staff to review their list for the presence of Native American sites, which are organized spatially based on a Public Land Survey System section grid (measuring one square mile). The NAHC responded on July 25, 2018, indicating that Native American cultural sites are present and urged that Dudek contact the Kumeyaay

Cultural Repatriation. Dudek immediately contacted Clint Linton, Director of Cultural Resources for Kumeyaay Cultural Repatriation. Mr. Linton indicated that he was not aware of any cultural sites on the surface of the Project APE, but suggested that archaeological and Tribal monitoring would ensure that any buried resources would be identified. Additionally, the NAHC response letter included a list of Native American group representatives whom should be contacted for information about these sites.

Outreach letters were mailed on July 29, 2018 to all Native American group representatives included on the NAHC contact list (Appendix C). These letters attempt to solicit additional information relating to cultural resources that could be affected by the Project. Native American representatives were requested to define a general area where known resources intersect the Project APE. This will help guide communications with tribal groups and representatives that maintain specific traditional associations with the Project APE. To date, there have been three responses to these outreach letters. In a response letter dated August 10, 2018, Ray Teran of Viejas Band of Kumeyaay Indians, stated that the project area has cultural significance to Viejas. He did not provide any information concerning the whereabouts of any cultural resources but did request that a Kumeyaay Cultural Monitor be present for any ground disturbing activities. Chairman Ralph Goff of the Campo Band of Mission Indians responded on August 14, 2018 and stated that the project area has a rich history for the Kumeyaay people. Campo Band of Mission Indians request a consultation meeting to discuss the project as it concerns Kumeyaay cultural resources. On August 17, 2018, Dudek archaeologist Matthew DeCarlo responded to both the email address and telephone number provided in the response letter to explain that formal AB-52 consultation would be handled by the lead agency. No further response from Campo Band has been received. The third response to the outreach letters was received on August 30, 2018 from Destiny Colocho of the Rincon Band of Luiseno Indians. The letter stated that the project area is not within the Luiseno Aboriginal Territory and they deferred to tribes whose ancestrial lands are in closer proximity to the project area. Any future responses to these outreach letters will be added to later renditions of this report.

Under CEQA, the lead agency is required to perform formal government-to-government consultation with Native American Tribes under AB 52.

3 METHODS

3.1 Survey

The survey of the Project APE was conducted on July 27, 2018. The APE was surveyed using a combination of north/south transects at 10-meter intervals. The terrain was largely flat so the survey team was able to survey the entire APE.

An iPad Air with georeferenced project maps and GPS capabilities was used to aid surveying and site recordation. Field work was conducted by Dudek archaeologist Matthew DeCarlo. Nick Ruiz of Red Tail Monitoring and Research Inc. participated in the survey as the Native American monitor.

Documentation of cultural resources would have complied with the Office of Historic Preservation and Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-44740) and the California Office of Historic Preservation Planning Bulletin Number 4(a). All sites identified during this inventory would have been recorded on California Department of Parks and Recreation Form DPR 523 (Series 1/95), using the Instructions for Recording Cultural Resources (Office of Historic Preservation 1995).

The APE shows signs of having been previously graded but vegetation has reestablished in the area. Visibility throughout the Project APE varied greatly. Vegetation in some areas was very sparse, providing good ground visibility. In other areas, ground visibility was obscured by vegetation and by dumping activities that completely obscures the ground surface in some areas.

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4 RESULTS

4.1 Survey Results

A Dudek archaeologist and a Red Tail Native American monitor conducted a pedestrian survey of the Project APE on July 27, 2018. The Project APE is relatively flat at it northern extent but slopes slightly to the east and south. Though it is largely undeveloped, the APE shows signs of previous grading and land alterations. The APE may have been used as a laydown yard or similar facility during the construction of the surrounding residential developments or during the construction of CA-94, resulting in these land alterations. The APE has been subject to extensive dumping activities with detritus including construction waste and household refuse. There is an extensive pile of chipped trees that completely obscures ground visibility in the northern portion of the APE. The pedestrian survey did not identify any cultural or built-environment resources within the Project APE, however ground visibility was poor.

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5 MANAGEMENT CONSIDERATIONS

5.1 Resource Management

This cultural resource inventory was conducted to determine the potential of the Project to impact cultural resources located within its APE. A records search of the SCIC did not identify any cultural resources within the APE. Review of historic aerial photographs demonstrate that the APE has never been fully developed but it does suggest repeated events of partial grading and vegetation removal. A geotechnical investigation conducted for the Project (Nova 2018) revealed that the Project's subsurface consists of two stratum: a mixed sandy fill and an underlying sandstone of the San Diego Formation. During the pedestrian survey, a Dudek archaeologist observed evidence of earth moving and was unable to identify any cultural resources within the APE.

Following a search of the Sacred Lands File, the NAHC indicated the presence of Native American sites. The NAHC did not describe the Native American site nor indicate their locations in relationship to the APE. The NAHC did suggest that Dudek contact the Kumeyaay Cultural Repatriation. Dudek contacted Clint Linton, Director of Cultural Resources for Kumeyaay Cultural Repatriation. Mr. Linton indicated that he was not aware of any cultural sites on the surface of the Project APE, but suggested that archaeological and Tribal monitoring would ensure that any buried resources would be identified.

Due to the negative SCIC records search, negative pedestrian survey, a geotechnical investigation that revealed low cultural sensitivity, and aerial photographs that show continued disturbance of the Project APE, Dudek does not recommend cultural monitoring during project construction.

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7 CERTIFICATION

Preparer: Micah Hale, PhD, RPA	**Title:** Archaeologist
Signature: Micah J. Hale	**Date:** January 4, 2019

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APPENDIX A

Project Personnel Qualification

Matthew DeCarlo

Archaeologist

Matthew DeCarlo is an archaeologist with more than 11 years' professional experience leading archaeological surveys and excavations, performing lithic and faunal analyses, constructing and analyzing geographic information system (GIS) data, producing cultural resource management reports, and consulting with clients, agencies, contractors, and Native American representatives.

EDUCATION

California State University, Bakersfield
M.A., Anthropology, pending
University of California, Irvine
B.A., Anthropology, 2006

PROFESSIONAL AFFILIATIONS

San Diego Archaeological Society
Society for American Archaeology
Society for California Archaeology

As acting district archaeologist for the U.S. Forest Service (USFS), Mr. DeCarlo worked intensively with federal regulations and Native American tribal representatives and from this experience, has developed the ability to work collaboratively with consulting groups on multi-phase projects. Within the private sector, Mr. DeCarlo has managed the cultural resource requirements for large-scale utility projects which required extensive cooperation with utility managers, construction efforts, and Native American tribal representatives.

Project Experience

Municipal Waterways Maintenance Plan, City of San Diego, San Diego County, California. Served as cultural resources project lead for the proposed Municipal Waterways Maintenance Plan for the City of San Diego. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Conducted site visits of project facilities while coordinating with a Native American representatives. Produced a report summarizing the finding of the cultural resources inventory including a cultural resources impact analysis, projected resource sensitivities, resource management recommendations, and mitigation measures. Developed a matrix indicating maintenance activities and facility locations that are exempt from further cultural review. (2017 to ongoing)

City of San Diego Underground Utility Program, City of San Diego, San Diego County, California. Served as manager for the cultural resource monitoring of a citywide utility underground program in the City of San Diego. Responsibilities included consultation with program representatives, scheduling and management of field technicians, oversite of daily field logs, recordation of identified cultural resources, and constructing a summary document at the completion of each project phase. (2017 to ongoing)

All-American Canal Surface Waters Seepage Recovery Project, City of El Centro, Imperial County, California. Served as cultural resources project lead for a proposed water recovery project outside the City of El Centro. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including a cultural resources impact analysis comparing alternate project routes, resource management recommendations, and mitigation measures. (2017 to ongoing)

East Highline Reservoir Project, City of El Centro, Imperial County, California. Served as cultural resources project lead for a proposed main canal offline storage reservoir project outside the City of El Centro. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including an impact analysis of a National Register of Historic Places listed resource, resource management recommendations, and mitigation measures. (2017 to ongoing)

Oceanside Campus Facilities Master Plan Project, City of Oceanside, San Diego County, California. Served as archaeological resources project lead for a proposed renovation and redevelopment of the Oceanside Campus within the MiraCosta Community College District. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Conducted a pedestrian survey of the project area and coordination with a Native American monitor. Aided the District with AB 52 consultation including hosting project site visits with Native American representatives. Produced a report summarizing the finding of the cultural resources inventory and resource management recommendations including mitigation measures. (2017 to 2018)

North City Project, City of San Diego, San Diego County, California. Served as cultural resources project lead for the proposed construction of a water purification program in the City of San Diego. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Aided the City with AB-52 tribal consultation and conducted a pedestrian survey of the project area while coordinating with a Native American monitors. Produced a report summarizing the finding of the cultural resources inventory including a cultural resources impact analysis comparing alternate project routes, resource management recommendations, and mitigation measures. (2016 to 2018)

Morena Pipelines Project, City of San Diego, San Diego County, California. Served as cultural resources project lead for a proposed utility pipeline installation project in the City of San Diego. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area in coordination with a Native American monitor. Produced a report summarizing the finding of the cultural resources inventory and resource management recommendations including mitigation measures. (2018)

1237 West 7th Street Project, City of Los Angeles, Los Angeles County, California. Served as lead analyst and report author for a tribal cultural resources assessment for a proposed urban development project in the City of Los Angeles. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Produced a report indicating the presence and the probability of encountering subsurface tribal cultural resources during construction. (2018)

1375 North Saint Andrews Place Project, City of Los Angeles, Los Angeles County, California. Served as lead analyst and report author for a tribal cultural resources assessment for a proposed urban development project in the City of Los Angeles. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Produced a report indicating the presence and the probability of encountering subsurface tribal cultural resources during construction. (2018)

Fig Project, City of Los Angeles, Los Angeles County, California. Served as lead analyst and report author for a tribal cultural resources assessment for a proposed urban development project in the City of Los Angeles. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Produced a report indicating the presence and the probability of encountering subsurface tribal cultural resources during construction. (2018)

Adams Solar Farm Project, City of Lind, Adams County, Washington. Developed an inadvertent discovery plan for utilization during the development of a solar farm. (2018)

Kaiser Permanente Irwindale Medical Office Building Project, City of Irwindale, Los Angeles County, California. Managed the cultural resource monitoring of the construction of a Kaiser Permanente medical building in the City of Irwindale. Responsibilities included consultation with program representatives, scheduling and management of field technicians, consultation with Native American representatives, oversite of daily field logs, recordation of identified cultural resources, and submitting a summary document at the completion of the project. (2017)

Fairway Business Park Project, Lake Elsinore, Riverside County, California. Managed the cultural resource monitoring of the construction of a business park in the City of Lake Elsinore. Responsibilities included consultation with program representatives, scheduling and management of field technicians, consultation with Native American representatives, oversite of daily field logs, recordation of identified cultural resources, and constructing a summary document at the completion of the project. (2017)

21st Street Ditch Project, City of Del Mar, San Diego County, California. Aided the City of Del Mar with AB-52 compliance for a proposed wastewater improvement project in the City of Del Mar. Drafted Responsibilities included drafting an AB-52 letter on the City's behalf requesting Native American representatives consultation. (2017)

MedVic/MccVic Tower Repair Project, near the City of Yermo, San Bernardino County, California. Served as cultural resources project lead for a proposed electrical transmission tower repair project outside the City of Yermo. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including an impact analysis of a National Register of Historic Places listed resource, resource management recommendations, and avoidance measures. (2017)

Kaiser Permanente Murrieta Valley Medical Center Project, City of Murrieta, Riverside County, California. Managed the cultural resource monitoring of the construction of a Kaiser Permanente medical center in the City of Murrieta. Responsibilities included consultation with program representatives, scheduling and management of field technicians, consultation with Native American representatives, oversite of daily field logs, recordation of identified cultural resources, and submission of a summary document at the completion of the project. (2016 to 2017)

Kettner Lofts Project, City of San Diego, San Diego County, California. Managed the preliminary cultural resources testing and the construction monitoring of the Kettner Lofts housing development in the City of San Diego. Responsibilities included directing construction personnel in the excavation of testing trenches, documentation of subsurface findings, and consulting with program representatives to establish an appropriate monitoring plan. Management of construction monitoring included scheduling and management of field technicians, consultation with Native American representatives, oversite of daily field logs, recordation of identified cultural resources, and submission of a summary document at the completion of the project. (2016 to 2017)

Rincon Del Diablo Sewer Master Plan Project, San Diego County, California. Served as cultural resources project lead for the proposed sewer master plan near the City of Escondido. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including a cultural resources impact analysis comparing alternate project routes and resource management recommendations. (2016)

Terra Vista Development Project, Victorville, San Bernardino County, California. Served as cultural resources project lead for a proposed residential development in Rancho Cucamonga. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including resource management recommendations. (2016)

Commercial Development Project, Morongo Valley, San Bernardino County, California. Served as cultural resources project lead for a proposed commercial development on Twenty-nine Palms Highway, Morongo Valley. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including resource management recommendations. (2016)

South Amargosa Plaza Project, Victorville, San Bernardino County, California. Served as cultural resources project lead for a proposed commercial development in Victorville. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including resource management recommendations. (2016)

RCP Walker Trails Project, City of Santee, San Diego County, California. Served as cultural resources project lead for the proposed construction of a residential community in the City of Santee. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Conducted a pedestrian survey of the project area in coordination with a Native American Monitor. Produced a report summarizing the finding of the cultural resources inventory including a cultural resource impact analysis and management recommendations. (2016)

1836 Columbia Street Project, City of San Diego, San Diego County, California. Served as cultural resources project lead for a proposed urban development project in the City of San Diego. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area and coordination with a Native American monitor. Produced a report summarizing the finding of the cultural resources inventory and mitigation recommendations. (2016)

West of Devers Upgrade Project (WODUP), Southern California Edison (SCE), Riverside and San Bernardino Counties, California. Served as project manager for a cultural resource impact assessment for a dual transmission line upgrade spanning from North Palm Springs to San Bernardino, California. Tasks included implementing archaeological surveys and excavations, producing a cultural resource evaluation report, and participation in construction site visits with SCE staff and construction specialists to resolve construction/resource conflicts. (2014 to 2016)

Devers to Palo Verde 2 (DPV2) Transmission Line Project, SCE, Riverside County, California. Served as field director for the construction of a 500 kV transmission line spanning from Blythe to Romoland, California. Tasks included conducting archaeological surveys and excavations; managing construction monitoring teams; producing cultural resource records and reports; and consulting with SCE, construction, and Native American representatives. The final cultural resource report has been submitted and is awaiting approval. (2010 to 2015)

Mountain Top Healthy Trees Project, USFS, Mount Pinos Ranger District, Santa Barbara County, California. Served as the acting district archaeologist for a proposed tree thinning project. To ensure that no previously recorded resources were impacted during the tree mastication, Mr. DeCarlo conducted a records search, delineated mastication boundaries, and monitored the mastication activities.

ARRA Wilderness Trails Restoration Project, USFS, Mount Pinos Ranger District, Santa Barbara and Ventura Counties, California. Served as the acting district archaeologist. Fulfilled cultural resource requirements for National Environmental Policy Act (NEPA) compliance to ensure the Mount Pinos Ranger District of the Los Padres Forest received American Recovery and Reinvestment Act (ARRA) federal funds to conduct trail work within wilderness areas. This required consultation with USFS supervisors to construct a viable timetable, completion of a records search, intensive survey of trails, and collaboration with trail maintenance crew chiefs to protect threatened cultural resources.

Cultural Resources Management for the Day Fire Reforestation Project, USFS, Mount Pinos Ranger District, Ventura County, California. Served as the acting district archaeologist for the reforestation of areas burned during the 2007 Day Wildfire. Prior to the planting of pine tree saplings, Mr. DeCarlo performed a records search, conducted an archaeological inventory, and evaluated the post-fire condition of previously identified archaeological sites. A survey report and archaeological site records were submitted to the Los Padres National Forest Headquarters and tree saplings were planted in the spring of 2010.

Sierra Madre Ridge Archaeological Survey and Rock Art Recordation Project, USFS, Mount Pinos Ranger District, Santa Barbara County, California. Served as the field chief for the Sierra Madre Ridge Project, a Section 110 of the National Historic Preservation Act (NHPA) project consisting of three one-week expeditions to update site records and survey previously unrecorded portions of a known archaeological district. Tasks included leading and training volunteer teams in survey and site recordation methods, updating previously recorded archaeological sites, identification of new sites, surveying previously unrecorded land, and managing fuels near significant sites to prevent possible fire damage. A survey report, site records, and GIS mapping were completed and submitted to the Los Padres National Forest Headquarters.

NEPA Compliance for the New Chuchupate Ranger Station, USFS, Mount Pinos Ranger District, Ventura County, California. Served as the acting district archaeologist. To ensure NEPA compliance and ensure acquisition of ARRA federal funds, conducted a records search, collaborated with the Forest Tribal Liaison, updated previously recorded sites, mapped the existing Chuchupate Ranger Station, conducted an intensive survey, contracted an architectural historian, and submitted a report to the Los Padres National Forest Headquarters.

Sapaski (Painted Rock) Tribal Protection Meeting, USFS, Mount Pinos Ranger District, Ventura County, California. Served as the acting district archaeologist for the Sapaski Tribal Protection Meeting, a collaborative effort with tribal representatives and USFS supervisors to protect a significant rock art resource. Conducted a records search and suggested possible protection strategies to tribal representatives.

Archaeological Investigation for the Yellow Jacket Fire Project, USFS, Mount Pinos Ranger District, Ventura County, California. Served as the acting district archaeologist for the archaeological investigation after the Yellow Jacket Fire. Conducted a records search to identify any previously identified cultural resource within burned or staging areas, appraised sites impacted by both fire and fire-fighting measures, consulted with fire personnel to determine possible impacts, and submitted a report to the Los Padres National Forest Headquarters.

Micah Hale, PhD, RPA

Senior Archaeologist

Micah Hale is Dudek's cultural resources practice manager and lead principal investigator, with technical expertise as a lithic and groundstone analyst, invertebrate analyst, and in ground penetrating radar. Over the course of his 18 year career, Dr. Hale has served as a principal investigator in the public and private sector for all levels of archaeological investigation, as a public outreach coordinator and as an assistant professor at the University of California, Davis (U.C. Davis). As Dudek's cultural resources practice manager, he currently functions as a principal investigator in project oversight including proposals, research designs, fieldwork, artifact analysis, and report authorship.

Dr. Hale's experience is both academic and professional spanning California, Arizona, Nevada, and Oregon, including work for Naval Facilities Engineering Command (NAVFAC) Southwest, California Department of Transportation (Caltrans), Western Area Power Administration, Bureau of Land Management (BLM), U.S. Army Corps of Engineers (ACOE), U.S. Fish and Wildlife Service (USFWS), California State Parks, various city and county agencies, and directly for Native American groups. Dr. Hale has supervised numerous large-scale surveys, test excavations, data recovery programs, and geoarchaeological investigations, served as a third party review consultant, and an expert witness in legal proceedings. He has authored research designs, management and treatment plans, proposals, preliminary and final reports, and technical analyses. Dr. Hale has integrated his personal research interests into projects and participated in professional symposia at local and national venues, including the Society for American Archaeology and the Society for California Archaeology. Additionally, he has conducted academic research in the Polar Arctic, Greenland. Dr. Hale's current focus is on hunter-gatherer archaeology of California and the Great Basin, applying theoretical premises of cultural evolution and human behavioral ecology.

EDUCATION

University of California, Davis
PhD, Anthropology, 2009

California State University, Sacramento
MA, Anthropology, 2001

University of California, Davis
BS, Anthropology, 1996

CERTIFICATIONS

Register of Professional Archaeologists (RPA), 2001

PROFESSIONAL AFFILIATIONS

Society for American Archaeology

Society for California Archaeology

Antelope Valley Archaeological Society

San Diego Archaeological Society

Project Experience

Development

Phase II Archaeological Data Recovery for the Newland Homes Sierra Project, San Diego County, California, 2013-present. As project manager and principal investigator, supervising data recovery investigations at two significant prehistoric archaeological sites and historic archival research of a homestead in support of the Newland Sierra Environmental Impact Report (EIR).

Phase I Archaeological Inventory and Phase II Archaeological Evaluation for the Yokohl Ranch Project, Tulare County, California, 2012-2013. As project manager and principal investigator, supervised completion of 12,000 acre survey and archaeological evaluation of 85 prehistoric and historical archaeological sites in support of the Yokohl Ranch EIR.

Phase I Inventory and Phase II Cultural Resources Evaluation for the Star Ranch Project, RBF Consulting, San Diego County, California, 2011. As project manager and principal investigator, supervised CEQA inventory and evaluation for private development.

Phase II Archaeological Evaluation of Two Prehistoric Sites, Torrey Pines Glider Port, San Diego County, California, 2012. As project manager and principal investigator, supervised CEQA evaluation of two prehistoric archaeological sites for the Torrey Pines City Park General Development Plan.

Data Recovery of One Prehistoric Site for the Rhodes Property, Sea Breeze Properties, San Diego County, California. As project manager and principal investigator, supervised CEQA compliant data recovery of a large prehistoric site for a residential development.

Archaeological Survey of the Paramount Mine Exploratory Drilling Project, Essex Environmental, Mono County, Nevada, 2006. As principal investigator and field director, conducted archaeological survey for mining exploration and prepared the technical report.

Phase I Inventory of 1,544 Acres and Phase II Evaluation of Archaeological Sites along the Western and Northwestern Boundaries, Edwards Air Force Base, Kern County, California, 2005. As field director, supervised a Phase I inventory of 1,544 acres. Recorded 30 new archaeological sites, more than a dozen "sub-modern" refuse dumps, and a variety of isolate finds. Notable sites include several early Holocene lithic scatters (Lake Mojave-, Silver Lake-, and Pinto-age deposits), a rhyolite lithic quarry, and a complex of historic dumps associated with homesteading activities around Lone Butte.

Pankey Ranch Testing, Pardee Homes, Northern San Diego County, California, 2004. As field director, supervised excavation of shovel test pits to delineate the boundaries of site CA-SDI-682, the prehistoric village of Tom-Kav. Managed field personnel, conducted excavation, and wrote portions of technical report.

Oceanside Hilton EIR, Dudek Associates, Oceanside, San Diego County, California, 2004. As principal investigator and field director, conducted a survey of the proposed Hilton Hotel at the eastern end of Buena Vista Lagoon in Carlsbad and prepared portions of technical report for an EIR.

Archaeological Survey of the La Mesa Meadows Residential Development Project, Helix Environmental, San Diego County, California, 2005. As principal investigator, conducted a survey of a proposed residential development in San Diego County.

Data Recovery of Locus O, Star Canyon Development, Agua Caliente Band of Cahuilla Indians, Palm Springs, Riverside County, California, 2004. As field director, supervised field crews for data recovery mitigation of an archaeological deposit and human remains near Tahquitz Canyon. Coordinated with Native American representatives and prepared portions of the technical report.

Linda Vista Survey, City of San Marcos Planning Department, San Diego County, California, 2003. As field director, conducted a Phase I cultural resource inventory of the proposed road realignment in San Marcos. Prepared technical reports and made recommendations for additional work to be done within the project area.

Archaeological Monitoring for Williams Communications Fiber-Optic Line, Jones and Stokes Associates, San Luis Obispo and Bakersfield, Kern and San Luis Obispo Counties, California, 2001. As resource monitor/Native American coordinator, conducted archaeological monitoring for a fiber-optic cable installation project that spanned 180 miles from San Luis Obispo to Bakersfield. Identified and protected archaeological resources in the project area in compliance with state and federal regulations. Managed Native American monitors and coordinated daily work with construction and environmental staff to facilitate project completion.

AT&T Cable Removal Project, Jones and Stokes Associates, Taft to Los Angeles, Kern and Los Angeles Counties, California, 1998. As field archaeologist, conducted a survey to determine archaeological impact by the removal of a lead-lined subsurface cable.

Subsurface Survey of a Proposed Bicycle Path Along the Columbia River Slough in Northwest Portland, City of Portland, Multnomah County, Oregon, 2000. As field archaeologist, conducted auger testing in a variable north-to-south transect at 30-meter intervals, and unit mapping.

Phase II Test Excavations, AT&T, Portland, Multnomah County, Oregon, and Vancouver, Clark County, Washington, 1999. This project determined the presence and condition of any cultural resources in the project areas that were situated on the northern and southern sides of the Columbia River in Washington and Oregon.

Education

Data Recovery for the Palomar North and Meadowood Projects, Palomar College, San Diego County, California, 2012. As principal investigator, supervised Section 106 and CEQA-compliant data recovery of the ethnohistoric village of Tom-Kav. Expert witness for litigation of archaeological work for the client.

Data Recovery Excavations in Advance of Geotechnical Coring at W-12, University of California San Diego (UCSD), San Diego County, California, 2009. As project manager and principal investigator, supervised data recovery excavations in a midden dated as early as 9,600 years before present.

Archaeological Test Excavations at Selected Sites on Vandenberg Air Force Base, University of California, Davis, Lompoc, Santa Barbara County, California, 2008. As principal investigator and field director, supervised and instructed 21 students for the 2008 U.C. Davis Field School.

Archaeological Survey and Excavations in the Polar Arctic, University of California Davis, Northwest Greenland, 2006. As researcher, conducted a project for the National Science Foundation, National Geographic, and the Inglefieldland Polar Archaeology Expedition; U.C. Davis.

Energy

Phase II Evaluation of 19 Archaeological Sites for Soitec's Tierra Del Sol Solar Project, San Diego County, California, 2012-2013. As principal investigator, oversaw and implemented significance evaluations, including fieldwork and documentation, under CEQA and San Diego County guidelines within the development footprint.

Phase II Evaluation of 42 Archaeological Sites for Soitec's Rugged Solar Project, San Diego County, California, 2012-2013. As principal investigator, oversaw and implemented significance evaluations, including fieldwork and documentation, under CEQA and San Diego County guidelines within the development footprint.

Class III Cultural Resources Inventory for the Level 3 Fiber Optic Installation Project, Fort Irwin Army Reserve and BLM, San Bernardino County, California, 2012-2013. As Project manager and co-principal investigator, oversaw and implemented cultural resource inventory of fiber optic corridor and recordation and evaluation of contributing elements to the NRHP-eligible LADWP transmission line corridor.

Class III Cultural Resources Inventory for Soitec's Fort Irwin Solar Project, San Bernardino County, California, 2013. As project manager and co-principal investigator, oversaw and implemented cultural resources inventory.

Third Party Compliance Monitoring for the Ocotillo Wind Energy Farm, Ocotillo, Imperial County, California, 2012-2013. As principal investigator, oversaw and implemented compliance assistance to the BLM to ensure adherence to mitigation measures and proper treatment of cultural resources.

Third Party Compliance Monitoring for the Tule Wind Project, San Diego County, California, 2012-2013. As principal investigator, oversaw and implemented compliance assistance to the Bureau of Land Management to ensure adherence to mitigation measures and proper treatment of cultural resources.

Third Party Compliance Monitoring for the East County Substation Project, San Diego County, California, 2012-2013. As principal investigator, oversaw and implemented compliance assistance to the BLM and California Public Utilities Commission (CPUC) to ensure adherence to mitigation measures and proper treatment of cultural resources.

Third Party Compliance Monitoring for the Rio Mesa Solar Project, Riverside County, California, 2012-2013. As principal investigator, oversaw and implemented compliance assistance to the BLM to ensure adherence to mitigation measures and proper treatment of cultural resources.

Phase II Archaeological Testing of One Historic Site for the Cool Valley Solar Project, RBF Consulting, San Diego County, California. As project manager, supervised implementation of archaeological testing of a historic airfield near Campo.

Phase II Archaeological Testing of Four Prehistoric Sites for the Gildred Solar Project, RBF Consulting, San Diego County, California. As project manager, supervised implementation of archaeological testing of four small prehistoric sites along the ancient Lake Cahuilla shoreline.

Phase II Archaeological Testing of One Prehistoric Site for the Borrego A and B Solar Projects, RBF Consulting, San Diego County, California. As project manager, supervised implementation of archaeological testing of a large prehistoric habitation site in the Imperial Valley.

Phase I Cultural Resources Inventories for the Sol Orchard and Sol Focus Solar Projects, RBF Consulting, San Diego County, California. As project manager, supervised implementation of Phase I CEQA inventories for more than 22 solar projects.

Class II Survey of 4,700 Acres for the Silurian Wind Project, Iberdrola Renewables, San Bernardino County, California, 2011. As project manager and principal investigator, supervised Section 106 inventory of proposed renewable energy project.

Class III and Class II Cultural Resources Inventory for the Tule Wind Alternative Energy Project, HDR Engineering for Iberdrola Renewables, San Diego County, California, 2010. As project manager and principal investigator, supervised inventory of 6,000 acres and recordation of nearly 200 archaeological sites, and assisted the BLM in preparation of a programmatic agreement between Iberdrola and the California State Historic Preservation Office (SHPO).

Monitoring of the Installation of Meteorological (MET) Towers for the Tule Wind Project, HDR Engineering, San Diego County, California, 2010. As project manager and principal investigator, supervised archaeological and Native American monitors during MET tower installation in the Tule Wind project area.

Jamul Substation 6, San Diego Gas & Electric Company (SDG&E), Jamul, San Diego County, California, 2004. As field director, conducted an intensive pedestrian survey of 18 acres in Jamul for a proposed substation construction project. Identified and recorded two archaeological sites within the project area. Prepared the technical report. Coordinated with paleontology subcontractor and incorporated paleontology report into ASM's archaeology technical report.

Path 15 Transmission Line Corridor, Steigers Corporation, San Joaquin Valley, Fresno and Merced Counties, California, 2004. As field director, supervised survey of over 87 miles of 400-foot transmission line corridor and over 46 miles of access roads in Merced and Fresno Counties. Supervised field crew, documented sites, coordinated with Native American representatives, coordinated access to survey areas, and prepared portions of technical report.

Carmel Valley Substation Survey, SDG&E, Carmel Valley, San Diego County, California, 2003. As field director, conducted a Phase I cultural resource inventory of a proposed power substation.

Federal

Ground-Penetrating Radar Survey and Class III Inventory for the Friendship Circle Project, Department of Homeland Security, Gulf South Research Corporation, San Diego County, California. As project manager and principal investigator, supervised and implemented a ground-penetrating radar survey and surface survey for the Friendship Circle project at Border Fields State Park, San Diego.

Military

Phase II Evaluation of 31 High Complexity Sites on Edwards Air Force Base, CH2MHill/JT3, Kern and Los Angeles Counties, California, 2010. As project manager, oversaw Section 106 test excavations at 31 prehistoric archaeological sites.

Phase II Evaluation of 85 Archaeological Sites on Edwards Air Force Base, CH2MHill/JT3, Kern and Los Angeles Counties, California, 2010. As project manager and principal investigator, supervised Section 106 test excavations at 42 prehistoric and 43 historic archaeological sites.

Western Acquisition Survey, Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, San Bernardino County, California, 2010. As principal investigator, managed the survey of 10,000 acres on land administered by the BLM in Johnson Valley, west of the base. Duties included project management, coordination with BLM Barstow field office and MCAGCC 29 Palms personnel, coordinating and supervising field crews, as well as document preparation.

Management Plan for the Coso Rock Art National Historic Landmark (NHL), Naval Air Weapons Station (NAWS) China Lake, Inyo County, California, 2010. As project manager, supervised and co-authored a management plan for the Coso Rock Art NHL, including arranging and implementing stakeholder meetings and field testing the implementation plan.

Section 110 Intensive Archaeological Survey of the Cole Flat Training Area, NAWS China Lake, Inyo County, California, 2009. As project manager and principal investigator, supervised the survey of 5,400 acres near the Coso Rock Art NHL.

Phase I Survey of Selected Parcels in Five Training Areas, MCAGCC Twentynine Palms, San Bernardino County, California, 2009. As project manager and principal investigator, supervised survey of 4,500 acres in the Blacktop, Lava, Lavic Lake, Sunshine Peak, and Quackenbush training areas.

Phase I Survey of Aerial Maneuver Zones for the 53 AMZ Project, MCAGCC Twentynine Palms, California, 2009. As project manager and principal investigator, supervised survey of 72 Aerial Maneuver Zones. Client Reference: Leslie Glover, MCAGCC 29 Palms, 760.830.5369.

Cultural Resources Inventory and Evaluation for the Skaggs Island BRAC Disposal Archaeological Survey, Naval Communications Station, Sonoma County, California, 2011-2012. As principal investigator, supervised survey of installation and recordation and evaluation of historic civilian and military resources.

Phase I Survey of 8,100 Acres on Edwards Air Force Base, ACOE, Kern County, California, 2008–2009. As principal investigator, supervised survey of 8,100 acres on Edward Air Force Base.

Phase I and II Survey of 2,500 Acres and Evaluation of 50 Sites on Edwards Air Force Base, ACOE, Kern County, California, 2008. As principal investigator, supervised survey of 2,500 acres and evaluation of 50 sites on Edward Air Force Base.

Cultural Resources Inventory and Evaluation for the Concord Inland BRAC Disposal Archaeological Survey, Naval Weapons Station, Seal Beach, Detachment Concord, Contra Costa County, California. As principal investigator, supervised survey of 5,200 acres and recordation and evaluation of historic civilian and military resources, and prehistoric archaeological sites.

Archaeological Evaluation of Eight Prehistoric Sites in the Emerson and Quackenbush Training Areas, ACOE, MCAGCC Twentynine Palms, San Bernardino County, California, 2005. As field director, supervised excavation of eight prehistoric sites on the Marine Corps base in Twentynine Palms, California.

Archaeological Evaluation of 22 Sites on Edwards Air Force Base, ACOE, San Bernardino County, California, 2005. As field director, supervised the National Register evaluation of 22 sites at Edwards Air Force Base.

Naval Base Point Loma Site Recordation, NAVFAC Southwest (SW), Point Loma, San Diego County, California, 2004. As principal investigator and field director, supervised relocation of 33 sites located on Naval Base Point Loma. Reviewed site documentation and re-recorded sites that were improperly documented by past surveys.

Archaeological Testing of 23 Sites in the Las Pulgas Corridor, MCB Camp Pendleton Environmental Security, MCB Camp Pendleton, San Diego County, California, 2004. As field director, supervised field crews for Phase II testing and mechanical coring of 23 sites on Camp Pendleton. Coordinated with coring contractor and base personnel. Documented sites in the field. Supervised field crews and prepared portions of technical report.

Rose-Arizone, Clay, and Photo Drainage, and Road Improvement Surveys, NAVFAC SW, NALF San Clemente Island, Los Angeles County, California, 2004. As field director, supervised archaeological surveys and the placement of protective signing on 750 sites. Coordinated access to the island and supervised one crew member.

Remote Sensing, NAVFAC SW, NALF San Clemente Island, Los Angeles County, California, 2004. As Global Positioning System (GPS) specialist, conducted data collection and image rectification for a remote sensing project in the detection of archaeological sites on the base. Supervised one crew member.

MCB Camp Pendleton Burn Survey, MCB Camp Pendleton Environmental Security, MCB Camp Pendleton, San Diego County, California, 2002. As field director, supervised an archaeological survey of 1,500 acres in the De Luz and Case Springs areas of Camp Pendleton. Managed field crews, documented archaeological sites, prepared site forms and portions of technical report.

Survey of Yuma Stormwater Basin, NAVFAC SW, MCAS Yuma, Yuma County, Arizona, 2002. As field director, supervised survey of stormwater basin along the Marine Corps airfield at MCAS Yuma. Managed field crew and prepared technical report. Client

Archaeological Coring of SDI-811, MCB Camp Pendleton Environmental Security, MCB Camp Pendleton, San Diego County, California, 2002. As field director, supervised first phase of a geologic coring project for a shell midden site along the coast of MCB Camp Pendleton, San Diego County. Coordinated with coring contractor and base personnel. Managed field monitors and field crew.

Archaeological Testing and Survey of the Lemon Tank Area, NAVFAC SW, NALF San Clemente Island, Los Angeles County, California, 2002. Conducted excavations, survey, and site recording.

Evaluation of Four Prehistoric Sites, Jones and Stokes Associates, Camp Roberts National Guard, San Luis Obispo County, California, 1998. As field technician, conducted excavation in order to determine the boundaries of the site for further mitigation.

Evaluation of Nine Prehistoric Sites, Edwards Air Force Base, San Bernardino County, California, 1999. As field archaeologist, evaluated nine sites through excavation to determine overall sensitivity and value of the archaeological remains that characterize the region.

Archaeological Survey and Excavation, ACOE, MCAGCC Twentynine Palms, San Bernardino County, California, 1998. As field archaeologist, participated in nine field rotations averaging 10 days each. Conducted survey of portions of the Marine Corps base to determine the distribution of cultural materials, and subsequently excavate sites based on priority. This area is characterized as high desert with the typically associated flora and fauna and archaeological sites that range in age from Early to Late Holocene.

Resource Management

Archaeological Data Recovery Excavations at Border Fields State Park, California State Parks, Imperial Beach, San Diego County, California, 2005. As field director, supervised excavation of prehistoric sites located within the APE of a fence along the U.S.–Mexico Border in San Diego County. Prepared technical report.

Archaeological Salvage Excavations of Two Ollas in Hellhole Canyon, BLM, San Diego County, California, 2005. As principal investigator, relocated a cache of prehistoric ceramic artifacts uncovered during wildfires in San Diego County. Documented cache and collected artifacts for subsequent reconstruction in the ASM laboratory. Prepared technical report detailing project.

Archaeological Data Recovery Excavations at CA-SDI-16691, Jackson Pendo Development Company, Escondido, San Diego County, California, 2005. As principal investigator, supervised data recovery excavation at a Late Prehistoric site in Escondido, California.

El Cuervo Wetlands Mitigation, City of San Diego Land Development Review Department and Mitigation Monitoring Coordination, Carmel Valley, San Diego County, California, 2004. As co-principal investigator, supervised an archaeological monitoring project in central San Diego County, conducted test excavation of one site identified during monitoring. The site was evaluated as not significant. Prepared portions of technical report and supervised on-site monitor.

Milk Vetch Emergency, Imperial Irrigation District, Imperial County, California, 2002. As archaeological monitor, conducted emergency monitoring along transmission line corridor in Imperial County. Coordinated with IID and construction personnel. Prepared technical report.

Burial Salvage Excavations at the Carp Site, CA-MER-295, California Department of Parks and Recreation, Los Banos, Merced County, California, 1999. As field supervisor, directed excavations at CA-MER-295 in the central San Joaquin Valley in order to salvage cultural remains (including burials) from further destruction by the San Joaquin River.

Archaeological Survey of the Silver Lake Recreation Area, El Dorado Irrigation District, El Dorado County, California, 2006. As principal investigator and field director, supervised an archaeological survey of the Silver Lake Recreation area.

Transportation

Ortega Highway Monitoring, City of San Juan Capistrano, Orange County, California, 2013. As project manager, supervised Dudek's principal investigator to coordinate archaeological, tribal, and paleontological mitigation monitoring associated with the construction of water conveyance facilities and road repairs.

Archaeological Testing and Ground Penetrating Radar Study of the Forester Creek Biological Mitigation Area, Caltrans District 11, Santee, San Diego County, California, 2005. As principal investigator and field director, supervised archaeological testing of a private parcel.

Bridge 230.6 Replacement, North County Transit District, Agua Hedionda, Carlsbad, San Diego County, California, 2004. As principal investigator and field director, managed an archaeological survey of an APE associated with the replacement of and historic railroad bridge. Recorded archaeological sites within APE and prepared portions of technical report.

Little Lake Phase II Testing, Caltrans District 5, Little Lake, Inyo County, California, 2004. As field director, supervised Phase II testing of four sites including the ethnohistoric village of *Pagunda* near the town of Little Lake. Supervised field crews, coordinated fieldwork with Caltrans and subcontractors, and prepared portions of technical report.

Extended Phase I Testing, Caltrans District 05, Little Lake, Inyo County, California, 2003. As field director, supervised fieldwork for extended Phase I testing of one prehistoric site along U.S. Highway 395 in Inyo County. Prepared portions of technical report.

Cartago and Olancha Four-Lane Project Test Excavations, Caltrans District 05, Inyo County, California, 2002. As field director, supervised test excavations of 15 sites for the proposed widening of U.S. Highway 395 near Cartago and Olancha. Supervised all fieldwork and managed a team of 12 field archaeologists. Coordinated selected specialized studies, conducted ground stone analysis, and prepared large portions of the resulting 800+-page report.

Survey of Amtrak Second Mainline Right-of-Way, North County Transit District, Oceanside, San Diego County, California, 2002. As co-field director, managed an archaeological survey of 6.2 miles of North County Transportation District railroad right-of-way near San Onofre, California.

State Route 905 Survey, Caltrans District 11, San Diego County, California, 2002. As co-field director, conducted survey and recording of sites along the State Route 905 right-of-way in southern San Diego County. Documented three prehistoric sites within the proposed right-of-way. Created site maps and prepared site forms.

Evaluation of 11 Sites along U.S. 395, Caltrans District 05, Blackrock, Inyo County, California, 2000. As crew chief, managed 6-18 personnel, prepared paperwork and report. Made decisions surrounding site excavations in Owens Valley. Project included Phase II test excavation of numerous sites ranging in age from early to late Holocene.

Phase I Survey, Caltrans District 10, Stockton, San Joaquin County, California, 1997. As field archaeologist, conducted various survey and excavation projects for Caltrans throughout central California. Conducted survey and excavation, operated as a graduate student assistant to the District 10 archaeologist dealing with compliance issues, prepared site mapping and technical reports including Archaeological Survey Reports (ASR), Historic Properties Survey Reports (HPSR), and Negative Declarations.

Phase I Survey/TEA, Caltrans, Inyo and Mono Counties, California, 1996–1997. As field archaeologist, conducted survey of most major highways in Mono and Inyo Counties, California. Documented the distribution of all cultural material within the Caltrans right-of-way in order to determine impacts by road widening.

Tribal

Section 106 Mitigation Development and Tribal Consultation Assistance, BLM, San Diego County, California, 2011–2012. As project manager, assisted the BLM in development of Historic Properties Treatment Plan, Tribal Participation Plan, and other mitigation measures for the Tule Wind project, McCain Valley California.

Mitigative Screening, Agua Caliente Band of Cahuilla Indians, Palm Springs, Riverside County, California, 2003. As field director, supervised archaeological mitigation of an impacted burial site on the Agua Caliente Reservation. Prepared mapping of the project, coordinated field efforts with Tribal representatives, oversaw monitoring of the project, and prepared portions of the technical report.

Water/Wastewater

San Clemente Water Recycling Monitoring, City of San Clemente, Orange County, California, 2013. As project manager, supervised Dudek's principal investigator to coordinate archaeological, tribal, and paleontological mitigation monitoring associated with the construction of a new water conveyance pipeline. Duties include preparation of a discovery and treatment plan.

Poseidon Resources Desalination Plant and Pipeline Monitoring, City of Carlsbad, San Diego County, California, 2013. As project manager, supervised Dudek's principal investigator to coordinate archaeological, tribal, and paleontological mitigation monitoring associated with the construction of the desalination plant and a new water conveyance pipeline. Duties include preparation of a discovery and treatment plan and evaluation of archaeological discoveries.

Poseidon Resources Desalination Plant and Pipeline Wetland Mitigation Archaeological Evaluation, City of San Diego, San Diego County, California, 2013. As project manager and principal investigator, developed methods and strategies to evaluate archaeological deposits most likely related to the 1782 ethnohistoric Kumeyaay village of La Punta located within the wetland mitigation area. Project included geotechnical coring and backhoe exploration to locate and evaluate buried archaeological deposits Duties included assistance provided to the USFWS for NAGPRA consultation and implementation.

Lee Lake Cultural Resources Inventory, Lee Lake Water District, Riverside County, California, 2013. As project manager, supervised Dudek's principal investigator to coordinate and implement cultural resources inventory for the construction of a new pipeline and water storage facility.

Cultural Resources Monitoring for the City of Napa Levee Improvement Project, ACOE, Sacramento District, Sacramento, California, 2010-2011. As principal investigator, supervised archaeological monitoring requiring HAZWOPER certified archaeologists to treat historical archaeological discoveries for a levee and stormwater improvement project.

Data Recovery Excavations at the Ridge Hill Facilities Site (SDI-18472), Padre Dam Municipal Water District (PDMWD), San Diego County, California, 2009. As principal investigator, supervised data recovery of a complex late prehistoric habitation site.

San Clemente Canyon Survey, City of San Diego Metropolitan Wastewater Department, City of San Diego, San Diego County, California, 2004. As principal investigator and field director, supervised and conducted an intensive pedestrian survey of proposed access road maintenance for the San Clemente Canyon sewer line. Two cultural resources were identified. Conducted site documentation, prepared sites forms and technical report. Managed survey crew member.

Lake Murray Survey, City of San Diego Metropolitan Wastewater Department, La Mesa, San Diego County, California, 2003. As field director, conducted survey of proposed trunk sewer replacement in La Mesa. Prepared portions of the technical report.

Imperial Irrigation District's Phase II Testing, Imperial Irrigation District, Imperial County, California, 2003. As field director, supervised Phase II testing of eight sites in the Colorado Desert. Managed field crews, conducted test excavations, and prepared site documentation and portions of the technical report.

Carmel Valley Archaeological Monitoring, City of San Diego Metropolitan Wastewater Department, Carmel Valley, San Diego County, California, 2002. As field monitor for pre-trenching for placement of sewer line, conducted monitoring and wrote portions of technical report.

EIR/EIS Preparation

Dr. Hale currently assists in the preparation of technical descriptions and analyses for environmental impact statements and reports at the state and federal levels for Dudek projects. Examples of completed environmental sections include those prepared for the Yokohl Ranch, Rio Mesa Solar, Soitec Rugged and Tierra Del Sol Solar, SDG&E's Wood to Steel project, and various others. More details are available upon request.

Other Relevant Experience

Training

- 2012 - Accounting and Finance for Non-Financial Managers, UCSD Rady School of Business Management
- 2010 - ESOP Planning and Management, UCSD Rady School of Business Management
- 2004 - Ground Penetrating Radar Field Methods and Interpretation Certificate
- 2002, 2010 - GPS Field Methods Training, ASC Scientific

Teaching

- 2008 - Assistant Professor, Archaeology, U.C. Davis
- 2008 - Instructor/ Principal Investigator, 2008 UC Davis Archaeology Field School, Vandenberg Air Force Base, California.
- 2005–2008 – Level III Teaching Assistant, U.C. Davis; taught discussion sections/ lectures for Human Evolution, Archaeology, and Human Ecology
- 1998–1999 – Acted as Public Education Coordinator for the Museum of Anthropology at UC Davis; included instructing a course teaching archaeology students how to inform the public about the value of anthropology through in-class presentations, exhibits, and the building of 'teaching trunks' for people in grades 1–12 of primary and secondary education
- 1997–1998 - Substitute teacher with an Emergency Credential in the Woodland and Davis Joint Unified School Districts for grades K–12, all subjects excluding foreign languages
- 1997–present – Regularly perform presentations about the value of archaeology in classrooms at the level of the grades 1–12
- 1996 – Teaching assistant at the U.C. Davis archaeological field school; job duties included student management and instruction in the methods of excavation and survey.

Publications

Selected Technical Reports

Hale, Micah J. 2010. "Limited Archaeological Excavations at SDI-4669 (SDM-W-12A)." In Advance of Geotechnical Coring, University House Rehabilitation Project, University of California at San Diego, La Jolla, California. Submitted to Ione Stiegler Architecture, La Jolla, California. Report on file at South Coastal Information Center, SDSU.

Hale, Micah J. 2010. Results of Archaeological Monitoring for Meteorological Masts in McCain Valley, San Diego County, California. Prepared for HDR Engineering Inc.

Hale, Micah J. 2007. Archaeological Survey of the Silver Lake Recreation Area, El Dorado Irrigation District, El Dorado County, California. Prepared for Trish Fernandez, El Dorado Irrigation District, El Dorado County, California.

Hale, Micah J. 2005. "Ground Stone Analysis." In From the Coast to the Inland: Prehistoric Settlement Systems Along the Las Pulgas Corridor, Camp Pendleton, California, by Micah J. Hale and Mark S. Becker. Report submitted to Southwest Division of Naval Facilities.

Hale, Micah J. 2005. Cultural Resources Inventory for the Proposed San Diego Model Schools Development Project. ASM Affiliates Inc., Carlsbad, California. Prepared for the City of San Diego, California.

Hale, Micah J. 2004. Cultural Resources Inventory for the Replacement of Bridge 230.6 over Agua Hedionda Lagoon, San Diego County, California. Submitted to North County Transit District, San Diego County, California.

Hale, Micah J. 2004. Cultural Resources Inventory for the Gawle Property, San Diego County, California. Submitted to Helix Environmental for the City of San Diego.

Hale, Micah J. 2004. Cultural Resources Inventory for the Hines Nursery, San Diego County, California. Submitted to Hines Nurseries, Rainbow Valley, California.

Hale, Micah J. 2004. Cultural Resources Inventory for the San Clemente Canyon Trunk Sewer Maintenance and Access Routes, San Diego County, California. Submitted to Metropolitan Wastewater Department, City of San Diego, California.

Hale, Micah J. 2004. Cultural Resources Inventory for the Montezuma Trunk Sewer Replacement, San Diego County, California. Submitted to Metropolitan Wastewater Department, City of San Diego, California.

Hale, Micah J. 2004. Cultural Resources Inventory for the Oceanside Hotel EIR, San Diego County, California. Submitted to Dudek for the City of Oceanside, California.

Hale, Micah J. 2004. Historic Resources Mitigation Monitoring of the El Cuervo Norte Project, San Diego County, California. Submitted to the City of San Diego.

Hale, Micah J. 2004. Emergency Test Excavations of an Exposed Olla, Riverside County, California. Submitted to BLM, Riverside County, California.

Hale, Micah J. 2004. Cultural Resources Monitoring for Geotechnical Coring Related to the All-American Canal Lining Project, Imperial County, California. Submitted to Imperial Irrigation District, Imperial County, California.

Hale, Micah J. 2004. Cultural Resources Monitoring of Geotechnical Coring Related to the Coachella Canal Lining Project, Riverside County, California. Submitted to Imperial Irrigation District, Riverside County, California.

Hale, Micah J. 2004. "Ground and Battered Stone Analysis." In Data Recovery Investigations at the Eucalyptus Site, CA-SDI-6954, San Diego County, California. Prepared by Don Laylander, ASM Affiliates Inc., Carlsbad, California. Submitted to EDAW, Inc.

Hale, Micah J. 2003. Cultural Resources Inventory for the Linda Vista Drive Re-Alignment Alternatives, City of San Marcos, California. Submitted to Nolte for the City of San Marcos.

Hale, Micah J. 2003. Cultural Resources Inventory for the Lake Murray Trunk Sewer Replacement, San Diego County, California. Submitted to the Metropolitan Wastewater Department, City of San Diego, California.

Hale, Micah J. 2000. Cultural Resource Monitoring Report. Jones and Stokes Associates Inc. Prepared for AT&T Corp., Atlanta, Georgia, for the AT&T cable removal project from Lucin, Utah, to Red Bluff, California.

Hale, Micah J. 2000. "Ground and Battered Stone Analysis." In Report on Excavations at Four Locations in the Lead Mountain Vicinity of the 29-Palms Marine Base, edited by Mark Basgall. Sacramento Archaeological Research Center.

Hale, Micah J. 2000. "Ground and Battered Stone Analysis." In Report on Excavations at CA-MER-295, edited by Mark Basgall and R. Bethard. Sacramento Archaeological Research Center.

Hale, Micah J. 2000. "Invertebrate Analysis." In Report on Excavations at CA-MER-295, edited by Mark Basgall and Mark Giambastiani. Sacramento Archaeological Research Center.

Hale, Micah J. 2000. "Site Reports for Sites SBR-9415 and SBR-9420." In Report on Excavations at Lead Mountain in Twentynine Palms Marine Corps Air Ground Combat Training Center, edited by Mark Basgall. Sacramento Archaeological Research Center.

Hale, Micah J. 1999. "Ground and Battered Stone Analysis." In Muddle in the Middle: Phase II Excavations of Five Sites in Kern County, California, edited by Mark Basgall. Prepared for V. Levulett, Environmental Management, Caltrans District 5, San Luis Obispo. Sacramento Archaeological Research Center.

Hale, Micah J., and Brad Comeau. 2009. Data Recovery Excavations at CA-SDI-18472 for the Proposed Padre Dam Municipal Water District Secondary Connection Project (Ridge Hill Facilities) Johnstown, San Diego County, California. Prepared for Mr. Albert Lau, Engineering Manager, Padre Dam Municipal Water District.

Hale, Micah, Brad Comeau, and Chad Willis. 2010. Class II and Class III Cultural Resources Inventory Report for the Tule Wind Project, McCain Valley, San Diego County, California. Prepared for HDR Engineering Inc. Report on file at the South Coastal Information Center, SDSU.

Hale, Micah J., and John R. Cook. 2005. Results of Ground Penetrating Radar Investigations at CA-SDI-10148 in the Forester Creek Biological Mitigation Site, San Diego County, California. With contributions by Jeffrey S. Patterson. Prepared for Chris White, Caltrans District 11.

Hale, Micah J., and Mark S. Becker. 2006. From the Coast to the Inland: Prehistoric Settlement Systems Along the Las Pulgas Corridor, Camp Pendleton, California. ASM Affiliates, Carlsbad, California. Submitted to Southwest Division of Naval Facilities.

Hale, Micah J., and Mark A. Giambastiani. 2010. A Cultural Resources Inventory for Sample Surveys in Selected Training Areas, Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, San Bernardino County, California. Prepared for Marine Air Ground Task Force Training Command, Natural Resources and Environmental Affairs, Twentynine Palms, California.

Hale, Micah, and Mark Giambastiani. 2010. Archaeological Resources Survey Report Aerial Maneuver Zone (AMZ) Project at the Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Twentynine Palms, California, San Bernardino County, California. Prepared for Marine Air Ground Task Force Training Command, Natural Resources and Environmental Affairs, Twentynine Palms, California.

Hale, Micah, and Mark Giambastiani. 2010. An Archaeological Survey of 3,650 Acres at Cole Flat, Naval Air Weapons Station (NAWS), China Lake, California. Prepared for Mike Baskerville, Base Archaeologist, NAWS China Lake, California.

Hale, Micah J., Mark Giambastiani, Michael Richards, and David Iversen. 2009. Phase II Cultural Resource Evaluations at 51 Archaeological Sites in Management Regions 1A, 1B, 2B, 2C, and 3E, Bissell Hills and Paiute Ponds, Edwards Air Force Base, Kern and Los Angeles Counties, California. Prepared for U.S. Army Corps of Engineers under contract numbers W91238-07-F-0051 and W91238-07-F-0052.

Basgall, Mark, Lynn Johnson, and Micah Hale. 2002. An Evaluation of Four Archaeological Sites in the Lead Mountain Training Area, Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Twentynine Palms, California. Prepared for United States Marine Corps Air Ground Combat Center, Twentynine Palms, California. Prepared by Archaeological Research Center, Institute of Archaeology and Cultural Studies, Department of Anthropology, California State University, Sacramento.

Becker, Mark S., and Micah J. Hale. 2004. "Flaked Stone and Ground Stone Artifact Analysis." In Phase II Archaeological Testing and Evaluation of CA-INY-3647, CA-INY-3650/H, CA-INY-3826, and P-14-7356, Little Lake Rehabilitation, U.S. 395, Inyo County, California, edited by Brian Byrd and Seetha Reddy, ASM Affiliates. Prepared for Caltrans District 6, Fresno.

Byrd, Brian F., and Micah J. Hale. 2005. Testing and Evaluation of CA-SDI-13,930 on Camp Pendleton Marine Corps Base, San Diego County, California: A Paleoenvironmental Approach. ASM Affiliates, Carlsbad, California. Prepared for Southwest Division Naval Facilities Engineering Command.

Byrd, Brian F., and Micah J. Hale. 2004. Final Report on the Rose-Arizone Site Survey and Documentation, San Clemente Island. Prepared for Dr. Andrew Yatsko, NAVFAC SW, South Bay Area Focus Team.

Byrd, Brian F., and Micah J. Hale. 2004. Final Report on the San Clemente Island Protective Signing and Maintenance Project. Prepared for Dr. Andrew Yatsko, NAVFAC SW, South Bay Area Focus Team.

Byrd, Brian F., and Micah J. Hale. 2004. Final Report on the San Clemente Island Road Improvement Survey. Prepared for Dr. Andrew Yatsko, NAVFAC SW, South Bay Area Focus Team.

Byrd, Brian F., Micah J. Hale, and Sinéad Ní Ghabhláin. 2004. "Archaeological Testing at INY-3647." In Phase II Archaeological Testing and Evaluation of CA-INY-3647, CA-INY-3650/H, CA-INY-3826, and P-14-7356, Little Lake Rehabilitation, U.S. 395, Inyo County, California, edited by Brian Byrd and Seetha Reddy, ASM Affiliates. Prepared for Caltrans District 6, Fresno.

Byrd, Brian F., Micah J. Hale, and Sinéad Ní Ghabhláin. 2004. "Archaeological Testing at INY-3650/H." In Phase II Archaeological Testing and Evaluation of CA-INY-3647, CA-INY-3650/H, CA-INY-3826, and P-14-7356, Little Lake Rehabilitation, U.S. 395, Inyo County, California, edited by Brian Byrd and Seetha Reddy, ASM Affiliates. Prepared for Caltrans District 6, Fresno.

Byrd, Brian F., Micah J. Hale, and Sinéad Ní Ghabhláin. 2004. Archaeological Testing at INY-3826. In Phase II Archaeological Testing and Evaluation of CA-INY-3647, CA-INY-3650/H, CA-INY-3826, and P-14-7356, Little Lake Rehabilitation, U.S. 395, Inyo County, California, edited by Brian Byrd and Seetha Reddy, ASM Affiliates. Prepared for Caltrans District 6, Fresno.

Byrd, Brian F., and Micah J. Hale. 2003. Final Report on Extended Phase I Excavation at CA-INY-2207/2758, Little Lake Rehab Project, Inyo County, California. ASM Affiliates, Encinitas. Prepared for Lynn Faraone, Chief, Central California Cultural Resource Branch, California Department of Transportation.

Byrd, Brian F., and Micah J. Hale. 2002. Phase II Investigations of 15 Prehistoric Sites for the Cartago-Olancha Four-Lane Project, U.S. 395, Owens Valley, California. ASM Affiliates Inc. Prepared for Caltrans District 6, Fresno.

Byrd, Brian F., and Micah J. Hale. 2001. Research Design for Phase II Investigations of 14 Prehistoric Sites for the Cartago-Olancha Four-Lane Project, U.S. 395, Owens Valley, California. ASM Affiliates Inc. Prepared for Caltrans District 6, Fresno.

Cook, John R., Collin O'Neill, and Micah J. Hale. 2001. Archaeological Survey for the Amtrak Second Main Line, San Onofre Segment, MP 210.1 to 214.7, San Diego County. ASM Affiliates Inc. Draft report prepared for North County Transit District.

Giambastiani, M., M. Hale, M. Richards, and S. Shelley. 2008. Draft Report Phase II Cultural Resource Evaluations at 47 Archaeological Sites on the East and Northeast Shores of Rogers Lake, Management Region 3, Edwards Air Force Base, Kern and Los Angeles Counties, California. Report submitted to Edward Air Force Base, Base Historic Preservation Officer.

Giambastiani, G., M. Hale, S. Ni Ghabhláin, and D. Iversen. 2006. Phase II Cultural Resource Evaluation of 21 Archaeological Sites along the Western and Northwestern Boundary Fence, Edwards AFB, Kern and Los Angeles Counties, California. Submitted to Earth Tech Inc., Colton, California.

Hector, Susan, Micah J. Hale, and Catherine Wright. 2003. Cultural Resource Inventory of the Path 15 Los Banos-Gates Transmission Line Construction Project, Merced and Fresno Counties, California. Contract No. 03-186-01-01-ASM. Prepared for Steigers Corporation, Littleton, Colorado.

Laylander, Don, and Micah J. Hale. 2004. Data Recovery Excavations at Locus O, CA-RIV-45. ASM Affiliates Inc., Carlsbad, California. Submitted to Agua Caliente Band of Cahuilla Indians.

Reddy, Seetha N., and Micah J. Hale. 2003. Archaeological Survey of Portions of the De Luz Housing Area, O'Neill Lake, and the Case Spring Highlands, Marine Corps Base Camp Pendleton, California. ASM Affiliates, Encinitas, California. Prepared for NAVFAC SW, San Diego, California.

Whitley, David, and Micah Hale. 2010. Management Plan for the Coso Rock Art District National Historic Landmark. Prepared for NAVFAC SW, San Diego County, California.

Other Publications

Hale, Micah J. 2012. "Malcolm Rogers' Archaeology in Coastal San Diego." Book chapter in preparation; edited by Don Laylander.

Hale, Micah J. 2011. "Modeling Socioeconomic Discontinuity in Southern Alta California." In, California Archaeology 2:2: December 2010, pp. 203-250.

Hale, Micah J. 2010. "A Comment on Hildebrandt et al. (2009) Shellfish Transport, Caloric Return Rates, and Prehistoric Feasting." In California Archaeology 3:111-113.

Hale, Micah J. 2009. Santa Barbara and San Diego: Contrasting Adaptive Strategies in Southern California. PhD dissertation; University of California, Davis.

Hale, Micah J. n.d. Preserving Cultural Heritage Through Public Outreach: A Curriculum for Jr. High and High School.

Hale, Micah J. 2005. Processing Economies, Coastal Settlement, and Intensification in Northern San Diego County. In Proceedings of the Society for California Archaeology, Volume 18.

Hale, Micah J. 2001. Technological and Social Organization of the Millingstone Horizon in Southern California. Master's thesis; California State University, Sacramento.

Hale, Micah J. 2000. Consumer Anthropology: Theory and Method of Recognizing and Interpreting Consumption Patterns for Product Development and Marketing Strategies. Developed for Richard Knight, Director of Intelligent Products, Addidas, USA.

Hale, Micah J., Richard McElreath, and Robert Bettinger. 2012. (in prep.) Modeling Time Minimizing and Energy Maximizing Adaptive Strategies.

Hale, Micah J., and Peter Richerson. 2012. (in prep.) Investigating the Rate-Limiting Factors of Cultural Evolution: Archaeological Evidence from Southern California.

Hale, Micah J., and Bruce Winterhalder. 2012. (in prep.) Discontinuous Sociocultural Evolution

Editorial Reviewer

Hale, Micah J. 2011. Editorial Reviewer, *Journal of California Archaeology*, Left Coast Press, California.

Hale, Micah J. 2011. Editorial reviewer, *Journal of California and Great Basin Anthropology*, Malki Museum Press, California.

Hale, Micah J. 2010. Editorial reviewer, *Pacific Coast Archaeology Society*, California.

Presentations

Hale, Micah J. 2012. *The Data Matter: Contributions of the Sacramento State Archaeological Research Center*. Presented at the 2012 Society for California Archaeology Meetings, San Diego, California.

Hale, Micah J. 2012. *Andy Yatsko, the Human Transit: Celebrating His Lifetime Contributions*. Presented at the 2012 Society for California Archaeology Meetings, San Diego, California.

Hale, Micah J. 2012. *Malcolm Rogers' Work Along the San Diego Coast*. Presented at the 2012 Society for California Archaeology Meetings, San Diego, California.

Hale, Micah J. 2011. *Tracing the Origins of Processing Economies in the Far West: A View from Coastal Southern California*. Presented at the Yucca Valley Archaeopalooza Conference, 29 Palms, California.

Hale, Micah J. 2011. *Adaptive Divergence Among Southern California Hunter Gatherers*. Presented at the 2011 Society for California Archaeology Meetings, Rohnert Park, California.

Hale, Micah J. 2011. *A 10,000 Year Old Habitation at the University House, La Jolla: Implications for Trans-Holocene Socioeconomic Stability in San Diego*. Presented at the 2011 Society for American Archaeology Meetings, Sacramento, California.

Hale, Micah J. 2010. *Using the Ideal Free Distribution to Model Socioeconomic Discontinuity Among Hunter-Gatherers*. Paper presented at the 2009 Society for American Archaeology Meetings, St. Louis, Missouri. Micah Hale, Symposium Chair.

Hale, Micah J. 2005. *Investigating the Role of Acorns in Southern California Hunter-Gatherer Economies*. Guest Speaker at the Antelope Valley Archaeological Society Meeting.

Hale, Micah J. 2005. *Processing Economies, Coastal Settlement, and Intensification in Northern San Diego County*. Presented at the Society for California Archaeology, Sacramento.

Hale, Micah J. 2004. *Cultural Resource Management in Practice: An Overview of Methodological Approaches*. Presented at the Imperial Valley Desert Museum Annual Meetings.

Hale, Micah J. 2003. *The Adaptive Significance of Technological Organization during the Holocene in Southern California*. Discussant in a symposium entitled, *Change and Cultural Adaptations Along the California Coast*. Organized by Seetha Reddy for the 68th Annual Meetings of the Society for American Archaeology, Milwaukee, Wisconsin. David Yesner and Roger Colten, Chairs.

Hale, Micah J. 2003. *The Organization of Subsistence Technology in Southern California During the Holocene.* Guest Speaker for the San Diego County Archaeological Society, January 28, 2003, San Diego.

Hale, Micah J. 2002. *Prehistory Along the Southwestern Shore of Owens Lake: Preliminary Results from the Cartago-Olancha Project.* Presented at the 2002 Northern California Data Sharing Meetings, Society for California Archaeology, Santa Cruz, California.

Hale, Micah J. 2002. *Ground and Battered Stone Along the Western Shores of Owens Lake.* Presented at the 2002 Northern California Data Sharing Meetings, Society for California Archaeology, Santa Cruz, California.

Hale, Micah J. 2001. *Technological and Social Organization during the Millingstone Horizon of Southern California*. Presented at the Society for California Archaeology Annual Meeting, Modesto.

Hale, Micah J. 1999. *The Analysis Method of Formatting Presentations and Lesson Plans in Archaeology*. Presented at the Society for American Archaeology 64th Annual Meeting, Chicago, Illinois.

Hale, Micah J. 1998. *A Practical and Effective Method for Teaching Archaeology to the Public*. Presented at the Society for California Archaeology Annual Meeting, San Diego, California.

Awards/Commendations

- 2010 – NAVFAC SW, Camp Pendleton, Research Grant, $59,000
- 2008 – U.S. Air Force, Vandenberg AFB, Radiocarbon Grant, $25,000
- 2008 – Fieldwork Fellowship, Graduate Studies, UC Davis, $2,010
- 2007 – Fieldwork Fellowship, Graduate Studies, UC Davis, $1,800
- 2006 – Fieldwork Fellowship, Graduate Studies, UC Davis, $5,650
- 2005–2009 – Graduate Fee Fellowship/Stipend, UC Davis, $74,500

Clearances

- Department of Defense (DoD) High-Security Clearance for SPAWAR, Naval Base Point Loma, NALF San Clemente Island, Vandenberg Air Force Base, MCAGCC 29 Palms, Edwards Air Force Base, NAWS China Lake, Yuma Proving Grounds, and MCB Camp Pendleton

APPENDIX B (CONFIDENTIAL)

SCIC Records Search Results

APPENDIX C

NAHC Sacred Lands File Search Results and Tribal Correspondence

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

July 24, 2018

Gayle Totton
Associate Government Program Analyst
Native American Heritage Commission

Subject: NAHC Sacred Lands Records Search Request for the 32nd and C Street Project in the City of San Diego, San Diego County, California

Dear Ms. Totton,

Dudek is conducting a cultural resources survey project for the 32nd and C Street Project. The approximately 1.6-acre project site consists of an undeveloped lot located in a residential area of the Golden Hill Community in San Diego, California (Figure 1). The project is located in unsectioned land on the U.S. Geological Survey (USGS) National City and Point Loma 7.5' quadrangles.

Dudek is requesting a NAHC search for any sacred sites, traditional cultural properties, or other Native American cultural resources that may fall within a 1-mile buffer of the proposed project location (Figure 1). Please provide contact information for all Native American tribal representatives that should be consulted regarding these project activities. This information can be emailed or faxed to 760-632-0164.

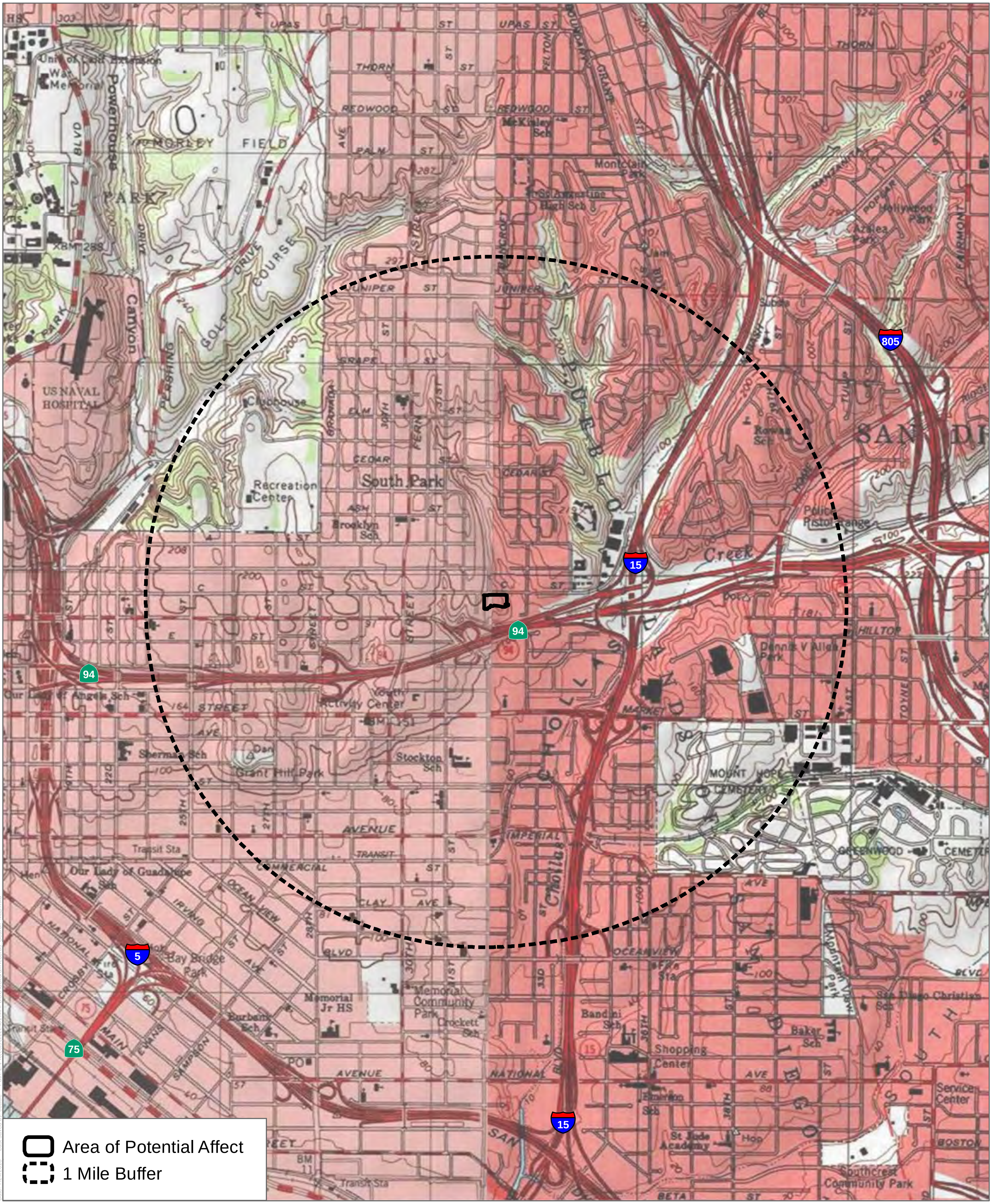
If you have any questions about this investigation, please contact me directly by email or phone.

Regards,

Matthew M. DeCarlo

Matthew DeCarlo
Archaeologist
DUDEK
Phone: (760) 632-0164
Email: mdecarlo@dudek.com

Attachments:
Figure1. Project location map.



SOURCE: USGS 7.5-Minute Series National City & Point Loma Quadrangles
Township 17S; Range 2W, 3W; Sections 1, 5, 6, 7, 8, 12

DUDEK

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1:24,000

Records Search

32nd and C Street Project

STATE OF CALIFORNIA **Edmund G. Brown, Jr., *Governor***

NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., ROOM 100
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

July 25, 2018

Matthew DeCarlo
Dudek

Sent by Email: mdecarlo@dudek.com

Re : 32nd and C Street Project, San Diego County

Dear Mr. DeCarlo,

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results indicate Native American cultural sites are present. Please contact the Kumeyaay Cultural Repatriation; 1095 Barona Road, Lakeside, CA 92040, 619-742-5587. Other sources for cultural resources should also be contacted for information regarding known and/or recorded sites.

Enclosed is a list of Native American tribes who may also have knowledge of cultural resources in the project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these tribes, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at frank.lienert@nahc.ca.gov.

Sincerely,

Frank Lienert
Associate Governmental Program Analyst

Native American Heritage Commission
Native American Contacts
July 25, 2018

Ewiiaapaayp Band of Kumeyaay Indians
Robert Pinto Sr., Chairperson
4054 Willows Road Diegueno/Kumeyaay
Alpine , CA 91901
(619) 445-6315

(619) 445-9126 Fax

La Posta Band of Diegueño Mission Indians
Gwendolyn Parada, Chairperson
8 Crestwood Road Diegueno/Kumeyaay
Boulevard , CA 91905
LP13boots@aol.com
(619) 478-2113
(619) 478-2125 Fax

Manzanita Band of Kumeyaay Nation
Angela Elliott-Santos, Chairperson
P.O. Box 1302 Diegueno/Kumeyaay
Boulevard , CA 91905
(619) 766-4930

(619) 766-4957 Fax

San Pasqual Band of Diegueño Mission Indians
Allen E. Lawson, Chairperson
P.O. Box 365 Diegueno
Valley Center , CA 92082
allenl@sanpasqualtribe.org
(760) 749-3200

(760) 749-3876 Fax

Sycuan Band of the Kumeyaay Nation
Cody J. Martinez, Chairperson
1 Kwaaypaay Court Diegueno/Kumeyaay
El Cajon , CA 92019
ssilva@sycuan-nsn.gov
(619) 445-2613

(619) 445-1927 Fax

Viejas Band of Kumeyaay Indians
Robert J. Welch, Jr., Chairperson
1 Viejas Grade Road Diegueno/Kumeyaay
Alpine , CA 91901
jhagen@viejas-nsn.gov
(619) 445-3810

(619) 445-5337 Fax

Campo Band of Diegueño Mission Indians
Ralph Goff, Chairperson
36190 Church Road, Suite 1 Diegueno/Kumeyaay
Campo , CA 91906
rgoff@campo-nsn.gov
(619) 478-9046

(619) 478-5818 Fax

Jamul Indian Village
Erica Pinto, Chairperson
P.O. Box 612 Diegueno/Kumeyaay
Jamul , CA 91935
(619) 669-4785

(619) 669-4817

Los Coyotes Band of Cahuilla and Cupeno Indians
Shane Chapparosa, Chairman
P.O. Box 189 Cahuilla
Warner Springs , CA 92086-01
Chapparosa@msn.com
(760) 782-0711

(760) 782-0712 Fax

Mesa Grande Band of Diegueño Mission Indians
Virgil Oyos, Chairperson
P.O Box 270 Diegueno
Santa Ysabel , CA 92070
mesagrandeband@msn.com
(760) 782-3818

(760) 782-9092 Fax

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American Tribes with regard to cultural resources assessments for the proposed
32nd and C Street Project, San Diego County

Native American Heritage Commission
Native American Contacts
July 25, 2018

Pala Band of Mission Indians
Shasta Gaughen, PhD, THPO
PMB 50. 35008 Pala Temecula Rd. Luiseno
Pala , CA 92059 Cupeno
sgaughen@palatribe.com
(760) 891-3515

(760) 742-3189 Fax

Pauma Band of Luiseno Indians
Temet Aguilar. Chairperson
P.O. Box 369 Luiseno
Pauma Valley , CA 92061
(760) 742-1289, Ext. 303

(760) 742-3422 Fax

Kwaaymii Laguna Band of Mission Indians
Carmen Lucas
P.O. Box 775 Diegueno-Kwaaymii
Pine Valley , CA 91962 Kumeyaay
(619) 709-4207

Inaja-Cosmit Band of Indians
Rebecca Osuna. Chairman
2005 S. Escondido Blvd. Diegueno
Escondido , CA 92025
(760) 737-7628

(760) 747-8568 Fax

Juaneno Band of Mission Indians Acjachemen Nation
Teresa Romero. Chairwoman
31411-A La Matanza Street Juaneno
San Juan Capistrano , CA 92675
tromero@juaneno.com
(949) 488-3484
(530) 354-5876 Cell
(949) 488-3294 Fax

Rincon Band of Luiseño Indians
Bo Mazzetti. Chairperson
1 West Tribal Road Luiseno
Valley Center , CA 92082
bomazzetti@aol.com
(760) 749-1051

(760) 749-5144

San Luis Rey Band of Mission Indians
Tribal Council
1889 Sunset Drive Luiseno
Vista , CA 92081
cjmojado@slrmissionindians.org
(760) 724-8505

(760) 724-2172 Fax

Agua Caliente Band of Cahuilla Indians
Jeff Grubbe. Chairperson
5401 Dinah Shore Drive Cahuilla
Palm Springs , CA 92264
(760) 699-6800

(760) 699-6919 Fax

Pechanga Band of Luiseño Indians
Mark Macarro. Chairman
P.O. Box 1477 Luiseno
Temecula , CA 92593
epreston@pechanga-nsn.gov
(951) 770-6000

(951) 695-1778 Fax

La Jolla Band of Luiseno Indians
Thomas Rodriguez. Chairperson
22000 Highway 76 Luiseno
Pauma Valley , CA 92061
(760) 742-3771

(760) 742-3779 Fax

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32nd and C Street Project, San Diego County

Native American Heritage Commission
Native American Contacts
July 25, 2018

Kumeyaay Cultural Repatriation Committee
Clint Linton, Director of Cultural Resources
P.O. Box 507 Diegueno/Kumeyaay
Santa Ysabel , CA 92070
cjlinton73@aol.com
(760) 803-5694

Ewiiaapaayp Band of Kumeyaay Indians
Michael Garcia, Vice Chairperson
4054 Willows Road Diegueno/Kumeyaay
Alpine , CA 91901
michaelg@leaningrock.net
(619) 445-6315

(619) 445-9126 Fax

Agua Caliente Band of Cahuilla Indians
Patricia Garcia-Plotkin, Director, THPO
5401 Dinah Shore Drive Cahuilla
Palm Springs , CA 92264
ACBCI-THPO@aguacaliente.net
(760) 699-6907
(760) 567-3761 Cell
(760) 699-6924 Fax

Barona Band of Mission Indians
Edwin Romero Chairperson
1095 Barona Road Diegueno
Lakeside , CA 92040
clloyd@barona-nsn.gov
(619) 443-6612

(619) 443-0681

Soboba Band of Luiseno Indians
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 Luiseno
San Jacinto , CA 92581 Cahuilla
jontiveros@soboba-nsn.gov
(951) 663-5279
(951) 654-5544 ext 4137
(951) 654-4198 Fax

Iipay Nation of Santa Ysabel
Virgil Perez, Chairperson
P.O. Box 130 Diegueno/Kumeyaay
Santa Ysabel , CA 92070
(760) 765-0845

(760) 765-0320 Fax

Pala Band of Mission Indians
Robert H. Smith, Chairperson
12196 Pala Mission Road Luiseno
Pala , CA 92059 Cupeno
rsmith@palatribe.com
(760) 891-3500

(760) 742-3189 Fax

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DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

July 29, 2018

Mr. Temet Aguilar, Chairperson
Pauma & Yuima Reservation
P.O. Box 369
Pauma Valley, CA 92061

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Aguilar,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

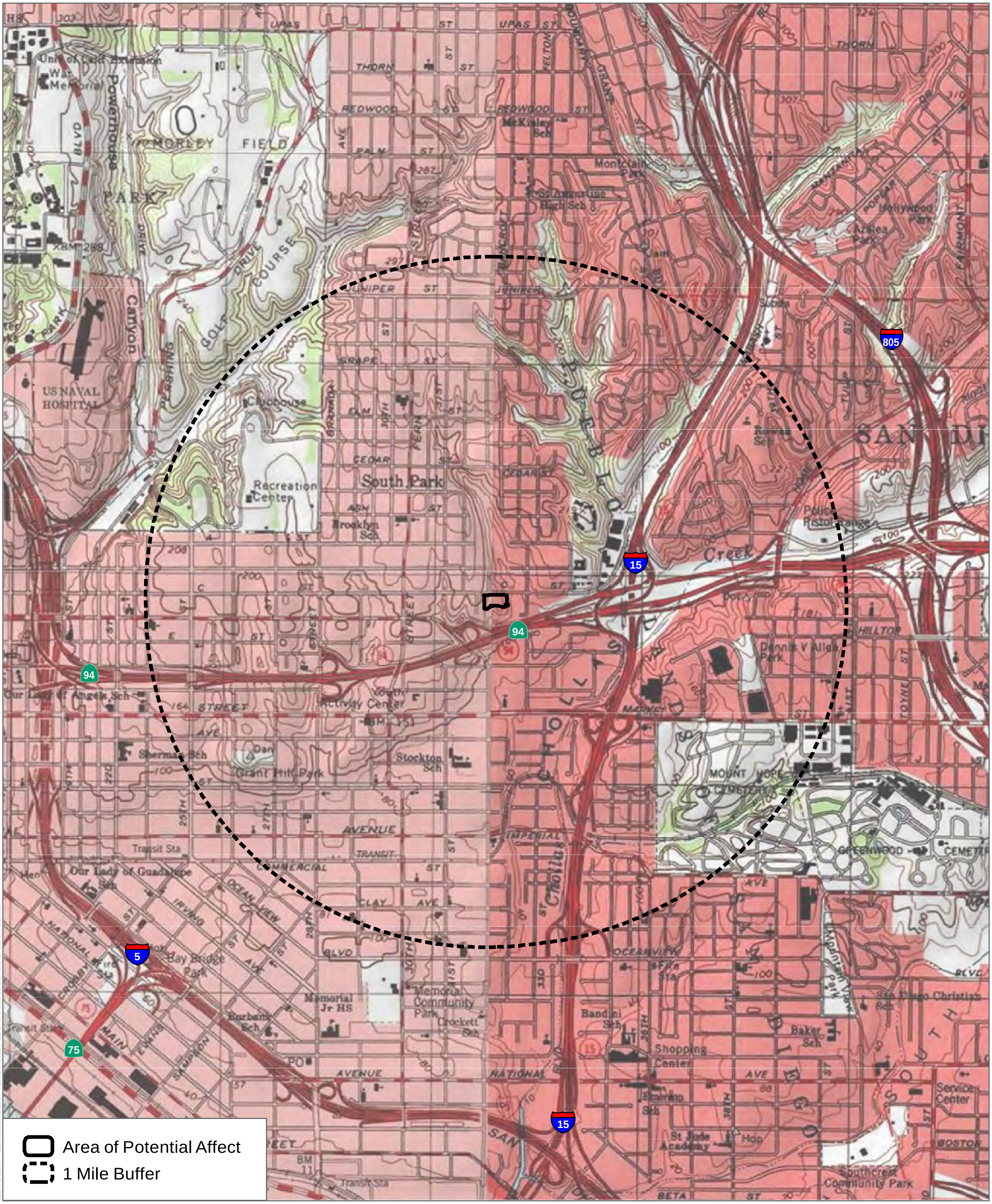
The Native American Heritage Commission conducted a Sacred Lands file search. They included your name on their contact list. I am writing as part of the cultural inventory process in order to find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me by phone or email.

Respectfully,

Matt M DeCarlo

Matthew DeCarlo, M.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com



SOURCE: USGS 7.5-Minute Series National City & Point Loma Quadrangles
Township 17S; Range 2W, 3W; Sections 1, 5, 6, 7, 8, 12

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Records Search

32nd and C Street Project

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

July 29, 2018

Mr. Shane Chapparosa, Chairman
Los Coyotes Band of Mission Indians
P.O. Box 189
Warner, CA 92086

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Chapparosa,
Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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Respectfully,

Matt H. DeCarlo

Matthew DeCarlo, M.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

July 29, 2018

Ms. Patricia Garcia, Tribal Historic Preservation Officer
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92262

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Ms. Garcia,
Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

July 29, 2018

Mr. Michael Garcia, Vice Chairperson
Ewiiaapaayp Tribal Office
4054 Willows Road
Alpine, CA 91901

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Garcia,
Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
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July 29, 2018

Ms. Shasta Gaughen, Assistant Director
Kupa Cultural Center
35008 Pala Temecula Rd.
Pala, CA 92059

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Ms. Gaughen,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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Phone: (760) 479-4831
Email: mdecarlo@dudek.com

DUDEK

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605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

July 29, 2018

Mr. Ralph Goff, Chairperson
Campo Band of Mission Indians
36190 Church Road, Suite 1
Campo, CA 91906

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Goff,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, M.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

July 29, 2018

Mr. Jeff Grubbe, Chairperson
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92262

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Grubbe,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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Email: mdecarlo@dudek.com

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MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

July 29, 2018

Mr. Allen E. Lawson, Chairperson
San Pasqual Band of Mission Indians
P.O. Box 365
Valley Center, CA 92082

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Lawson,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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MAIN OFFICE
605 THIRD STREET
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T 760.942.5147 T 800.450.1818 F 760.632.0164

July 29, 2018

Mr. Clint Linton, Director of Cultural Resources
Ipay Nation of Santa Ysabel
P.O. Box 507
Santa Ysabel, CA 92070

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Linton,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

The Native American Heritage Commission conducted a Sacred Lands file search. They included your name on their contact list. I am writing as part of the cultural inventory process in order to find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me by phone or email.

Respectfully,

Matt H DeCarlo

Matthew DeCarlo, M.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

July 29, 2018

Ms. Carmen Lucas,
Kwaaymii Laguna Band of Mission Indians
P.O. Box 775
Pine Valley, CA 91962

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Ms. Lucas,
Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Mr. Mark Macarro, Chairperson
Pechanga Band of Mission Indians
P.O. Box 1477
Temecula, CA 92593

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Macarro,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Mr. Cody Martinez, Chairperson
Sycuan Band of the Kumeyaay Nation
1 Kwaaypaay Court
El Cajon, CA 92019

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Martinez,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Mr. Bo Mazzetti, Tribal Chairman
Rincon Band of Mission Indians
1 W. Tribal Road
Valley Center, CA 92082

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Mazzetti,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Mr. Joseph Ontiveros, Cultural Resource Department
Soboba Band of Luiseno Indians
P.O. Box 487
San Jacinto, CA 92581

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Ontiveros,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Ms. Rebecca Osuna, Chairman
Inaja Band of Mission Indians
2005 S. Escondido Blvd.
Escondido, CA 92025

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Ms. Osuna,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Mr. Virgil Oyos, Chairperson
Mesa Grande Band of Mission Indians
P.O. Box 270
Santa Ysabel, CA 92070

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Oyos,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Ms. Gwendolyn Parada, Chairperson
La Posta Band of Mission Indians
8 Crestwood Rd.
Boulevard, CA 91905

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Ms. Parada,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Mr. Virgil Perez, Chairperson
Iipay Nation of Santa Ysabel
P.O. Box 130
Santa Ysabel, CA 92070

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Perez,
Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Ms. Erica Pinto, Chairperson
Jamul Indian Village
P.O. Box 612
Jamul, CA 91935

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Ms. Pinto,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Mr. Robert Pinto, Sr., Chairperson
Ewiaapaayp Tribal Office
4054 Willow Rd.
Alpine, CA 91901

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Pinto, Sr.,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Mr. Thomas Rodrigues, Chairperson
La Jolla Band of Mission Indians
22000 Highway 76
Pauma Valley, CA 92061

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Rodrigues,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Mr. Edwin (Thorpe) Romero, Chairperson
Barona Group of the Capitan Grande
1095 Barona Road
Lakeside, CA 92040

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Romero,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

July 29, 2018

Ms. Teresa Romero, Chairwoman
Juaneno Band of Mission Indians Acjachemen Nation
31411-A La Matanza Street
San Juan Capistrano, CA 92675

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Ms. Romero,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Ms. Angela Elliott Santos, Chairperson
Manzanita Band of Kumeyaay Nation
P.O. Box 1302
Boulevard, CA 91905

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Ms. Santos,
Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Mr. Robert H. Smith, Chairperson
Pala Band of Mission Indians
35008 Pala Temecula Rd., PMB 50
Pala, CA 92059

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Smith,

Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Mr. Robert J. Welch, Jr., Chairperson
Viejas Band of Kumeyaay Indians
1 Viejas Grade Rd.
Alpine, CA 91901

Subject: ***Information Request for the 32nd and C Street Project in San Diego, San Diego County, California***

Dear Mr. Welch, Jr.,
Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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July 29, 2018

Tribal Council ,
San Luis Rey Band of Mission Indians
1889 Sunset Dr.
Vista, CA 92081

Subject: Information Request for the 32nd and C Street Project in San Diego, San Diego County, California

Dear Tribal Council ,
Development has been proposed by Citymark Communities LLC in San Diego, San Diego County, California. The project area consists of a vacant lot within a residential neighborhood at the corner of 32nd Street and C Street. The area falls within Township 17S/ Range 2W on the National City and Point Loma, CA 1:24,000 USGS map (Figure 1).

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Matthew H. DeCarlo

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Campo Band of Mission Indians

Chairman Ralph Goff
Vice-Chairman Harry P. Cuero Jr.
Secretary Kerm Shipp
Treasurer Marcus Cuero
Committee Brian Connolly Sr.
Committee Steven M. Cuero
Committee Benjamin Dyche

August 14, 2018

Matthew DeCarlo, MA

Archaeologist

Dudek

605 Third Street

Encinitas, CA 92024

Dear Mr. DeCarlo

Subject: Information Request for the 32 Street and C Street Project

After review of the Information Request for the 32 Street and C Street Project, Campo Band of Mission Indians concludes this area has a rich history for the Kumeyaay people. There were many villages throughout the Kumeyaay territory. Much of that history was lost when the Kumeyaay people were relocated to other areas. Campo Band of Mission Indians would like to request a consultation meeting to discuss some of the issues regarding this project, to ensure Kumeyaay cultural resources are not overlooked. If there are any questions, please feel free to contact Marcus Cuero at marcuscuero@campo-nsn.gov or by phone (619) 478-9046

Sincerely,

Ralph Goff

Chairman

Campo Band of Mission Indians

36190 Church Rd., Suite 1 Campo, CA 91906 Phone: (619) 478-9046 Fax: (619) 478-5818

RINCON BAND OF LUISEÑO INDIANS
Cultural Resources Department
1 W. Tribal Road · Valley Center, California 92082 ·
(760) 297-2330 Fax:(760) 297-2339

August 29, 2018

Matthew DeCarlo
Dudek
Archaeologist
605 Third Street
Encinitas, CA 92024

Re: 32nd and C Street Project

Dear Mr. DeCarlo:

This letter is written on behalf of the Rincon Band of Luiseño Indians. Thank you for inviting us to submit comments on the 32nd and C Street Project. Rincon is submitting these comments concerning your projects potential impact on Luiseño cultural resources.

The Rincon Band has concerns for the impacts to historic and cultural resources and the finding of items of significant cultural value that could be disturbed or destroyed and are considered culturally significant to the Luiseño people. This is to inform you, your identified location is not within the Luiseño Aboriginal Territory. We recommend that you locate a tribe within the project area to receive direction on how to handle any inadvertent findings according to their customs and traditions.

If you would like information on tribes within your project area, please contact the Native American Heritage Commission and they will assist with a referral.

Thank you for the opportunity to protect and preserve our cultural assets.

Sincerely,

Destiny Colocho, RPA
Tribal Historic Preservation Officer
Rincon Cultural Resources Department

VIEJAS
TRIBAL GOVERNMENT

P.O. Box 908
Alpine, CA 91903
#1 Viejas Grade Road
Alpine, CA 91901

Phone: 619.445.3810
Fax: 619.445.5337
viejas.com

August 10, 2018

Mathew DeCarlo
Archaeologist
Dudek
605 Third Street
Encinitas, CA 92024

RE: 32nd and C Street Project

Dear Mr. DeCarlo,

The Viejas Band of Kumeyaay Indians ("Viejas") has reviewed the proposed project and at this time we have determined that the project site has cultural significance or ties to Viejas.

Viejas Band request that a Kumeyaay Cultural Monitor be on site for ground disturbing activities to inform us of any new developments such as inadvertent discovery of cultural artifacts, cremation sites, or human remains.

Please call me at 619-659-2312 or Ernest Pingleton at 619-659-2314 or email, rteran@viejas-nsn.gov or epingleton@viejas-nsn.gov , for scheduling. Thank you.

Sincerely,

Ray Teran, Resource Management
VIEJAS BAND OF KUMEYAAY INDIANS

Report
Update Preliminary Geotechnical Investigation

Proposed Residential Development
32^{nd} Street and C Street, San Diego, California

PREPARED FOR

Boretto + Merrill Consulting LLC
4871 Viane Way, San Diego, CA 92110

PREPARED BY

NOVA Services, Inc.
4373 Viewridge Ave, Ste. B
San Diego, California 92123

NOVA Project No. 2018951
February 5, 2018

NOVA

GEOTECHNICAL ■ MATERIALS ■ SPECIAL INSPECTIONS

SBE ■ SLBE ■ SCOOP

4373 Viewridge Avenue, Ste. B
San Diego, CA 92123
858.292.7575

February 5, 2018
NOVA Project 2018951

Mr. Brad Miller
Boretto + Merrill Consulting LLC
4871 Viane Way
San Diego, CA 92110

Subject: Report
Update Preliminary Geotechnical Investigation
Proposed Residential Development
32nd Street and C Street, San Diego, California

Dear Mr. Miller:

NOVA Services, Inc. (NOVA) is pleased to present herewith its report of the above-referenced geotechnical investigation. The work reported was completed by NOVA for Boretto + Merrill Consulting LLC in accordance with NOVA's proposal dated January 5, 2018.

The report is an update of a 2002 preliminary geotechnical investigation by others. As an update geotechnical report, the recommendations presented herein are intended to supersede those provided in the 2002 report.

NOVA appreciates the opportunity to be of service to Boretto + Merrill Consulting LLC. Should you have any questions regarding this report or other matters, please do not hesitate to contact the undersigned at (858) 292-7575.

Sincerely,
NOVA Services, Inc.

Wail Mokhtar
Project Manager

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Report
Update Preliminary Geotechnical Investigation
Proposed Residential Development
32nd Street and C Street, San Diego, California

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1.0 INTRODUCTION

1.1 Terms of Reference

This report provides an update of a 2002 preliminary geotechnical investigation for a proposed townhome development now known as "32nd and C Street," located in San Diego, California (hereafter, also referenced as 'the site', or 'the development').

The work reported was completed by NOVA for Boretto + Merrill Consulting LLC in accordance with NOVA's proposal dated January 5, 2018.

Figure 1-1 depicts the vicinity of the planned development.

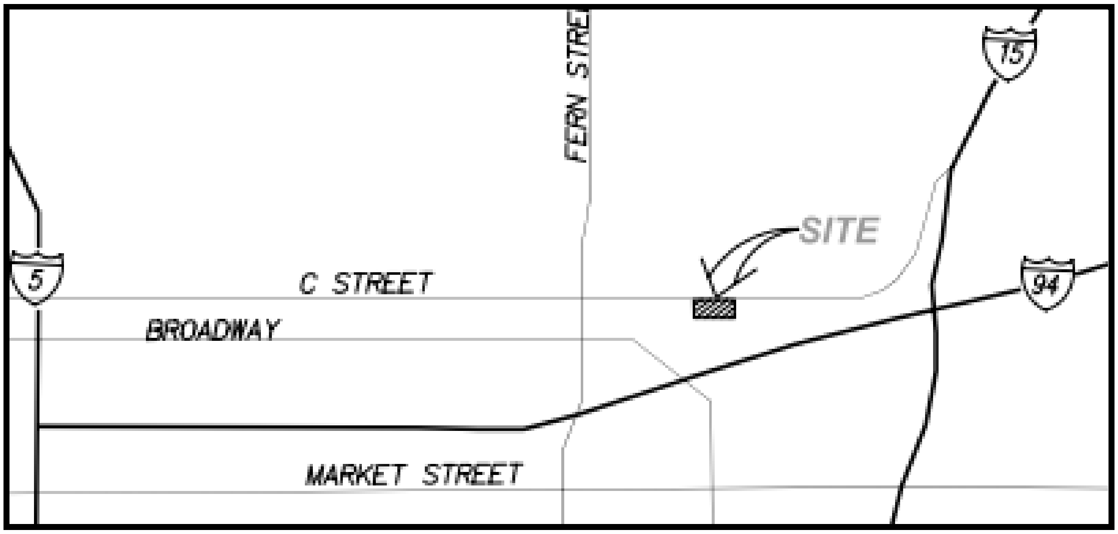

Figure 1-1. Vicinity Map
(source: Husaker 2018)

1.2 Objectives and Scope of This Work

1.2.1 Objectives

The objectives of the work reported herein are twofold, as described below.

1. Objective 1, Review and Reconnaissance. Complete a reconnaissance of the site, visually verifying its current condition, comparing these observations with the 2002 site characterization, assessing its suitability for the currently planned development.

2. Objective 2, Geotechnical. Provide recommendations for geotechnical-related development, including foundations and earthwork.

1.2.2 Scope

In order to accomplish the above objectives, NOVA undertook the task-based scope of work described below.

- Task 1, Background Review. Reviewed *Report of Preliminary Geotechnical Investigation and Geologic Reconnaissance, Proposed Starcevic Apartment Development, 3201 'C' Street, San Diego, California*, Geotechnical Exploration, Inc., Job 02-8263, 27 August 2002 (hereafter, 'GEI 2002').

  NOVA reviewed other readily available background data regarding the site area, including a site biologic report, published topographic maps, published geologic data and fault maps. Drawings depicting preliminary planning for the development were also reviewed.

- Task 2, Site Reconnaissance. A NOVA engineer and geologist completed a visual site reconnaissance on February 2, 2018.

- Task 3, Engineering Evaluation. Reviewed of the findings of GEI 2002, completing independent geotechnical evaluations relevant to development of foundations and criteria for earthwork.

- Task 4, Reporting. Preparation of this report addressing recommendations for earthwork and development of foundation support for the residential structures completes NOVA's scope of work.

1.3 Expected Use of This Report

This report is an update of a 2002 geotechnical investigation by others. As an update geotechnical report, the recommendations presented herein are intended to supersede those provided in the 2002 report.

NOVA expects that this report will be utilized by the Design Team in planning and design of the foundation and earthwork elements of the planned development.

1.4 Limitations

The recommendations included in this report are not final. These recommendations are developed by NOVA using judgment and opinion and based upon the limited information available from the exploratory trenches. NOVA can finalize its recommendations only by observing actual subsurface conditions revealed during construction. NOVA cannot assume responsibility or liability for the report's recommendations if NOVA does not perform construction observation.

This report does not address any assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site.

The report does not address any of the numerous other considerations often associated with assessments of real property, including:

- cultural/archaeologic/historic resources; or,
- any environmental consideration, including assessment of biological/habitat resources.

Appendix A provides additional discussion regarding the limitations and use of this report.

1.5 Report Organization

The remainder of this report is organized as described below.

- Section 2 reviews the presently available project information.
- Section 3 describes the field investigation and laboratory testing.
- Section 4 describes the geologic and subsurface conditions.
- Section 5 reviews soil and geologic hazards that may affect the site.
- Section 6 provides recommendations for earthwork and foundations.
- Section 7 reviews planning for storm water infiltration.
- Section 8 provides recommendations for pavements.
- Section 9 lists the principal references used in evaluations for this report.

The report is supported by three appendices. Appendix A presents discussion regarding use of this report. Appendix B provides the 2002 preliminary geotechnical investigation (i.e., GEI 2002). Appendix C presents an Infiltration Feasibility Condition Letter, as well as completed worksheets.

2.0 PROJECT INFORMATION

2.1 Location

The planned townhomes will be developed on a vacant approximately 1-acre parcel located at the southeast corner of the intersection of 32nd Street and C Street (hereafter, also referenced as 'the site') in the City of San Diego. This site is bounded to the north by C Street, to the west by 32nd Street, to the south by vacant land, and to the east by an existing apartment development and an alleyway. The site is located within the Greater Golden Hills community planning area. Figure 2-1 depicts the location and limits of the planned development.

Figure 2-1. Site Location and Limits

2.2 Planned Development

2.2.1 General

NOVA's understanding of the development is based on review of the following planning level drawings:

1. Hunsaker 2018. *Vesting Tentative Map/Site Development Plan, 32nd & C Street, City of San Diego, California*, Hunsaker & Associates. W.O. 3471-0001, January 22, 2018.

2. McKinley 2018. *32nd & C City Mark Architectural Submittal Package*, The McKinley Associates, Inc., January 18, 2018.

The above preliminary planning indicates the development will include 20 multilevel townhomes. The proposed townhomes are identified on McKinley 2018 as Buildings A through D. Hunsaker 2018 shows that Building A comprises Units 1 through 6; Building B comprises Units 7 through 11; Building C comprises Units 12 through 15; and Building D comprises Units 16 through 20.

Associated with the townhomes, improvements to the site will include site retaining walls, private sewer, water and storm drain utilities within public streets, and construction of street and alley improvements.

Figure 2-2 depicts conceptual planning for the layout of the planned development.

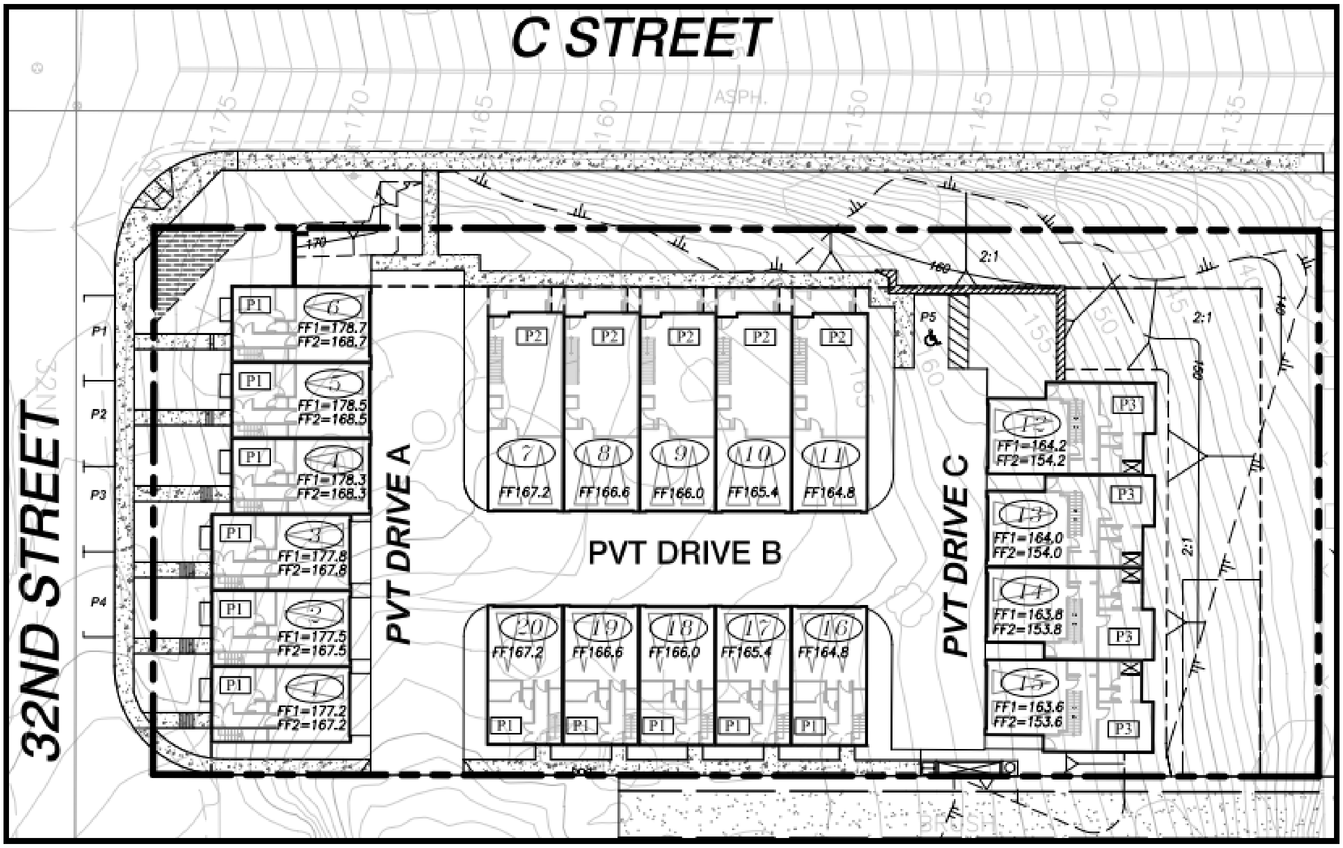

Figure 2-2. Conceptual Design for the Planned Development
(source: Hunsaker 2018)

2.3 Structural

2.3.1 General

Design is still in preliminary stages. As a consequence of the preliminary nature of the design, structural design has not begun. However, it is expected that design will seek development of the townhomes on shallow (ground supported) foundations.

2.3.2 Below Grade Construction

Based upon review of the design that is currently available, Building A (Units 1-6) will be partly subterranean on three sides. Building C (Units 12-15) will have an at grade level and a below grade level.

Figure 2-3 depicts this planning at Building C.

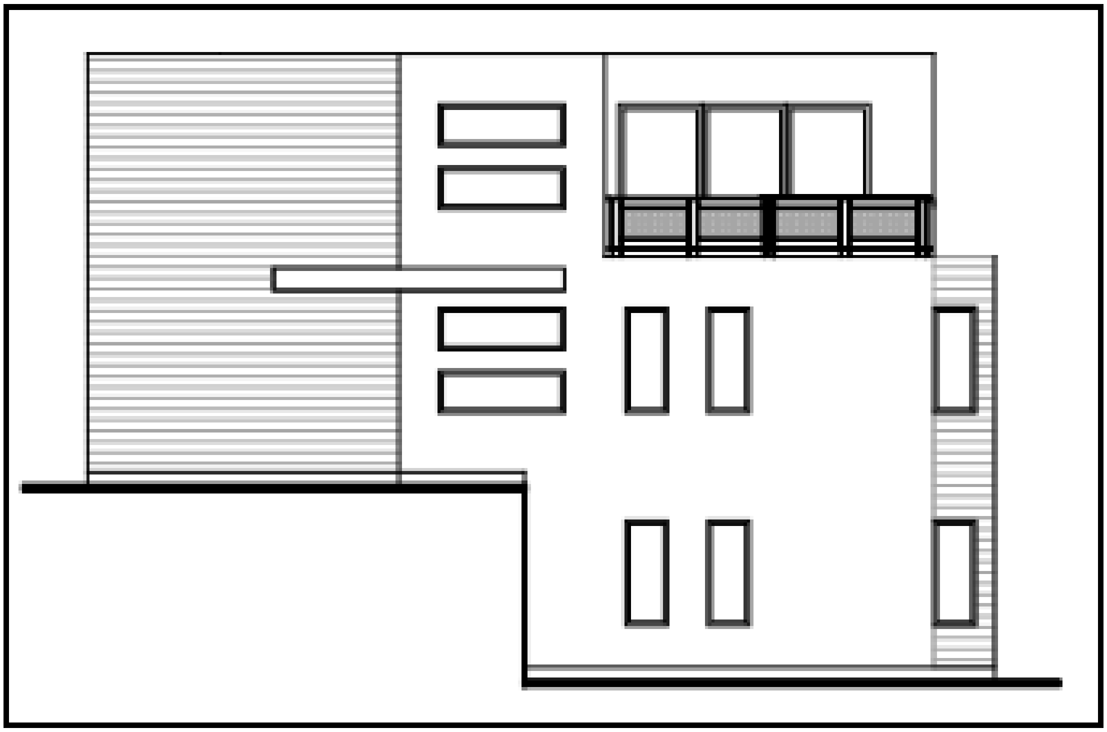

Figure 2-3. Building C South Elevation View Showing Cut Into Ground
(source: McKinley 2018)

Planning also indicates that design will also require development of relatively smaller cantilevered site retaining walls, on the order of 6 feet or less in height. Construction of utilities, certain elements of storm water BMPs (discussed above), and related infrastructure will require limited below grade construction.

2.3.3 Stormwater BMPs

Hunsaker 2018 depicts current planning for storm water management. Hunsaker 2018 indicates that site development and related drainage will be adapted to the current site topography, for the most part draining the site to the south and southeast.

Stormwater BMPs will include detention tankage and modular wetlands to effect biofiltration prior to discharge to a new storm drain. Figure 2-4 (following page) depicts the planned layout of the storm drain system.

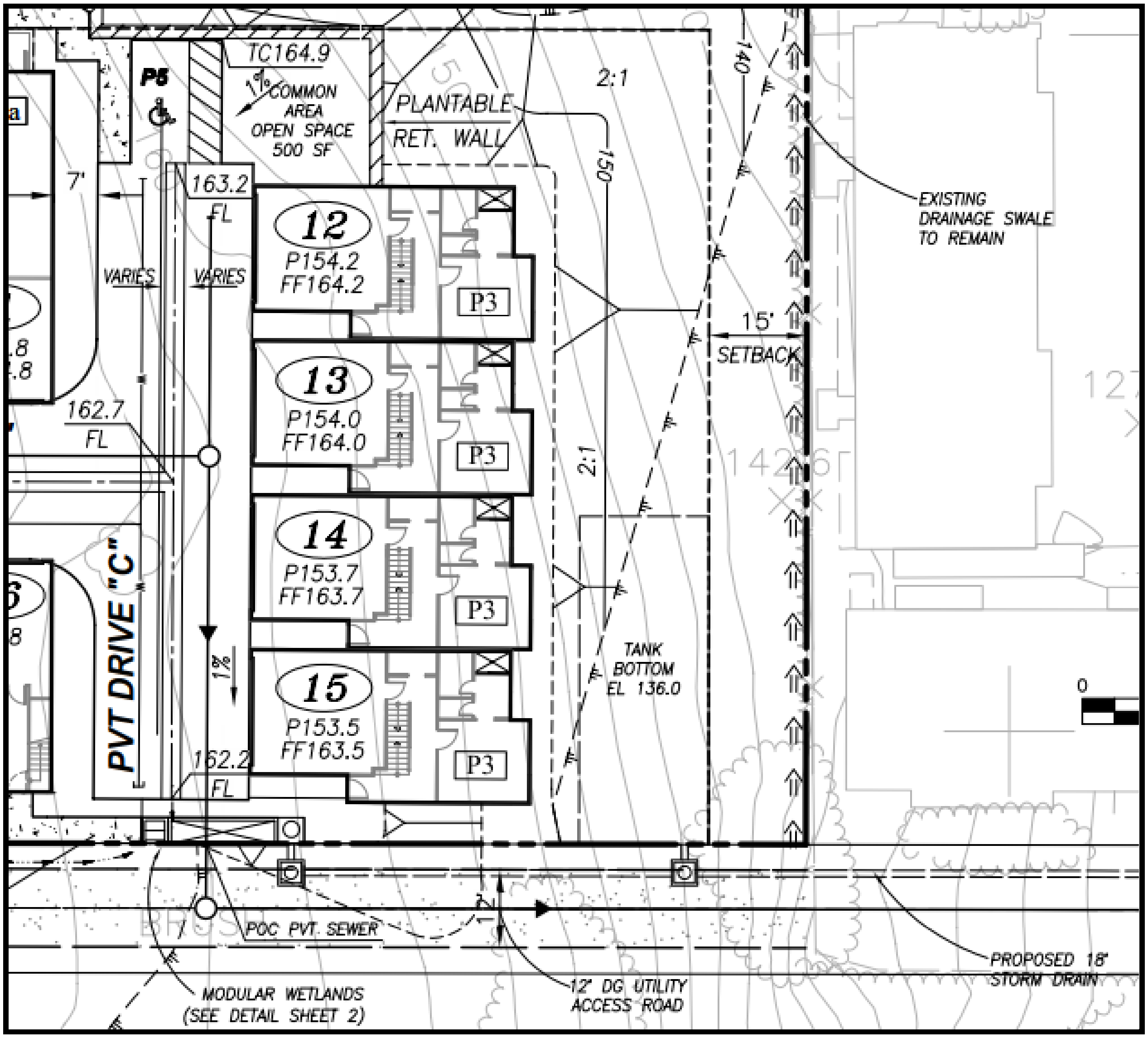

Figure 2-5. Proposed Storm Drain System
(source: Hunsaker 2018)

Figure 2-5 provides an elevation view of the biofiltration BMP planned to be located near the end of Private Drive C. this structure will release treated storm water to a proposed new storm drain.

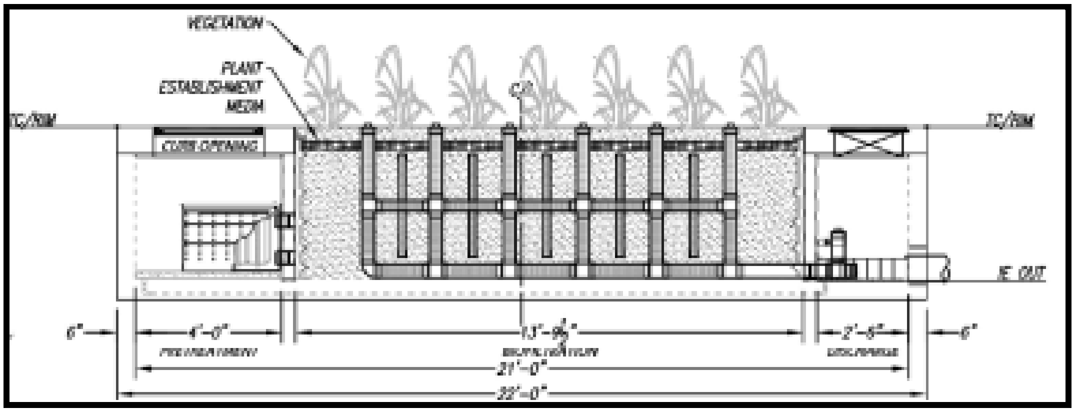

Figure 2-5. Stormwater Biofiltration Detail
(source: Hunsaker 2018)

2.4 Potential for Earthwork

Adapting Buildings A and C to the existing site grades may require cuts of up to 10 to 12 feet to establish building pads. Earthwork at Buildings B and D may require fills of two to six feet.

In addition, 2:1 (H:V) fill slopes of up to 14 feet in height are proposed in other areas of the site.

3.0 GEI 2002 FIELD EXPLORATION AND LABORATORY TESTING

3.1 Overview

The field exploration reported in GEI 2002 was comprised of two elements, namely: (i) geologic reconnaissance, and (ii) seven (7) exploratory trenches. Figure 3-1 depicts the geologic mapping and the location of the exploratory trenches.

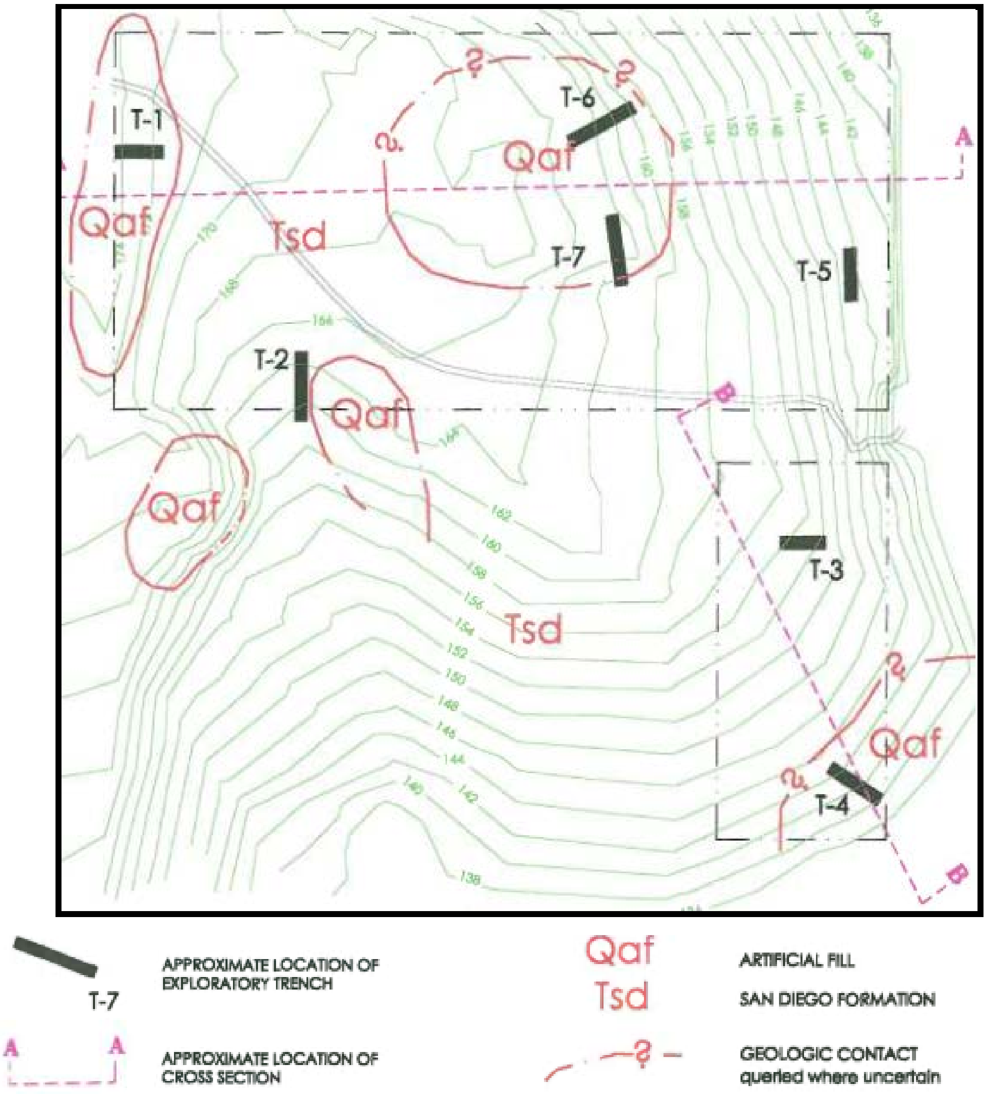

Figure 3-1. Site Exploration and Geologic Mapping
(source: GEI 2002)

3.2 Exploratory Trenches

The exploratory trenches were excavated by a rubber-tired backhoe. The locations for the exploratory trenches were determined in the field by the GEI geologist as a means of supporting geologic mapping.

Elevations of the ground surface at the trench locations were estimated. Table 3-1 provides an abstract of the indications of the exploratory trenches.

Table 3-1. Abstract of the Exploratory Trenches

Trench Reference	Approximate Ground Surface Elevation (feet, msl)	Total Depth Below Ground Surface (feet)[1]	Depth to the San Diego Formation (feet) [2,3]
T-1	±174	5.5	3
T-2	±162	6	2
T-3	±151	5	3
T-4	±140	6.5	2.5
T-5	±145	5	2
T-6	±163	7	4.5
T-7	±164	20.5	4.5

Notes:

1. Groundwater not encountered in any trench
2. All soils above the San Diego Formation (Tsd) are undocumented artificial fill (Qaf) or residual soil.

GEI 2002 reports that disturbed samples were recovered from the trenches.

3.3 Geotechnical Laboratory Testing

3.3.1 Compaction

Near-surface soils removed from exploratory trenches may be suitable for reuse (see Section 6 for definition of suitable soils). In order to address the potential that some soil could be replaced, compaction testing after ASTM D 1557 was undertaken by GEI to establish the moisture-density relationship of these soils. The results of the compaction testing are summarized in Table 3-2.

Table 3-2. Summary of the Compaction Testing, ASTM D 1557

Trench	Sample Depth (feet)	Soil Description	Maximum Dry Density (lb/ft^3)	Optimum Moisture Content (%)
T-1	3 to 4	Dark brown clayey sand	114.5	14.5
T-2	0 to 2	Gray brown silty sand	125	10.5
T-2	3 to 5	Orange brown silty sand	120	12

3.3.2 Soil Gradation and Moisture

The visual classifications were further evaluated by performing moisture content and grain size testing. Gradation testing was performed after ASTM D422. Table 3-3 provides a summary of this testing.

Table 3-3. Abstract of the Soil Gradation and Moisture Content Testing

Sample Reference		As Sampled		Percent Finer than the U.S. No 200 Sieve	Classification after ASTM D2488
Trench	Depth (feet)	Natural Moisture (%)	Dry Unit Weight (pcf)		
T-1	3 to 4	11	--	45	SM-SC
T-2	0 to 2	10	--	19	SM
T-2	3 to 5	10	--	3	SP

Note: ‘Percent finer’ is percent by weight passing the U.S. # 200 sieve (0.074 mm).

3.3.3 Expansion Potential

Testing to determine Expansion Index (EI) was completed after ASTM D 4829). Table 3-4 summarizes this testing.

Table 3-4. Testing To Determine Expansion Index

Sample Reference		As Tested		Load (psf)	Expansion Index after ASTM D4829
Trench	Depth (feet)	Initial Moisture (%)	Initial Dry Weight (pcf)		
T-1	3 to 4	11	97	144	11
T-2	0 to 2	10	116	144	4
T-2	3 to 5	10	104	144	29

4.0 SITE CONDITIONS

4.1 Geologic Setting

4.1.1 Regional

The project area is located in the coastal portion of the Peninsular Range geomorphic province. This geomorphic province encompasses an area that extends approximately 900 miles from the Transverse Ranges and the Los Angeles Basin south to the southern tip of Baja California. The province varies in width from approximately 30 to 100 miles.

This area of the Province has undergone several episodes of marine inundation and subsequent marine regression (coastline changes) throughout the last 54 million years. These events have resulted in the deposition of a thick sequence of marine and nonmarine sedimentary rocks on the basement igneous rocks of the Southern California Batholith and metamorphic rocks.

Gradual emergence of the region from the sea occurred in Pleistocene time, and numerous wave-cut platforms, most of which were covered by relatively thin marine and nonmarine terrace deposits, formed as the sea receded from the land. Accelerated fluvial erosion during periods of heavy rainfall, along with the lowering of base sea level during Quaternary times, resulted in the rolling hills, mesas, and deeply incised canyons which characterize the landforms in western San Diego County.

4.1.2 Site Specific

The site is situated within the Coastal Plain of the Peninsular Ranges geomorphic province. The geology of the area is controlled by both alluvial and marine influences. This plain is underlain by near-shore marine sedimentary rocks deposited at various intervals from the late-Mesozoic through Quaternary ages.

The Coastal Plain increases in elevation from west to east across marine terrace surfaces uplifted during Pleistocene time. Sedimentary rocks consist of sandstones, siltstones, and claystones that were deposited during the Cretaceous, Tertiary, and Quaternary periods.

The geologic unit mapped in this area and disclosed by the exploratory trenches is the late Tertiary-aged San Diego Formation (Tsd). This formation is middle or late Pliocene in age and is principally composed of yellowish brown fine- to medium-grained, poorly indurated sandstone. The upper 1 to 2 feet of this soil unit is weathered, including some finer grained soils and cobbles. This observation is consistent with descriptions and the geologic literature, which note that thin beds of clay, brown mudstone, and marl, as well as lenses of cobble conglomerate, can also be found in the San Diego Formation.

Figure 4-1 (following page) depicts the geology of the site area from which it can be seen that the San Diego Formation (‘Tsd’) is mapped to occur widely in this area of San Diego.

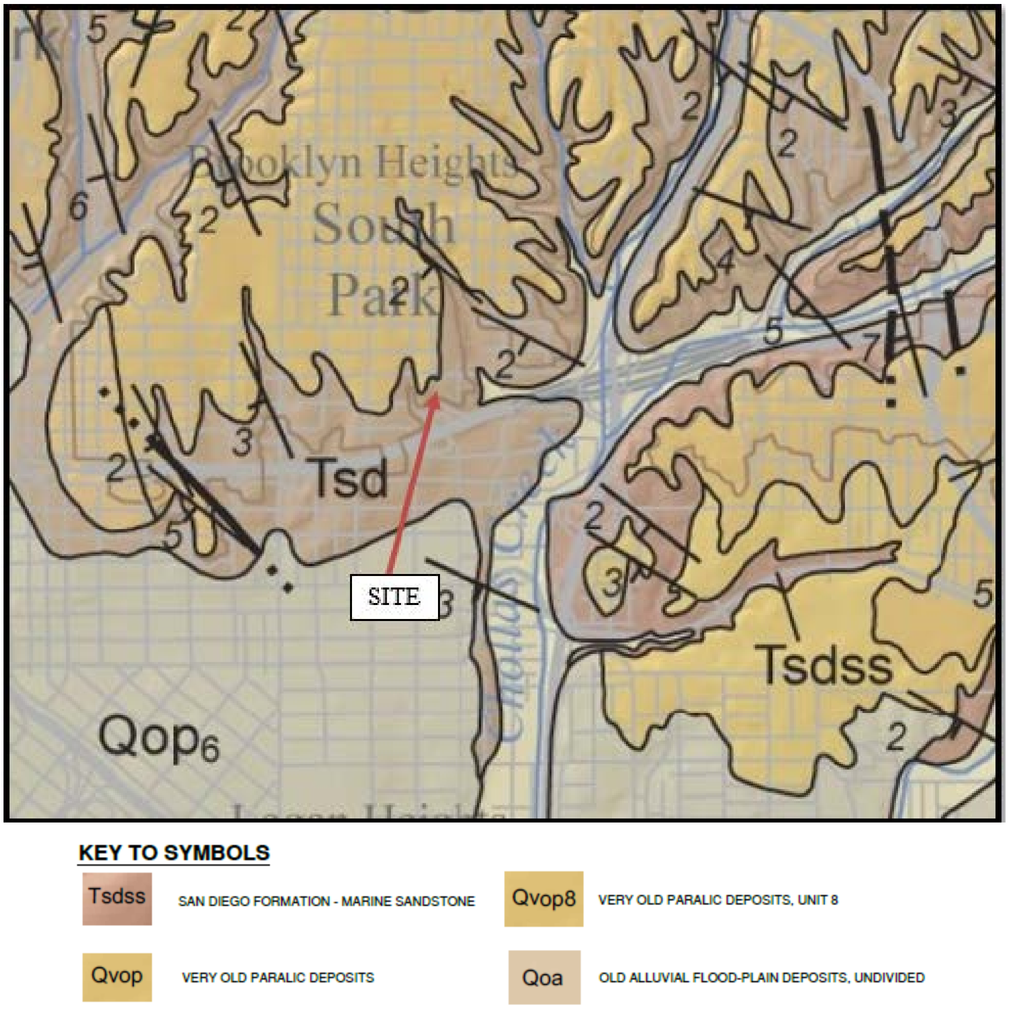

Figure 4-1. Geologic Mapping of the Site Vicinity

4.2 Site-Specific Conditions

4.2.1 Surface

The site area is currently undeveloped and unused. Figure 4-2 (following page) provides a close up aerial view of the site depicting surface conditions. As may be seen by review of this graphic, the site is sparsely vegetated with trees and light grasses. Figure 4-3 (following page) provides a current ground level view of this area.

The ground surface slopes downward from west to east, declining from an average elevation of about +180 feet msl at the northwest corner of the site to about +130 feet msl at the northeast end. This elevation differential occurs over a distance of about 300 feet, an average surface gradient of about 16%. Relatively steeper ground surface gradients occur to the south and east.

Figure 4-2. Close-up Aerial View Depicting Surface Conditions

Figure 4-3. Surface Conditions, February 2018

4.2.2 Subsurface

The exploratory trenches indicate the site is covered by a thin veneer of fill below which lies above naturally occurring dense/stiff sands and clays. For the purposes of this report, the subsurface may be considered to occur as the sequence of soil units described below.

- Unit 1, Fill. As is evident from review of Figure 3-1, the site is locally covered by a thin artificial fill (Qaf). This unit is a predominantly sandy mix of soils of medium dense consistency, ranging from 2 feet to about 6 feet in thickness. No records exist regarding placement of this fill, such that the fill is considered 'undocumented', subject to wide variations in gradation and consistency.
- Unit 2, San Diego Formation. The fill material is underlain by silty and sandy soils/sandstones of the San Diego Formation (Tsd). These materials are characteristically sandy dense to very dense consistency. Locally, the upper surface of this unit is weathered such that soils are somewhat finer grained, with low plasticity. This upper surface also locally includes gravel and cobbles. Throughout the region, the San Diego Formation is characterized by relatively higher strength and low compressibility.

Figure 4-4 depicts an exposure of the Unit 2 San Diego Formation at a construction site immediately southeast of the subject site. As may be seen by review of this figure, an approximately 4-foot high excavation in this unit stands vertically. The upper, weathered portion of Unit 2 is darker in color than the unweathered sandstones below it. Also evident are cobbles that occur within the upper, weathered zone.

Figure 4-4. Exposure of the Unit 2 San Diego Formation at Adjacent Construction Site, January 2018

4.2.3 Groundwater

Static

No groundwater was encountered in the trenches above the maximum depth explored (20 feet). Based upon experience3 in the area, NOVA expects groundwater to first occur below about 30 feet bgs, or about El +120 feet msl. Groundwater should not affect construction.

Perched

Infiltrating storm water from prolonged wet periods can 'perch' atop localized zones of lower permeability soil that exist above the static groundwater level. Localized perched groundwater conditions may also develop once site development is complete and landscape irrigation commences.

If work is undertaken during or soon after a wet period, perched water could affect construction.

4.2.4 Surface Water

No surface water was evident on the site at the time of NOVA's February 2018 site reconnaissance.

An ephemeral stream crosses the site, flowing approximately south to north on the western one-third of the site. The approximate alignment and limits of this drainage feature are evident on a 2010 aerial photo, reproduced as Figure 4-3.

NOVA did not observe any other visual evidence of seeps, springs, erosion, staining, discoloration, etc. that would indicate the occurrence of surface water.

5.0 REVIEW OF GEOLOGIC HAZARDS

5.1 Overview

This section provides review of soil and geologic-related hazards common to this region of California, considering each for its potential to affect the planned development.

The primary hazard identified by this review is the risk for moderate-to-severe ground shaking in response to a large-magnitude earthquake during the lifetime of the planned development. While there is no risk of liquefaction or related seismic phenomena, strong ground motion could affect the site. This circumstance is common to all civil works in this area of California.

The following subsections address these and other potential soil and geologic hazards.

5.2 Geologic Hazards

5.2.1 Strong Ground Motion

The site is not located within a currently designated Alquist-Priolo Earthquake Zone (Hart and Bryant, 2007). No known active faults are mapped in the site area. The nearest known active fault is the Rose Canyon fault system, located approximately 1.5 miles west of the site. This system has the potential to be a source of strong ground motion.

The seismicity of the site was evaluated utilizing a web-based analytical tool provided by the USGS. This evaluation shows the site may be subjected to a Magnitude 7 seismic event, with a corresponding risk-based Peak Ground Acceleration (PGA_M) of $PGA_M \sim 0.49$ g.

5.2.2 Fault Rupture

No evidence of faulting was observed during NOVA's geologic reconnaissance of the site. No faulting is otherwise mapped within a mile of the site. Because of the lack of known active faults on the site, the potential for surface rupture at the site is considered low. Shallow ground rupture due to shaking from distant seismic events is not considered a significant hazard, although it is a possibility at any site.

Figure 5-1 (following page) reproduces seismic hazard mapping of the site vicinity by the City of San Diego (reference, City of San Diego, Seismic Safety Study, Geologic Hazards and Faults, City of San Diego Development Services Department, April 3, 2008). The site is mapped in Area 52 that indicate "Other level areas, gently sloping steep terrain, favorable structure. Low risk".

5.2.3 Landslide

As used herein, 'landslide' describes downslope displacement of a mass of rock, soil, and/or debris by sliding, flowing, or falling. Such mass earth movements are greater than about 10 feet thick and larger than 300 feet across. Landslides typically include cohesive block glides and disrupted slumps that are formed by translation or rotation of the slope materials along one or more slip surfaces.

The causes of classic landslides start with a preexisting condition- characteristically, a plane of weak soil or rock-inherent within the rock or soil mass. Thereafter, movement may be precipitated by earthquakes, wet weather, and changes to the structural or loading conditions on a slope (e.g., by erosion, cutting, filling, release of water from broken pipes, etc.).

In consideration of the relatively level ground at and around the site, NOVA considers the landslide hazard at the site to be ‘negligible’ for the site and the surrounding area.

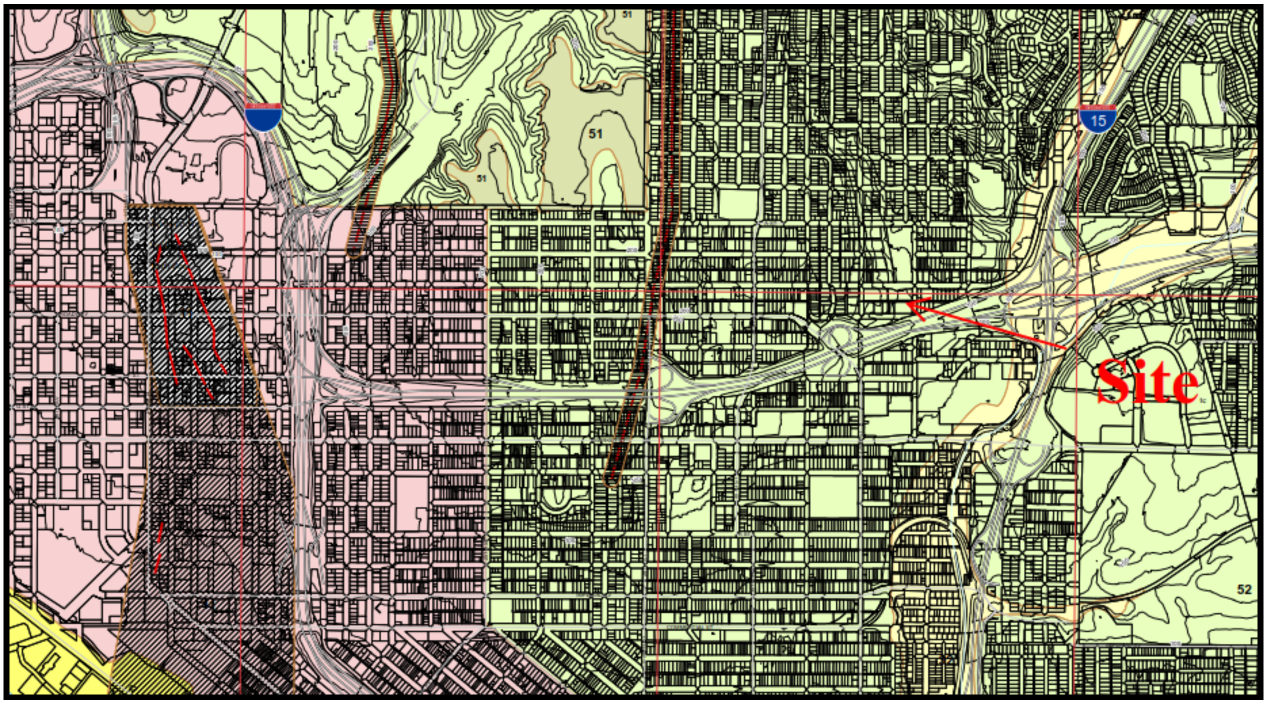

Figure 5-1. Seismic Setting, Including Faulting in the Site Vicinity
(source: *Seismic Safety Study*, *Geologic Hazards, and Faults*, Grid Tile 17, City of San Diego, April 2008)

5.3 Soil Hazards

5.3.1 Embankment Stability

As used herein, ‘embankment stability’ is intended to mean the safety of localized natural or man-made embankments against failure. Unlike landslides described above, embankment stability can include smaller scale slope failures such as erosion-related washouts and more subtle, less evident processes such as soil ‘creep.’

Fill slopes of up to 14 feet high are proposed. The proposed slopes should be stable provided they are constructed in accordance with the recommendations provided in this report. Slopes currently exist at the site boundaries. These slopes are largely formed over the Unit 2 San Diego Formation and will be inherently stable against deeper seated instability.

Portions of the slopes formed of fill may be prone to erosion during periods in which landscaping atop these slopes fails. Absent proper maintenance to restore eroded areas, larger-scale embankment instability may occur. In particular, absent care to control drainage over the slopes and to vegetate slopes to limit erosion due to normal run-on, surficial instability (evident as "sloughing" and/or “rilling erosion”) will certainly occur, a longer-term consequence of which will be larger-scale loss of ground.

5.3.2 Seismic

Liquefaction

'Liquefaction' refers to the loss of soil strength during a seismic event. The phenomenon is observed in areas that include geologically 'younger' soils (i.e., soils of Holocene age), shallow water table (less than about 60 feet depth), and cohesionless (i.e., sandy and silty) soils of looser consistency. The seismic ground motions increase soil water pressures, decreasing grain-to-grain contact among the soil particles, which causes the soils to lose strength.

Resistance of a soil mass to liquefaction increases with increasing density, plasticity (associated with clay-sized particles), geologic age, cementation, and stress history. The stiff/dense and geologically 'older' subsurface units at this site have no potential for liquefaction.

Seismically Induced Settlement

Apart from liquefaction, a strong seismic event can induce settlement within loose to moderately dense, unsaturated granular soils. The cohesionless sandy soils of both Unit 1 and Unit 2 are sufficiently dense and finer grained that these soils will not be prone to seismic settlement.

Lateral Spreading

Lateral spreading is a phenomenon in which large blocks of intact, non-liquefied soil move downslope on a liquefied soil layer. Lateral spreading is often a regional event. For lateral spreading to occur, a liquefiable soil zone must be laterally continuous and unconstrained, free to move along sloping ground. Due to the absence of a potential for liquefaction and relatively flat surrounding topography, there is no potential for lateral spreading.

5.3.3 Expansive Soil

Expansive soils are characterized by their ability to undergo significant volume changes (shrinking or swelling) due to variations in moisture content¸ the magnitude of which is related to both clay content and plasticity index. These volume changes can be damaging to structures. Nationally, the annual value of real estate damage caused by expansive soils is exceeded only by that caused by termites.

5.3.4 Hydro-Collapsible Soils

Hydro-collapsible soils are common in the arid climates of the western United States in specific depositional environments- principally, in areas of young alluvial fans, debris flow sediments, and loess (wind-blown sediment) deposits. These soils are characterized by low *in situ* density, low moisture contents, and relatively high unwetted strength. The soil grains of hydro-collapsible soils were initially deposited in a loose state (i.e., high initial 'void ratio') and thereafter lightly bonded by water sensitive binding agents (e.g., clay particles, low-grade cementation, etc.). While relatively strong in a dry state, the introduction of water into these soils causes the binding agents to fail. Destruction of the bonds/binding causes relatively rapid densification and volume loss (collapse) of the soil. This change is manifested at the ground surface as subsidence or settlement. Ground settlements from the wetting can be damaging to structures and civil works. Human activities that can facilitate soil collapse include irrigation, water impoundment, changes to the natural drainage, disposal of wastewater, etc.

The consistency and geologic age of the Unit 2 San Diego Formation is such that these soils are not potentially hydro-collapsible.

5.4 Other Hazards

5.4.1 Flood

The site is not located within a FEMA-designated flood zone, FEMA Panel Nos**.** 06073C1885G and 06073C1903G, effective on 05/16/2012. Most of the site area is designated "Zone X," an area of minimal flood hazard. However, the northwestern portion of the site is identified to include a 0.2% annual chance of flooding.

Figure 5-2 reproduces flood mapping by FEMA of the site area.

Figure 5-2. Flood Mapping of the Site Area

(source: FEMA Panel Nos**.** 06073C1885G and 06073C1903G, effective on 05/16/2012)

5.4.2 Tsunami

Tsunami describes a series of fast-moving, long period ocean waves caused by earthquakes or volcanic eruptions. The altitude of the site and distance from the ocean preclude this threat.

5.4.3 Seiche

Seiches are standing waves that develop in an enclosed or partially enclosed body of water such as lakes or reservoirs. Harbors or inlets can also develop seiches. Most commonly caused by strong winds and rapid atmospheric pressure changes, seiches can be effected by seismic events and tsunamis.

The site is not located near a body of water that could generate a seiche.

6.0 EARTHWORK AND FOUNDATIONS

6.1 Overview

6.1.1 General

This report is an update of a 2002 preliminary geotechnical investigation reported in *Report of Preliminary Geotechnical Investigation and Geologic Reconnaissance, Proposed Starcevic Apartment Development, 3201 'C' Street, San Diego, California,* Geotechnical Exploration, Inc., Job 02-8263, 27 August 2002 ('GEI 2002').. As an update, the recommendations presented herein are intended to supersede those provided in the 2002 report.

Based upon its experience with similar projects in the San Diego area, NOVA concurs with the scope the investigation provided in GEI 2002. The data developed by that work is suitable for projects of this genre.

Based upon the indications of the field and laboratory data developed by GEI 2002 for this site, as well as review of previously developed subsurface information, it is the opinion of NOVA that the site is suitable for development of the planned structures on shallow foundations provided the geotechnical recommendations described herein are followed.

As is discussed in Section 5, the planned structures may experience strong ground motions associated with a large magnitude earthquake. This hazard is common to all civil development in this area of California. Section 6.2 addresses seismic design parameters.

6.1.2 Review and Surveillance

The subsections following provide geotechnical recommendations for the planned development as it is now understood. It is intended that these recommendations provide sufficient geotechnical information to develop the project in general accordance with 2016 California Building Code (CBC) requirements.

NOVA should be given the opportunity to review the grading plan, foundation plan, and geotechnical-related specifications as they become available to confirm that the recommendations presented in this report have been incorporated into the plans prepared for the project. All earthwork related to site and foundation preparation should be completed under the observation of NOVA.

6.2 Seismic Design Parameters

6.2.1 Site Class

Determination of Site Class typically includes deep borings with testing determine Standard Penetration resistance ('N-values'). The depth of soil information available for this site is limited. However, the geology of the site is well understood such that the site is considered Site Class C per ASCE 7-10 (Table 20.3-1).

6.2.2 Seismic Design Parameters

Table 6-1 (following page) provides seismic design parameters for the site in accordance with 2016 CBC and mapped spectral acceleration parameters.

Table 6-1. Seismic Design Parameters, ASCE 7-10

Parameter	Value
Site Soil Class	C
Site Latitude (decimal degrees)	32.71689
Site Longitude (decimal degrees)	-117.12562
Site Coefficient, F_a	1.000
Site Coefficient, F_v	1.368
Mapped Short Period Spectral Acceleration, S_S	1.125 g
Mapped One-Second Period Spectral Acceleration, S_1	0.432 g
Short Period Spectral Acceleration Adjusted For Site Class, S_{MS}	1.125 g
One-Second Period Spectral Acceleration Adjusted For Site Class, S_{M1}	0.591 g
Design Short Period Spectral Acceleration, S_{DS}	0.750 g
Design One-Second Period Spectral Acceleration, S_{D1}	0.394 g

Source: U.S. Seismic Design Maps, found at http://earthquake.usgs.gov/designmaps/us/application.php

6.3 Corrosivity and Sulfates

6.3.1 Corrosivity

Electrical resistivity, chloride content, and pH level are all indicators of the soil's tendency to corrode ferrous metals. No such testing is reported in GEI 2002. However, based upon its experience in this area of San Diego with development of civil works in the Unit 2 San Diego Formation, the on-site soils should not be corrosive to embedded metals. If additional information is required in this regard, soil chemical testing may be undertaken as design becomes finalized.

6.3.2 Sulfates

No testing was reported in GEI 2002 to evaluate the potential that water-soluble sulfates (SO_4) may affect concrete.

Based upon its experience in this area of San Diego with development of civil works in the Unit 2 San Diego Formation, the on-site soils should be expected to include a level of sulfates that would become a threat to embedded concrete. NOVA expects that the soils will with have concentrations of SO_4 with no potential to for sulfate attack to embedded concrete (i.e., Exposure Class 'S0' per American Concrete Institute (ACI) 318-08). . If additional information is required in this regard, soil testing for sulfates may be undertaken as design becomes finalized.

Table 6-2 (following page) reproduces the ACI guidance.

Table 6-2. Exposure Categories and Requirements for Water-Soluble Sulfates

Exposure Category	**Class**	**Water-Soluble Sulfate (SO_4) In Soil (percent by weight)**	**Cement Type (ASTM C150)**	**Max. Water-Cement Ratio**	**Min. f'_c (psi)**
Not Applicable	S0	$SO_4 < 0.10$	-	-	-
Moderate	S1	$0.10 \leq SO_4 < 0.20$	II	0.50	4,000
Severe	S2	$0.20 \leq SO_4 \leq 2.00$	V	0.45	4,500
Very severe	S3	$SO_4 > 2.0$	V + pozzolan	0.45	4,500

Adapted from: ACI 318-08, Building Code Requirements for Structural Concrete

6.3.3 Limitations

Testing to determine several chemical parameters that indicate a potential for soils to be corrosive to construction materials are traditionally completed by the Geotechnical Engineer, comparing test results with a variety of indices regarding corrosion potential.

Like most geotechnical consultants, NOVA does not practice in the field of corrosion protection, since this is not specifically a geotechnical issue. Should you require more information, a specialty corrosion consultant should be retained to address these issues.

6.4 Site Preparation and Earthwork

6.4.1 Establish Erosion and Sedimentation Control

Construction-related erosion and sedimentation must be controlled in accordance with Best Management Practices and City of San Diego requirements. These controls should be established at the outset of site disturbance.

6.4.2 Clearing and Grubbing

Before proceeding with construction, all vegetation, root systems, topsoil, refuse and other deleterious nonsoil materials should be stripped from construction areas.

Underground utilities within the footprint of the proposed structures should be grouted in place or removed. Clearing, include the removal of any abandoned utilities, should be extended a minimum of 5 feet beyond the building and pavement limits.

Stripped materials consisting of vegetation and organic materials should be wasted from the site, or used in landscaping non-structural areas

6.4.3 Grading for Foundations

Foundations- either ground supported slabs or footings- may be supported at grade on compacted fill or Unit 2 San Diego Formation prepared as described in this section. Preparation of the subgrade for ground supported slabs should include the step-wise series of actions described below.

1. Excavation. Fill soils not removed by planned excavations should be removed to contact with the underlying Unit 2 San Diego Formation within areas to support the proposed buildings and retaining walls. The removals should extend to at least three feet laterally beyond the buildings and site walls footprint. The excavated soils should be staged near the excavation for moisture conditioning and subsequent reuse.
2. Redensification/Proof Rolling. Prior to replacement, the soils disturbed by excavation should be examined to identify any localized soft, yielding or otherwise unsuitable materials by a Geotechnical Engineer from NOVA. Areas at the bottom of the removal area that are disturbed by excavation should be proof rolled with a heavily loaded wheeled vehicle (for example, a loaded dump truck) to identify any remaining loose areas.
3. Soil Replacement. Excavated soils that are free of organics may be replaced following moisture conditioning to at least 2% of the optimum moisture content then recompacted to at least 90% relative compaction after ASTM D1557 (the 'Modified Proctor'). The moisture conditioned soil should be replaced in loose lifts, then de3nsified by equipment suitable for the lift thickness and soil type. In no case should loose lifts of soil should exceed 10-inches.
4. Select Replacement Soil. In the event that the excavated soils prove unsuitable for use, or a shortage of these soils occurs, the soil replacement may be completed by use of a Select Fill (see Section 6.4.4)
5. Timely Foundation Construction. Foundations should be constructed as soon as possible following subgrade approval. The Contractor should be responsible for maintaining the subgrade in its approved condition (i.e., free of water, debris, etc.) until the foundation is constructed.

6.4.4 Select Fill

Such soil should consist of a well-graded, low expansivity soil (EI < 30), with at least 40% fines and no particle size greater than 2". Most of the Unit 1 and Unit 2 soil now found on-site meet these criteria.

Select Fill should be moisture-conditioned to at least 2 percent over the optimum moisture content and densified to at least 90% relative compaction after ASTM D1557. The Select Fill should be placed in loose lifts not to exceed the ability of the equipment employed to completely densify the soil as required. In no case should loose lifts of soil should not exceed 10-inches.

6.4.5 Slope Construction

In areas to support fill slopes, keys should be cut into competent formational soils. Based on the proposed slope heights, the keys should be at least five feet wide and be sloped back into the hillside at least two percent. The keys should extend at least one foot into the competent supporting materials. Where the existing ground has a slope of 5:1 (horizontal to vertical) or steeper, it should be benched into as the fill extends upward from the keyway.

Compaction of fill slopes should be performed by back-rolling with a sheepsfoot compactor at vertical intervals of four feet or less as the fill is being placed, and track-walking the face of the slope when the slope is completed. If space allows, the fill slopes may alternatively be overfilled by at least three feet and then cut back to the compacted core at the design line and grade.

6.4.6 Grading for Flatwork

Non-structural areas outside of building pads that include sidewalks and other flatwork, etc., should be over-excavated a minimum of 12-inches below existing grade or finished subgrade, whichever is deeper, and be replaced with either moisture conditioned Unit 1 fill soil, Unit 2 San Diego Formation, or imported Select Fill.

Depending on the observed condition of the existing soils, deeper over-excavation may be required in some areas. The over-excavation should extend beyond the proposed improvements a horizontal distance of at least two feet.

6.5 Ground Supported Slabs

6.5.1 Conventionally Reinforced Slab-on-Grade

The individual townhomes may be supported on conventionally reinforced on-grade concrete slabs designed using a modulus of subgrade reaction of 90 pounds per cubic inch (90 pci) provided the subgrade is prepared as described in Section 6.4.

NOVA recommends that ground supported slabs be a minimum of 5 inches thick, though selection of slab thickness should be completed by the Structural Engineer.

Designed as described above, slab foundations will settle less than ¾ inch, with angular distortion due to differential settlement of unequally loaded areas less than one in 400. About 80% of foundation movement will occur during construction, such that post-construction settlement should be small enough to be imperceptible.

Despite the expected low building movements, minor cracking of slab concrete after curing due to drying and shrinkage is normal and can occur. Cracking is aggravated by a variety of factors, including high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due during curing. The use of low-slump concrete or low water/cement ratios can reduce the potential for shrinkage cracking. To reduce the potential for excessive cracking, concrete slabs-on-grade should be provided with construction or ‘weakened plane’ joints at frequent intervals. Joints should be laid out to form approximately square panels.

6.5.2 Slab Setback from Slopes

Descending slopes may be developed near several structures. Foundations for the townhomes should be set back from descending slopes as described below:

- a minimum of 5 feet from the crest of any descending slope 4:1 or flatter; and
- a minimum of 8 feet from the crest of any slope steeper than 4:1.

6.5.3 Slope Maintenance

The existing site slopes will be stable, but only with proper maintenance. Design should take care to not change the surface water environment in or around slopes. This should include care to control surface water drainage over the slopes and to vegetate slopes to limit erosion. Absent such protection, surficial instability or "sloughing" and “rilling erosion” will occur. If such smaller-scale losses of ground occur repairs should be effected to avoid larger scale loss of ground.

6.5.4 Moisture Barrier

Industry Design Guidance

NOVA recommends that any moisture barrier be designed in accordance with ACI Publication 302.1R-15, "*Guide to Concrete Floor and Slab Construction*."

Capillary Break and Vapor Membrane

Ground supported slabs that support moisture-sensitive floor coverings or equipment may be protected by an underslab moisture barrier. Such barriers normally include two components, as described below

1. Capillary Break. A "capillary break" consisting of a 4-inch thick layer of compacted, well-graded gravel or crushed stone should be placed below the floor slab. This porous fill should be clean coarse sand or sound, durable gravel with not more than 5 percent coarser than the 1-inch sieve or more than 10 percent finer than the No. 4 sieve, such as AASHTO Coarse Aggregate No. 57.

2. Vapor Membrane. A minimum 15-mil polyethylene membrane, or similarly-rated vapor barrier, should be placed over the porous fill to preclude floor dampness. Membranes set below floor slabs in should be rugged enough to withstand construction. NOVA recommends that a minimum 15 mil low permeance vapor membrane be used. For example, Carlisle-CCW produces the Blackline 400® underslab, vapor and air barrier, a 15 mil low density polyethylene (LDPE) rated at 0.012 perms after ASTM E 96.

Limitations of This recommendation

Recommendation for moisture barriers are traditionally included with geotechnical foundation recommendations, though these requirements are primarily the responsibility of the Structural Engineer or Architect. NOVA does not practice in the field of moisture vapor transmission evaluation since this is not specifically a geotechnical issue. A specialty consultant would provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structures, as deemed appropriate.

6.6 Shallow Foundations

6.6.1 Bearing Unit

Spread or continuous footings can also be used to support the new townhomes. Such foundations should bear entirely on either compacted fill or Unit 2 San Diego Formation. In the rare case that a cut and fill transition occurred within the foundations for a building, the footings will need to be extended at least 6 inches into formational soils.

6.6.2 Minimum Dimensions and Reinforcing

Continuous footings should be at least 18 you never know inches wide and have a minimum embedment of 24 inches below lowest adjacent grade. Isolated square or rectangular footings should be a minimum of 36 inches wide, embedded at least 24 inches below surrounding grade.

It is recommended that all foundation elements, including any grade beams, be reinforced top and bottom. The actual reinforcement should be designed by the Structural Engineer.

6.6.3 Allowable Contact Stress

Continuous and isolated footings constructed as described in the preceding sections may be designed using an allowable (net) contact stress of 2,000 pounds per square foot (psf). An allowable increase of 500 psf for each additional 12 inches in depth may be utilized if desired.

In no case should the maximum allowable contact stress should be greater than 4,000 psf. The maximum bearing value applies to combined dead and sustained live loads (DL + LL). The allowable bearing pressure may be increased by one-third when considering transient live loads, including seismic and wind forces.

6.6.4 Lateral Resistance

Resistance to lateral loads will be provided by a combination of (i) friction between the Unit 1 or Unit 2 soils and foundation interface; and, (ii) passive pressure acting against the vertical portion of the footings. Passive pressure may be calculated at 250 psf per foot of depth. A frictional coefficient of 0.35 may be used. No reduction is necessary when combining frictional and passive resistance.

6.6.5 Settlement

Structure supported on shallow foundations as recommended above will settle on the order of 0.5 inch or less, with about 80% of this settlement occurring during the construction period.

The differential settlement between adjacent columns is estimated on the order of ½ inch over a horizontal distance of 40 feet. The estimated seismic settlement (on the order of ½ inch or less, as is discussed in Section 5) would occur in addition to this movement.

6.6.6 Footing Construction and Inspection

Foundation excavations be cleaned of loose material and observed by a qualified Geotechnical Engineer or Engineering Geologist prior to placing steel or concrete to verify soil conditions exposed at the base of the excavations.

6.7 Control of Drainage Around Structures

6.7.1 General

Geotechnical, civil, structural, architectural and landscaping design for the areas around foundations must be undertaken be undertaken with a view to the maintenance of an environment that encourages constant moisture conditions in the soils following construction. Roof and surface drainage, landscaping, and utility connections must be designed to limit infiltration and/or releases of moisture beneath or around structures. This care should, at a minimum, include the actions described in the following subsections.

6.7.2 Landscaping

Landscaping adjacent to the structures should be limited. No new trees should be planted. If used, trees should be planted the greater of (i) 15 feet away from foundations; or (ii) 1.5 times its mature height away from foundations.

Do not plant flowers or shrubs closer than five (5) feet from foundations. Planters and other surface features which could retain water in areas adjacent to the buildings should be sealed or eliminated. Sprinkler systems should not be installed within 5 feet of foundations or floor slabs.

If trees are planted at locations that do not conform with the above, this action would be undertaken at the Designer's/Owner's sole risk. In such an event, the risk of such planting can perhaps be limited by utilizing root barriers, drought-resistant trees (to limit the need for watering) or trees with relatively shallower root systems.

6.7.3 Drainage

Rainfall to roofs should be collected in gutters and discharged in a controlled manner through downspouts designed to drain away from foundations. Downspouts, roof drains or scuppers should discharge into splash blocks to slabs or paving sloped away from buildings.

6.7.4 Surface Grades

In areas where sidewalks or paving do not immediately adjoin the structure, protective slopes should be provided with a minimum grade of approximately 3 percent for at least 10 feet from perimeter walls.

A minimum gradient of 1 percent is recommended in hardscape areas. In earth areas, a minimum gradient of 5 percent away from the structure for a distance of at least 10 feet should be provided. Earth swales should have a minimum gradient of 2 percent. Stormwater should be directed to approved drainage facilities. Proper surface and subsurface drainage will be required to minimize the potential for surface water to seep to the level of the bearing soils under the foundations, pavements, and flatwork.

6.7.5 Backfills

In order to reduce the possibility of moisture infiltration, backfill against foundation elements, exterior walls, and in utility and sprinkler line trenches should be with well compacted, non-expansive, low permeability soil that is free of all construction debris.

6.7.6 Utilities

Excavations for utility lines which extend under or near structural areas should be properly backfilled and compacted. Utilities should be bedded and backfilled with approved granular soil to a depth of at least one foot over the pipe. This backfill should be uniformly watered and compacted to a firm condition for pipe support. The remainder of the backfill should be low permeability clayey soils, moisture-conditioned and compacted to at least 90%.

6.8 Retaining Walls

6.8.1 General

As is discussed in Section 2, only conceptual design information is currently available. Review of this information indicates that smaller retaining walls may be employed near ascending slopes. Additionally, some residences may include ground-level walls that retain soil.

The following subsections provide guidance for design of retaining walls.

6.8.2 Shallow Foundations

Retaining walls should be developed on ground prepared in accordance with the criteria provided in Section 6.4. Continuous shallow foundations may be designed in accordance with the criteria provided in Section 6.6. Alternatively, retaining walls for individual townhomes may be founded on ground supported slabs designed in accordance with the criteria provided in Section 6.5.

6.8.3 Lateral Earth Pressures

Design may include smaller (perhaps 6 feet tall) cantilevered, conventionally reinforced concrete retaining walls. Some residences may include ground-level walls of similar height that retain soil. This section provides recommendations for wall pressures for those walls.

Lateral earth pressures for wall design are provided in Table 6-3 as equivalent fluid weights, in psf/foot of wall height or pounds per cubic foot (pcf). These values do not contain a factor of safety.

Table 6-3. Lateral Earth Pressures

Loading Condition	**Equivalent Fluid Density (pcf) for Approved 'Native' Backfill** Notes A, B	
	Level Backfill	**2:1 Backfill Sloping Upwards**
Active (wall movement allowed)	35	60
"At Rest" (no wall movement)	65	100
'Passive" (wall movement toward the soils)	260	220

Note A: 'native' means site-sourced soil with EI < 50 after ASTM D4546.
Note B: assumes wall includes appropriate drainage.

It is recommended that cantilevered retaining walls be designed for the 'Active' condition. Walls integrated as part of individual townhomes should be designed for the 'At Rest' condition.

6.8.4 Foundation Uplift

A soil unit weight of 125 pcf may be assumed for calculating the weight of soil over a wall footing.

6.8.5 Resistance to Lateral Loads

Lateral loads to wall foundations will be resisted by a combination of frictional and passive resistance as described below.

- Frictional Resistance. A coefficient of friction of 0.35 between the soil and base of the footing.
- Passive Resistance. Passive soil pressure against the face of footings or shear keys will accumulate at an equivalent fluid weight of 250 pounds per cubic foot (pcf). The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in calculations of passive resistance.

6.8.6 Wall Drainage

The above recommendations assume a wall drainage panel or a properly compacted granular free-draining backfill material (EI <30).

The use of drainage openings through the base of the wall (weep holes) is not recommended where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall.

6.8.7 Seismic

The lateral seismic pressure acting on a cantilevered retaining wall should be applied as an inverted triangle with a magnitude of 11H, where H is the free height of the wall. The resultant dynamic thrust acts at a distance of 0.6H above the base of the wall. This equation applies to level backfill and walls that retain no more than 15 feet of soil.

6.9 Temporary Slopes

Temporary slopes may be required for excavations during grading. All temporary excavations should comply with local safety ordinances. The safety of all excavations is solely the responsibility of the Contractor and should be evaluated during construction as the excavation progresses.

Based on the data interpreted from the exploratory trenches, the design of temporary slopes may assume California Occupational Safety and Health Administration (Cal/OSHA) Soil Type C for planning purposes.

As is evident by review of Figure 4-4, it is likely that excavations into the Unit 2 San Diego Formation will stand vertically to a height of about 4 feet for the period of construction.

7.0 STORM WATER

7.1 General

NOVA has not conducted infiltration testing for this site; nor is it aware of other studies that may have been performed for the property.

Figure 7-1 provides a plan view of the southeastern portion of the site, depicting the location of two planned Drainage Management Areas (DMA's) and related permanent storm water Best Management Practices (BMP's)

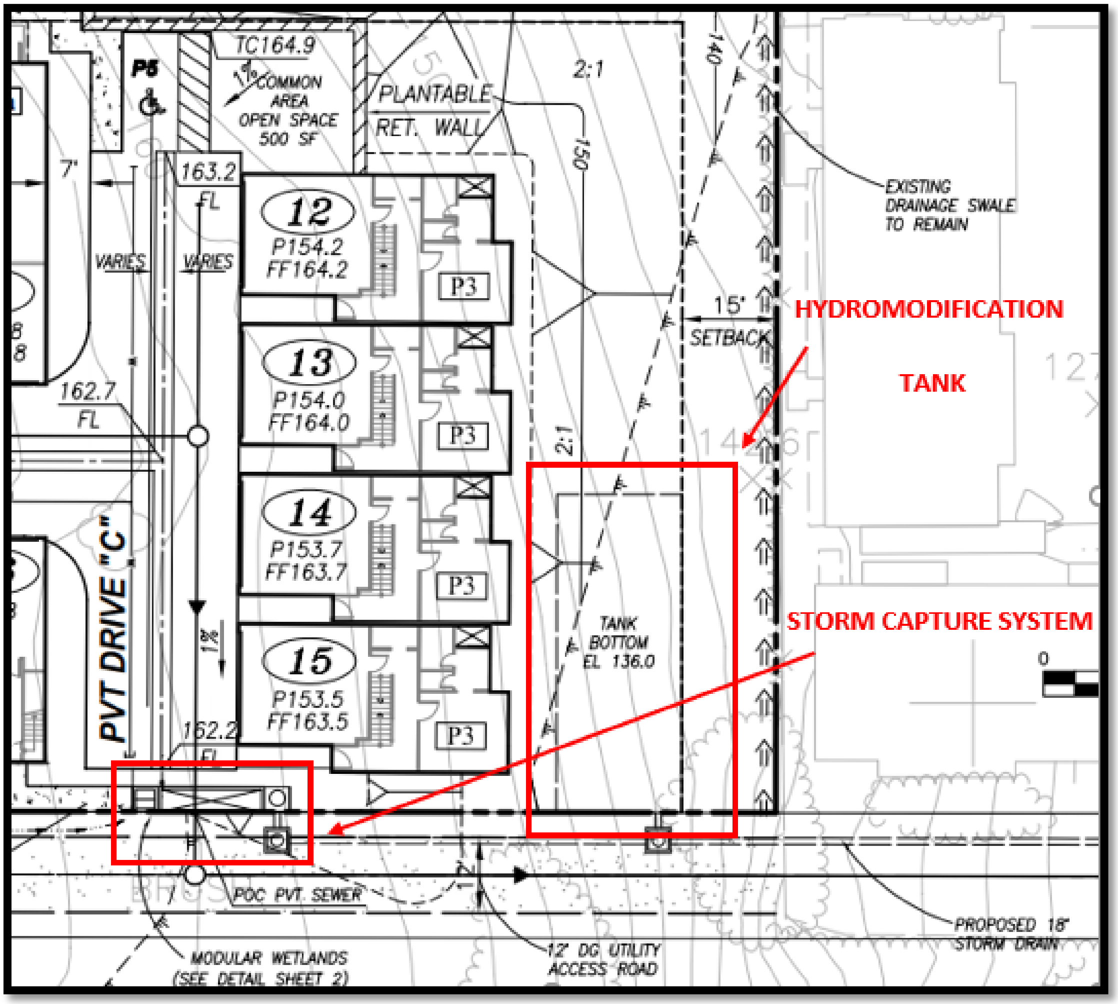

Figure 7-1. Planned DMA Locations
(Hunsaker 2018)

As may be seen by review of Figure 7-1 storm water BMP's will include a hydromodification tank and a storm capture system. The hydromodification tank is located east of Units 14 and 15 of the planned improvements. The storm water capture system will be sited south of Unit 15, at the end of Private Drive C

7.2 Review of Conditions for Storm Water Infiltration

The site will be designed to drain generally to the southeast, adapting to the current site topography. The proposed DMA's are located at the southeast corner of the site. Design for storm water infiltration will conform with the current City of San Diego guidance in this regard (reference, *The City of San Diego Storm Water Standards, November 2017 Edition*, hereafter, 'the manual').

Based on the current DMA locations and project plans, the setback required from the existing cut slope and planned fill slope cannot be achieved. Per the Simple Feasibility Criteria, Section C.1 of the manual, full and partial infiltration BMPs shall not be proposed within 50 feet of a natural slope (25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope. This DMA is located in a 'no infiltration condition'.

GEI 2002 provides the findings of a preliminary geotechnical investigation for this site. The San Diego Formation (Tsd) was found at depths ranging from 2 feet to 6 feet below ground surface (bgs). Consistent with the geologic literature, GEI 2002 reports the formation as 'dense' to 'very dense.' This condition will result in very low infiltration rates, dramatically limiting the potential for storm water infiltration.

Appendix C provides completed worksheets assessing the feasibility of storm water infiltration as required by the manual.

7.3 Opinion of Site Suitability For Storm Water Infiltration

Based on the Storm Water Standards presented in Section C.1 of the referenced storm water manual, the proximity to the existing slopes, and the tendency for dense to very dense formation to result in very low infiltration rates, it is NOVA's opinion that the proposed DMA's and related permanent storm water infiltration BMP's are located in an area with a 'no infiltration condition.'

A letter addressing this opinion is provided in Appendix C.

8.0 PAVEMENTS

8.1 General

Similar to the requirements for control of moisture beneath floor slabs and flatwork, control of surface drainage is important to the design and construction of pavements for this site.

Moisture must be controlled in the Unit 1 fill. Moreover, where standing water develops either on the pavement surface or within the base course- softening of the subgrade and other problems related to the deterioration of the pavement can be expected. Furthermore, good drainage should minimize the risk of the subgrade materials becoming saturated and weakened over a long period of time.

The following recommendations should be considered to limit the amount of excess moisture, which can reach the subgrade soils:

- maintain surface gradients at a minimum 2% grade away from the pavements;
- compact utility trenches for landscaped areas to the same criteria as the pavement subgrade;
- seal all landscaped areas in or adjacent to pavements to minimize or prevent moisture migration to subgrade soils;
- planters should not be located next to pavements (otherwise, subdrains should be used to drain the planter to appropriate outlets);
- place compacted backfill against the exterior side of curb and gutter; and,
- concrete curbs bordering landscaped areas should have a deepened edge to provide a cutoff for moisture flow beneath pavements (generally, the edge of the curb can be extended an additional twelve inches below the base of the curb).

Preventative maintenance should be planned and provided for. Preventative maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Preventative maintenance consists of both localized maintenance (e.g. crack sealing and patching) and global maintenance (e.g. surface sealing). Preventative maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements.

8.2 Setback from Slopes

Pavements should be set back a minimum of 10 feet from the crest of any slope steeper than 4:1. Pavements should be set back a minimum of 5 feet from the crest of slopes 4:1 or flatter.

8.3 Subgrade Preparation

8.3.1 Rough Grading

Grading for paved areas should be as described in Section 6.4, removing and replacing the Unit 1 fill to a depth of two feet.

The surface of the Unit 1 soils disturbed by excavation should be moisture conditioned and re-densified. Thereafter, this unit should be proof rolled to make sure no soft areas exist. Following proof rolling, the excavated Unit 1 fill should be moisture conditioned to at least 2% above the optimum moisture content and replaced to at least 95% relative compaction after ASTM D 1557 (the 'modified Proctor'). Replacement filling should be done in lifts (i) not to exceed 10-inches thickness; or, (ii) the ability of the compaction equipment employed to densified through a complete lift, whichever is less.

8.3.2 Proof-Rolling

After the completion of compaction/densification, areas to receive pavements should be proof-rolled. A loaded dump truck or similar should be used to aid in identifying localized soft or unsuitable material. Any soft or unsuitable materials encountered during this proof-rolling should be removed, replaced with an approved backfill, and compacted. The Geotechnical Engineer can provide alternative options such as using geogrid and/or geotextile to stabilize the subgrade at the time of construction, if necessary.

8.3.3 Moisture Control

Construction should be managed such that preparation of the subgrade immediately precedes placement of the base course. Proper drainage of the paved areas should be provided to reduce moisture infiltration to the subgrade.

8.3.4 Surveillance

The preparation of roadway and parking area subgrades should be observed on a full-time basis by a representative of NOVA to confirm that any unsuitable materials have been removed and that the subgrade is suitable for support of the proposed driveways and parking areas.

8.4 Flexible Pavements

Provided the subgrade in paved areas is prepared per the recommendations in Section 8.2, an R-value of 25 can be assumed. Table 8-1 provides recommended sections for flexible pavements. The recommended pavement sections are for planning purposes only. Additional R-value testing should be performed on actual soils at the design subgrade levels to confirm the pavement design.

Table 8-1. Preliminary Recommendations for Flexible Pavements

Area	Estimated Subgrade R-Value	Traffic Index	Asphalt Thickness (in)	Base Course Thickness (in)
Auto Driveways/Parking	25	5.0	4.0	6.0
Roadways	25	6.0	4.0	7.5

The above sections assume properly prepared subgrade consisting of at least 24 inches of select soil compacted to a minimum of 95% relative compaction. The aggregate base materials should also be placed at a minimum relative compaction of 95%. Construction materials (asphalt and aggregate base) should conform to the current Standard Specifications for Public Works Construction (Green Book).

8.5 Rigid Pavements

8.5.1 General

Concrete pavement sections should be developed in the same manner as undertaken for all other slabs and pavements: removal of the Unit 1 undocumented fill and replacement of that material in an engineered manner as described in Section 6.4.

Concrete pavement sections consisting of 7 inches of Portland cement concrete over a base course of 4 inches and a properly prepared subgrade support a wide range of traffic indices.

Where rigid pavements are used, the concrete should be obtained from an approved mix design with the minimum properties of Table 8-2.

Table 8-2. Recommended Concrete Requirements

Property	Recommended Requirement
Compressive Strength @ 28 days	3,750 psi minimum
Strength Requirements	ASTM C94
Minimum Cement Content	5.5 sacks/cu. yd.
Cement Type	Type I Portland
Concrete Aggregate	ASTM C33 and CalTrans Section 703
Aggregate Size	1-inch maximum
Maximum Water Content	0.50 lb/lb of cement
Maximum Allowable Slump	4 inches

8.5.2 Jointing and Reinforcement

Longitudinal and transverse joints should be provided as needed in concrete pavements for expansion/contraction and isolation. Sawed joints should be cut within 24-hours of concrete placement, and should be a minimum of 25% of slab thickness plus 1/4 inch. All joints should be sealed to prevent entry of foreign material and doweled where necessary for load transfer.

Load transfer devices, such as dowels or keys are recommended at joints in the paving to reduce possible offsets. Where dowels cannot be used at joints accessible to wheel loads, pavement thickness should be increased by 25 percent at the joints and tapered to regular thickness in 5 feet.

9.0 REFERENCES

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9.3 Geologic and Site Setting

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APPENDIX A

USE OF THE GEOTECHNICAL REPORT

NOVA

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
The Best People on Earth

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APPENDIX B

2002 PRELIMINARY GEOTECHNICAL INVESTIGATION

NOVA

REPORT OF PRELIMINARY GEOTECHNICAL INVESTIGATION AND GEOLOGIC RECONNAISSANCE

Proposed Starcevic Apartment Development
3201 "C" Street
San Diego, California

JOB NO. 02-8263
27 August 2002

Prepared for:

Starcevic Family Revocable Trust
c/o Mr. Jim Engelke, Architect

GEOTECHNICAL EXPLORATION, INC.
SOIL & FOUNDATION ENGINEERING • GROUNDWATER
HAZARDOUS MATERIALS MANAGEMENT • ENGINEERING GEOLOGY

27 August 2002

Susanna P. Starcevic
STARCEVIC FAMILY REVOCABLE TRUST
c/o Mr. Jim Engelke, Architect
P.O. Box 507
Borrego Springs, CA 92004

Job No. 02-8263

Subject: **Report of Preliminary Geotechnical Investigation and Geologic Reconnaissance**
Proposed Starcevic Apartment Development
3201 "C" Street
San Diego, California

Dear Mrs. Starcevic:

In accordance with the request of your architect, Mr. Jim Engelke, and our proposal dated June 10, 2002, ***Geotechnical Exploration, Inc.*** has prepared this report of geotechnical investigation for a proposed apartment project at the subject site. Additionally, we have performed a geologic reconnaissance of the site, per the requirements of the City of San Diego. The field work was performed on June 27, 2002, by our field representative.

It is our understanding that it is proposed to develop the site, consisting of two undeveloped lots, to receive 35 new apartment units and associated improvements. The apartment structures are to be a maximum of three stories in height with a parking area comprising the lower level of each unit. The structures are currently planned to be constructed of standard-type building materials utilizing a conventional concrete slab-on-grade foundation system. We have ***not*** reviewed plans that provide final site configuration information to date. We understand these will be prepared subsequent to release of this report.

The purpose of our preliminary investigation was to evaluate the existing surface and subsurface soil and moisture conditions, recommend any necessary site preparation procedures, assess the allowable bearing value of the on-site soils, and to provide preliminary slab and foundation design recommendations.

Our investigation revealed that the site is underlain by dense, lightly cemented formational materials locally overlain by up to 6 feet of fill soil and 12 to 18 inches of weathered formational materials. In general, the encountered fill soils and weathered formational materials were observed to be dry and of variable density (loose to medium dense), and will not, in their present condition, provide a stable soil base for the proposed structures and associated improvements. It is recommended that the loose fill soils and weathered formational material be removed and recompacted as part of site preparation prior to the addition of any new fill or structural improvements.

In our opinion, if the conclusions and recommendations presented in this report are implemented during site preparation, the site should be suited for the proposed structures and associated improvements.

The work performed and recommendations presented in this report are the result of an investigation and analysis that meet the contemporary standard of care in our profession within the County of San Diego.

This opportunity to be of service is sincerely appreciated. Should you have any questions concerning the following report, please contact our office. Reference to our **Job No. 02-8263** will help expedite a response to your inquiry.

Respectfully submitted,

GEOTECHNICAL EXPLORATION, INC.

Leslie D. Reed, President
C.E.G. 999[exp. 3-31-03]/R.G. 3391

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D.
REED
NO. 999

Jaime A. Cerros, P.E.
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No. 002007
Exp. 9/30/03

SCB/DCV/LDR/JAC/pj

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REPORT OF PRELIMINARY GEOTECHNICAL INVESTIGATION AND GEOLOGIC RECONNAISSANCE

Proposed Starcevic Apartment Development
3201 "C" Street
San Diego, California

JOB NO. 02-8263

The following report presents the findings and recommendations of ***Geotechnical Exploration, Inc.*** for the subject project (refer to Figure Nos. I and II for Vicinity Map and Site Plan.)

I. SCOPE OF WORK

It is our understanding, based on communications with the project architect, Mr. Jim Engelke, that the site is being developed to receive 35 apartment units and associated improvements (refer to Site Plan, Figure No. IIa). The structures are to be a maximum height of three stories consisting of two-story apartment units over a parking area, and utilizing standard-type building materials and conventional foundations. At the time of our report preparation, plans for the intended construction were not available. When plans become available they should be provided to us for a review. Additional analysis and/or field exploration may be necessary once the project grading plans have been reviewed by this office.

With the above in mind, the scope of work is briefly outlined as follows:

1. Identify and classify the surface and subsurface soils in the area of the proposed construction, in conformance with the Unified Soil Classification System (refer to Appendix A).

2. Make note of any faults or significant geologic features that may affect the site (see Figure Nos. IVa and IVb, and Appendices B, C and D).

3. Evaluate the existing fill and formational material.

4. Recommend the allowable bearing capacities for the on-site dense natural soils or properly compacted fills.

5. Recommend site preparation procedures.

6. Evaluate the settlement potential of the bearing soils under the proposed structural loads.

7. Recommend preliminary foundation design information and provide active and passive earth pressures to be utilized in design of any proposed retaining walls and foundation structures.

II. SITE DESCRIPTION

The property, addressed as 3201 "C" Street, consists of two parcels. Parcel 1 is 18,375 square feet and is known as Assessor's Parcel No. 539-563-06, Lots 34-36 of Block 124, Choates Subdivision, according to Recorded Map No. 167 (filed Nov. 20, 1886) in the Golden Hill area of the City of San Diego, County of San Diego, State of California. Parcel 2 is 42,000 square feet and is known as Assessor's Parcel No. 539-563-01, Lots 13-24 of Block 124, Choates Subdivision, according to Recorded Map No. 167 (filed Nov. 20, 1886) in the Golden Hill area of the City of San Diego, County of San Diego, State of California.

The adjacent parcels total 1.21 acres, and are located to the southeast of the intersection of "C" Street and 32nd Street, in the City of San Diego (see Figure No. I). The two parcels are rectangular and form an "L-shaped" property, located on an easterly and southerly sloping site. The property is bordered to the north by "C" Street; to the south by an exit for westbound Interstate 94; to the east and at a lower elevation by undeveloped property; and to the west by an unpaved portion of 32nd Street that was cut into the easterly-descending hillside, and undeveloped land (see Figure No. IIa).

The site is presently undeveloped, however, residential structures and existing streets surround the property. Underground utilities beneath and along 32nd Street provide utility service to the property. Vegetation on the site consists primarily of a few mature trees, native weeds and grasses. Scattered end-dumped fill was also observed on the site.

Elevations across the site range from approximately 178 feet above Mean Sea Level (MSL) at the northwestern corner of the property adjacent to "C" Street, to approximately 134 feet above MSL at the southeastern corner of the property. Approximate elevations for the site were obtained from a topographic map prepared by the City of San Diego.

III. FIELD INVESTIGATION

Our field investigation, conducted June 27, 2002, consisted of the excavation of seven exploratory trenches and a geologic reconnaissance of the site and surrounding terrain (for excavation locations, see Figure No. IIa). The soils encountered in the exploratory trenches were observed and logged by our field representative, and samples were taken of the predominant soils throughout the field operation. Trench logs have been prepared on the basis of our observations and the results have been summarized on Figure Nos. IIIa through IIIg. The predominant soils have been classified in conformance with the Unified Soil Classification System (refer to Appendix A).

IV. LABORATORY TESTS AND SOIL INFORMATION

Laboratory tests were performed on the disturbed and relatively undisturbed soil samples in order to evaluate their physical and mechanical properties and their ability to support the proposed additions. The following tests were conducted on the sampled soils:

1. *Moisture Content (ASTM D2216-98)*
2. *Moisture/Density Relations (ASTM D1557-98, Method A)*
3. *Mechanical Analysis (ASTM D422-98)*
4. *Expansion Test (UBC Test Method 29-2)*

The moisture content of a soil sample is a measure of the weight of water, expressed as a percentage of the dry weight of the sample.

The relationship between the moisture and density of remolded soil samples gives qualitative information regarding the soil strength characteristics and compaction soil conditions to be anticipated during any future grading operation.

The Mechanical Analysis Test was used to aid in the classification of the soils according to the Unified Soil Classification System.

The expansion potential of the soils is determined, when necessary, utilizing the Uniform Building Code Test Method for Expansive Soils (UBC Standard No. 29-2). In accordance with the UBC (Table 18-1-B), expansive soils are classified as follows:

EXPANSION INDEX	***POTENTIAL EXPANSION***
0 to 20	Very low
21 to 50	Low
51 to 90	Medium
91 to 130	High
Above 130	Very high

Based on our laboratory analysis, the near-surface, on-site silty sand fill material is considered to have a low expansion potential, with an expansion index of 50 or less. The near-surface, weathered, formational soils were observed to be clayey and appear to have a moderate expansion potential.

Based on laboratory test data and our observations of the primary soil types on the project, and our previous experience with laboratory testing of similar soils in this area of the City of San Diego, our Geotechnical Engineer had assigned conservative values for friction angle, coefficient of friction, and cohesion to those soils which will have significant lateral support or bearing functions on the project. The assigned values are presented in Figure No. V and have been utilized in the determining the recommended soil bearing capacity, as well as active and passive earth pressure design criteria and the slope stability analysis.

V. GENERAL GEOLOGIC DESCRIPTION

The San Diego area is part of a seismically active region of California. It is on the eastern boundary of the Southern California Continental Borderland, part of the Peninsular Ranges Geomorphic Province. This region is part of a broad tectonic boundary between the North American and Pacific Plates. The actual plate boundary is characterized by a complex system of active, major, right-lateral strike-slip faults, trending northwest/southeast. This fault system extends eastward to the San Andreas Fault (approximately 70 miles from San Diego) and westward to the San Clemente Fault (approximately 50 miles off-shore from San Diego) (Berger and Schug, 1991).

During recent history, the San Diego County area has been relatively quiet seismically. No fault ruptures or major earthquakes have been experienced in historic time within the San Diego area. Since earthquakes have been recorded by instruments (since the 1930s), the San Diego area has experienced scattered seismic events with Richter magnitudes generally less than 4.0. During June 1985, a series of small earthquakes occurred beneath San Diego Bay; three of these earthquakes had recorded magnitudes of 4.0 to 4.2. In addition, the Oceanside earthquake of July 13, 1986, resulted in a magnitude of 5.3 (Hauksson and Jones, 1988) located approximately 26 miles offshore of the City of Oceanside.

In California, major earthquakes can generally be correlated with movement on active faults. As defined by the California Division of Mines and Geology (Hart, E.W., 1980), an "active" fault is one that has had ground surface displacement within Holocene time (about the last 11,000 years). Additionally, faults along which major historical earthquakes have occurred (about the last 210 years in California) are also considered to be active (Association of Engineering Geologist, 1973). The California Division of Mines and Geology defines a "potentially active" fault as one that has had ground surface displacement during Quaternary time, that is, during the past 11,000 to 1.6 million years (Hart, E.W., 1980).

VI. SITE-SPECIFIC GEOLOGIC DESCRIPTION

Our field work, reconnaissance and review of pertinent geologic maps and reports indicate that the site is underlain by fill soils and formational material of the Tertiary-age San Diego Formation (Tsd). Figure No. IIa presents a plan view geologic map of the site including San Diego Formation location, as well as man-made fill locations. Figure Nos. IIIa through IIIg provide a description of the materials encountered during our field exploration.

A. Stratigraphy

In general, the subject site is underlain at depth by the formational soils of the Tertiary-age San Diego Formation. Fill soils of variable density to approximately 6 feet in depth were encountered in the central portion and southern and western perimeters of Parcel 2 and near the southeastern corner of Parcel 1.

Artificial Fill Soils (Qaf): The encountered fill soils consist primarily of silty fine to medium sand with some clay, gravels and cobbles. The fill soils are generally in a loose, dry condition with some construction debris such as concrete, etc. The encountered fill thicknesses varied from 2 to 3 feet at the location of trenches T-1, T-2, and T-4, to approximately 5 to 6 feet at the location of trenches T-6 and T-7. These fill soils are not suitable in their current condition for bearing support.

San Diego Formation (Tsd): Formational soils of the Tertiary-age San Diego Formation were encountered at the locations of all exploratory trenches. The encountered sandstone portion of the San Diego Formation consists of an orange-brown, slightly to well-cemented, dense, silty to clayey sandstone with some gravels and cobbles. A conglomerate portion of the San Diego Formation was encountered in the central portion of Parcel 1 and consists of a loose to medium dense, weathered, gray-brown, gravel/cobble conglomerate with a silty to clayey sand matrix. The conglomerate was encountered to depths of approximately 2 to 3 feet in exploratory trenches T-3 and T-5. The sandstone formational soils were encountered at depths of approximately 2 feet to 6 feet in the exploratory trenches. The formational soils have excellent bearing strength characteristics. Refer to Figure Nos. IIIa through IIIg for details.

B. Structure

Roadcuts along 32nd Street and "C" Street allowed observation of bedding and geologic structural features of the San Diego Formation in the vicinity of the subject lot. The observed San Diego formational material appears to be massively bedded (as exposed in the roadcut) and the relatively shallow exploratory trenches placed on the site. Geologic structure conditions should be verified during grading observations. Evidence of significantly tilted or dipping bedding was not observed.

VII. GEOLOGIC HAZARDS

A. Local and Regional Faults

Rose Canyon Fault: The site is located approximately 2 to 3 miles east of the mapped traces of the Rose Canyon Fault. The Rose Canyon Fault Zone is mapped trending north-south from Oceanside to downtown San Diego, from where it appears to head southward into San Diego Bay, through Coronado and offshore. The Rose Canyon Fault Zone is considered to be a complex zone of onshore and offshore, en echelon strike slip, oblique reverse, and oblique normal faults. The Rose Canyon Fault is considered to be capable of causing a 7.5-magnitude earthquake and considered microseismically active, although no significant recent earthquake is known to have occurred on the fault. Work by many investigators on faults at the Police Administration and Technical Center in downtown San Diego, at the SDG&E facility in Rose Canyon, within San Diego Bay, and elsewhere within the downtown area of San Diego, has encountered offsets in Holocene (geologically recent) sediments. These findings confirm Holocene offset on the Rose Canyon Fault, which was designated an "active" fault as of November 1991 (California Division of Mines and Geology -- Fault Rupture Hazard Zones in California, 1999).

Coronado Bank Fault: The Coronado Bank Fault is located offshore, approximately 15 miles southwest of the site. Evidence for this fault is based upon geophysical data (acoustic profiles) and the general alignment of epicenters of recorded seismic activity (Greene, 1979). An earthquake of 5.3 magnitude, recorded July 13, 1986, is known to have been centered on the fault or within the Coronado Bank Fault Zone. Although this fault is considered active, due to the seismicity within the fault zone, it is significantly less active seismically than the Elsinore Fault (Hileman, 1973). It is postulated that the Coronado Bank Fault is capable of generating a 7.0-magnitude earthquake and is of great interest due to its close proximity to the greater San Diego metropolitan area.

Elsinore Fault: The Elsinore Fault is located approximately 40 to 65 miles east-northeast of the site. The Elsinore Fault extends approximately 200 km (125 miles) from the Mexican border to the northern end of the Santa Ana Mountains. The Elsinore Fault zone is a 1- to 4-mile-wide, northwest-southeast-trending zone of discontinuous and en echelon faults extending through portions of Orange, Riverside, San Diego, and Imperial Counties. Individual faults within the Elsinore Fault Zone range from less than 1 mile to 16 miles in length. The trend, length and geomorphic expression of the Elsinore Fault Zone identified it as being a part of the highly active San Andreas Fault system.

Like the other faults in the San Andreas system, the Elsinore Fault is a transverse fault showing predominantly right-lateral movement. According to Hart, et al. (1979), this movement averages less than 1 centimeter per year. Along most of its length, the Elsinore Fault Zone is marked by a bold topographic expression consisting of linearly aligned ridges, swales and hallows. Faulted Holocene alluvial deposits (believed to be less than 11,000 years old) found along several segments of the fault zone suggest that at least part of the zone is currently active.

Although the Elsinore Fault Zone belongs to the San Andreas set of active, northwest-trending, right-slip faults in the southern California area (Crowell, 1962), it has not been the site of a major earthquake in historic time, other than a 6.0-magnitude quake near the town of Elsinore in 1910 (Richter, 1958; Toppozada and Parke, 1982). However, based on length and evidence of late-Pleistocene or Holocene displacement, Greensfelder (1974) has estimated that the Elsinore Fault Zone is reasonably capable of generating an earthquake with a magnitude as large as 7.5. Study and logging of exposures in trenches in Glen Ivy Marsh across the Glen Ivy North Fault (a strand of the Elsinore Fault Zone between Corona and Lake Elsinore), suggest a maximum earthquake recurrence interval of 300 years, and when combined with previous estimates of the long-term horizontal slip rate of 0.8 to 7.0 mm/year, suggest typical earthquake magnitudes of 6 to 7 (Rockwell, 1985).

B. Other Geologic Hazards

Ground Rupture: Ground rupture is characterized by bedrock slippage along an established fault and may result in displacement of the ground surface. For ground rupture to occur along a fault, an earthquake usually exceeds magnitude 5.0. If a 5.0-magnitude earthquake were to take place on a local fault, an estimated surface-rupture length 1 mile long could be expected (Greensfelder, 1974). Our research and background review indicate that the subject site is not directly on a known fault trace and, therefore, the risk of ground rupture is remote.

Ground Shaking: Structural damage caused by seismically induced ground shaking is a detrimental effect directly related to faulting and earthquake activity. Ground shaking is considered to be the greatest seismic hazard in San Diego County. The intensity of ground shaking is dependent on the magnitude of the earthquake, the distance from the earthquake, and local seismic conditions. Earthquakes of magnitude 5.0 Richter scale or greater are generally associated with significant damage. It is our opinion that the most serious damage to the site would be caused by a large earthquake originating on the nearby Rose Canyon Fault Zone. Although the chance of such an event is remote, it could occur within the useful life of the structure. The anticipated ground accelerations at the site from earthquakes on faults within 100 miles of the site are provided in Appendix B.

Landslides: Based upon our geologic investigation, a review of the geologic map (Kennedy and Tan, 1977) and the City of San Diego Geologic Hazards Maps, there are no confirmed ancient landslides located on the site. According to the City of San Diego Geologic Hazards Maps, it appears that the site is located within Geologic Hazard Category 52. Category 52 is defined as "*gently sloping to steep terrain*" with "*favorable geologic structure*" and of "*low risk.*" Evidence of site landsliding was not found during our field investigation.

Slope Stability: Given the site is underlain at depth by dense formational materials, and the existing natural slopes on the site appear to have performed relatively well, it is our opinion, based on preliminary slope stability calculations (with assigned strength parameters), that sufficient gross stability will exist across the site once the loose fill is removed and recompacted. During subsequent site development (such as when a grading plan for the proposed project is available) our firm should be asked to review specific planned slope heights and gradients with respect to stability.

Liquefaction: The liquefaction of saturated sands during earthquakes can be a major cause of damage to buildings. Liquefaction is the process in which soils are transformed into a dense fluid that will flow as a liquid when unconfined. It occurs principally in loose, saturated sands and silts when they are shaken by an earthquake. These types of sands do not exist on the subject lot.

On this site, the risk of liquefaction of foundation material due to seismic shaking is considered to be remote due to the dense nature of the natural-ground material and the lack of a shallow water table in this hillside area.

VIII. EARTHQUAKE RISK EVALUATION

Evaluation of earthquake risk requires that the effect of faulting on, and the mass stability of, a site be evaluated utilizing the M_{10} seismic design event (i.e., an earthquake event on an active fault with less than a 10 percent probability of being exceeded in 50 years). Further, sites are classified by UBC 1997 Edition into "soil profile types S_A through S_F." Soil profile types are defined by their shear velocities where shear velocity is the speed at which shear waves move through the upper 30 meters (approximately 100 feet) of the ground. These are:

$S_A \Rightarrow$ Greater than 1500 m/s
$S_B \Rightarrow$ 760 m/s to 1500 m/s
$S_C \Rightarrow$ 360 m/s to 760 m/s
$S_D \Rightarrow$ 180 m/s to 360 m/s
$S_E \Rightarrow$ Less than 180 m/s
$S_F \Rightarrow$ Soil requiring specific soil evaluation

By utilizing an earthquake magnitude M_{10} for a seismic event on an active fault, knowing the site class and ground type, a prediction of anticipated site ground acceleration, g, from these events can be estimated. The subject site has been assigned Classification "S_C."

An estimation of the peak ground acceleration and the repeatable high ground acceleration (RHGA) likely to occur at the project site by the known significant local and regional faults within 100 miles of the site is also included in Appendix B. Also, a listing of the known historic seismic events that have occurred within 100 miles of the site at a magnitude of 5.0 or greater since the year 1800, and the probability of exceeding the experienced ground accelerations in the future based upon the historical record, is provided in Appendix C. Both Appendix B and Appendix C are tables generated from computer programs EQFault and EQSearch by Thomas F. Blake (2002) utilizing a digitized file of late-Quaternary California faults (EQFault) and a file listing of recorded earthquakes (EQSearch). Estimations of site intensity are also provided in these listings as Modified Mercalli Index values. The Modified Mercalli Intensity Index is provided as Appendix D.

Summary: It is our opinion, based upon a review of the available maps and our site investigation, that the site is underlain by stable formational materials and loose fill soils that will be removed and recompacted, and will be suited for the proposed apartment construction provided our recommendations as delineated herein are followed. No significant geologic hazards are known to exist on the site that would prevent the proposed construction.

IX. GROUNDWATER

No groundwater was encountered during our field investigation and we do not expect significant problems to develop in the future -- if the property is developed as recommended herein and proper drainage is maintained. However, the potential does exist for a perched water condition to occur if rainwater and irrigation waters are allowed to infiltrate through surficial soils and encounter the less permeable formation, or flow beneath the structure along utility laterals if not properly sealed at footing penetration. Attempts must be made to prevent a perched water condition by providing proper surface drainage.

Subsurface drainage will be required along with continuous back drainage behind any lower-level walls, retaining walls, or any perimeter stem walls for raised-wood floor areas where the outside grades are higher than the crawl space grades. Furthermore, crawl spaces shall be provided with the proper cross-ventilation to help reduce the potential for moisture-related problems. Lower-level slabs shall also be properly protected by proper sealing and waterproofing to help reduce potential for moisture intrusion.

It should also be kept in mind that any required grading operations may change surface drainage patterns and/or reduce permeabilities due to the densification of compacted soils. Such changes of surface and subsurface hydrologic conditions, plus irrigation of landscaping or significant increases in rainfall, may result in the appearance of surface or near-surface water at locations where none existed previously. The damage from such water is expected to be localized and cosmetic in nature, if good positive drainage is implemented, as recommended in this report, during and at the completion of construction.

It must be understood, however, that unless discovered during initial site exploration or encountered during site construction operations, it is extremely difficult to predict if or where perched or true groundwater conditions may appear in the future. When site fill or formational soils are fine-grained and of low permeability, water problems may not become apparent for extended periods of time.

Even without the presence of free water, the capillary draw characteristics, especially of fine-grained soils such as at the site, can result in excessive transmission of water vapor through walls and floor slabs. In order to reduce the potential for moisture-related problems to develop at the site, proper ventilation and waterproofing shall be provided for building retaining walls and slabs of below-grade areas.

Water conditions, where suspected or encountered during construction at the site, should be evaluated and remedied by the project civil and geotechnical consultants. The project developer and homeowner, however, must realize that post-construction appearances of groundwater may have to be dealt with on a site-specific basis.

X. CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

The following conclusions and recommendations are based upon the field investigation conducted by our firm, and resulting laboratory tests, in conjunction with our knowledge and experience with the soils in the Golden Hill area of the City of San Diego.

It is our understanding that the site is to be developed to receive a 35-unit apartment development and associated improvements. Preliminary and final plans should be submitted for our review as soon as they become available, so that more specific design recommendations or needed alterations to the recommendations included herein can be provided, if warranted.

In general, we found that the site is underlain by medium dense to dense, silty sand formational material, which is, in turn, overlain by loose/uncompacted fill soil and weathered formational material ranging in thickness from 2 to 6 feet. The encountered fill soils and weathered formational materials were observed to be dry and loose (and potentially compressible). As such, we recommend that in order to provide a more firm, uniform soil base, the existing fill soils (to a depth of 6 feet) and the weathered upper 1 to 4 feet of the formational soils shall be removed and properly compacted (to at least 90 percent per ASTM D1557-98) prior to the addition of any new fill or structural improvements. The anticipated amount of removal and recompaction is approximately 2 to 6 feet. The soils at the bottom of the excavation shall be scarified, moisture conditioned and recompacted. On-site soils within 4 feet of finish surface grade that are found to have significant amounts of expansive clayey soils shall be recompacted to a relative compaction between 88 and 92 percent. The moisture content of medium to highly expansive soils shall be at least 5 percent over the optimum moisture.

A. Site Grading

1. The proposed grading operations shall be performed in accordance with the General Earthwork Specifications (Appendix E) and the requirements of the City of San Diego Grading Ordinance. ***Geotechnical Exploration, Inc.*** recommends that our firm verify the actual soil conditions revealed during the grading to be as anticipated in this "Report of Geotechnical Investigation and Geologic Reconnaissance." In addition, the compaction of any fill soils placed during the grading must be tested by the geotechnical engineer or his supervised representative. It is the responsibility of the grading contractor to comply with the requirements of the grading plans and the local grading ordinance. Any fill soils that are observed to be loose or that have been placed without control or sufficient testing shall be removed and recompacted to comply with the grading specifications.

   It is recommended that our firm review the final grading plans and project soil-related specifications prior to the start of construction. Also, we recommend that a pre-construction conference be held at the site with the owner/developer, architect, civil engineer, contractor, grader, and geotechnical engineer in attendance. Special soil handling procedures and the grading plan requirements can be discussed at that time.

2. We recommend that the entire property be cleared of vegetation and any other debris or rubble. The unsuitable material generated should be disposed of off-site prior to the placing of any new fill.

3. Our investigation revealed that the site is underlain by medium dense to dense formational materials overlain by fill soil ranging from 2 to 6 feet. The encountered fill thicknesses varied from 2 to 3 feet at the location of trenches T-1, T-2, and T-4, to approximately 5 to 6 feet at the location of trenches T-6 and T-7. The encountered fill soils and the upper 2 to 4 feet of the formational materials were observed to be dry, loose (and potentially compressible) and weathered. As such, we recommend that in order to provide a more firm, uniform soil base, the existing fill soil and weathered formational soils shall be removed and properly recompacted prior to the addition of any new fill or structural improvements. The excavated low-expansive soils to be used as fill shall be watered to approximately optimum moisture content and compacted to at least 90 percent of Maximum Dry Density (ASTM D1557-98).

   Any clayey soils within the upper 4 feet from final finish subgrade shall be evaluated during grading by our field personnel. If found to possess an expansion potential equal to or higher than 50, they shall be compacted with a moisture content at or higher than 5 percent over the optimum moisture content. The relative compaction of such compacted soils shall be between 88 and 92 percent of the maximum obtained per ASTM D1557-98

   We should review the grading plan as soon as it is available, so that we can provide additional or modified recommendations for site preparation based on the anticipated soil conditions exposed at finish grade elevations.

4. Any backfill soils placed in utility trenches or behind retaining walls that support structures and other improvements (such as patios, sidewalks, driveways, pavements, etc.) shall be compacted to at least 90 percent of Maximum Dry Density.

B. Design Parameters for Proposed Foundations

5. For preliminary foundation design of new footings, based on the assumption that new footings will be placed at least 12 inches into properly compacted on-site soils for one-story buildings, 18 inches into properly compacted on-site soils for two-story buildings, and 24 inches into properly compacted on-site soils for three-story buildings, we provide a preliminary allowable soil bearing capacity equal to 2,000 pounds per square foot (psf) for the fill soils and a preliminary allowable soil bearing capacity equal to 3,000 pounds per square foot (psf) for the formational soils. This applies to footings at least 12 inches into the bearing soils and at least 12 inches in width. Footings on sloping ground or near slope tops or slope faces shall be deepened as shown in Figure No. VII (also see Section E, Slopes). The footings shall have an effective minimum distance of 8 feet to daylight. Footings built downslope shall be built with level step bottoms, and have a 2.0:1.0 ratio in the rise. For wider and/or deeper footings, the allowable soil bearing capacity may be calculated based on the following equation:

$$Qa = 1500D+500W$$

where

"Qa" is the allowable soil bearing capacity (in psf);

"D" is the depth of the footing (in feet) as measured from the lowest adjacent grade; and

"W" is the width of the footing (in feet).

The allowable soil bearing capacity may be increased one-third for analysis including wind or earthquake loads. Up to 6,000 psf may be allowed for total vertical bearing capacity for foundations in dense, sound formation or properly compacted soils.

6. The passive earth pressure of the properly recompacted fill soils (to be used for design of shallow foundations and footings to resist the lateral forces) shall be based on an **Equivalent Fluid Weight** of **300** pounds per cubic foot. This passive earth pressure shall only be considered valid for design if the ground adjacent to the foundation structure is essentially level for a distance of at least three times the total depth of the foundation and is properly compacted soil.

7. An allowable Coefficient of Friction of 0.40 times the dead load may be used between the bearing soils and concrete foundations, walls, or floor slabs.

8. The following table summarizes site-specific seismic design criteria to calculate the base shear needed for the design of the residential structure. The design criteria was obtained from the Uniform Building Code (1997 edition) based on the soil characteristics and distance to the closest fault.

Parameter	Value	Reference
Seismic Zone Factor, Z	0.40	Table 16-I
Soil Profile Type	S_c	Table 16-J
Seismic Coefficient, C_a	$0.40N_a$	Table 16-Q
Seismic Coefficient, C_v	$0.56N_v$	Table 16-R
Near-Source Factor, N_a	1.18	Table 16-S
Near-Source Factor, N_v	1.44	Table 16-T
Seismic Source Type	B	Table 16-U

9. Our experience indicates that, for various reasons, footings and slabs occasionally crack, causing ceramic tiles and brittle surfaces to become damaged. Therefore, we recommend that all conventional shallow footings and slabs-on-grade contain at least a minimum amount of reinforcing steel to reduce the separation of cracks, should they occur.

    9.1 A minimum of steel for 12- and 18-inch-deep continuous footings should include at least four No. 4 steel bars continuous, with two bars near the bottom of the footing and two bars near the top. A minimum of steel for 24-inch-deep continuous footings should include at least four No. 5 steel bars continuous, with two bars near the bottom of the footing and two bars near the top. A minimum clearance of 3 inches shall be maintained between steel reinforcement and the top, bottom or sides of the footing.

    9.2 Isolated square footings should contain, as a minimum, a grid of No. 4 steel bars on 12-inch centers, both ways, with no less than two bars each way.

    9.3 Interior floor slabs should be a minimum of 4 inches actual thickness and be reinforced with at least No. 3 steel bars on 15-inch centers, both ways, placed at midheight in the slab. *Slabs shall be underlain by a 2-inch-thick layer of clean sand (S.E. = 30 or greater) overlying a moisture retardant membrane over 2 inches of sand.* Slab subgrade soil shall be verified by a ***Geotechnical Exploration, Inc.*** representative to have the proper moisture content within 48 hours prior to placement of the vapor barrier and pouring of concrete.

We recommend the project Civil/Structural Engineer incorporate isolation joints and sawcuts to at least one-fourth the thickness of the slab in any floor designs. Control joints should not be spaced farther than every 25 feet for slabs reinforced with rebars, and 15 feet for exterior slabs reinforced with welded wire fabric. The joints and cuts, if properly placed, should reduce the potential for and help control floor slab cracking. However, due to a number of reasons (such as base preparation, construction techniques, curing procedures, and normal shrinkage of concrete), some cracking of slabs can be expected. Control joints shall be placed within 12 hours after concrete placement and shall penetrate at least one-quarter the slab thickness.

9.4 Following placement of any concrete floor slabs, sufficient drying time must be allowed prior to placement of floor coverings. Premature placement of floor coverings may result in degradation of adhesive materials and loosening of the finish floor materials. Tiled floors shall be provided with an approved isolation sheet to prevent reflective shrinkage and/or control joint cracking.

NOTE: The project Civil/Structural Engineer shall review all reinforcing schedules. The reinforcing minimums recommended herein are not to be construed as structural designs, but merely as minimum safeguards to reduce possible crack separations. Actual reinforcing requirements should be provided by the project Structural Engineer for the design loads and anticipated deflections.

Based on our laboratory test results and our experience with the soil types on the subject site, the dense natural soils and properly compacted fill soils should experience differential angular rotation of less than 1/240 under the allowable loads. The maximum differential settlement across the structure and footings when founded on properly compacted fill or dense natural formation shall be on the order of 1 inch.

10. As a minimum for protection of on-site improvements, it is recommended that all nonstructural concrete slabs (such as patios, sidewalks, etc.), be founded on properly compacted, moisture-conditioned and tested fill or dense native formation with 6x6-6/6 welded wire mesh at the center of the slab, and contain adequate isolation and control joints.

    The performance of on-site improvements can be greatly affected by soil base preparation and the quality of construction. It is therefore important that all improvements are properly designed and constructed for the existing soil conditions. The improvements should not be built on loose soils or fills placed without our observations and testing. Any rigid improvements founded on the existing loose surface soils can be expected to undergo movement and possible damage and is therefore not recommended. ***Geotechnical Exploration, Inc.*** takes no responsibility for the performance of the improvements built on loose or inadequately compacted fills. Any exterior area to receive concrete improvements shall be verified for compaction and moisture within 48 hours prior to concrete placement.

    For exterior slabs with the minimum shrinkage reinforcement, control joints shall be placed at spaces no farther than 15 feet apart or the width of the slab, whichever is less, and also at re-entrant corners. Control joints in exterior slabs shall be sealed with elastomeric joint sealant. The sealant shall be inspected every 6 months and be properly maintained. Control joints shall penetrate at least one-quarter the thickness of the slab.

11. For concrete pavement, we recommend that the compressive strength f'c be at least 3,500 psi at 28 days of age and the slab thickness be not less than 5½ inches thick, with control joints no farther than 15 feet apart. For trash enclosure areas, the slab thickness shall be not less than 6 inches thick. Subgrade soils shall be properly compacted and moisture conditioned before any base and/or concrete placement.

    No. 6 dowels shall be provided every 12 inches in the longitudinal joint within 15 feet of outside pavement, and at transverse joints near free ends of pavement. Other longitudinal joints will need to be provided with keyed joints. A base layer at least 4 inches in thickness shall be provided in heavy traffic areas. Subgrade surface and base layers shall be compacted to at least 95 percent of Maximum Dry Density (ASTM D1557-98).

    For asphalt concrete (A.C.) placement, we recommend a preliminary section of 3 inches of A.C. on 8 inches of Class II base gravel on properly compacted subgrade. The subgrade and base shall be compacted to at least 95 percent of Maximum Dry Density. The definitive pavement cross sections shall be established after rough grading is completed and shall be based on R-value soil tests performed on subgrade soils.

C. ***Floor Slab Vapor Transmission***

12. Vapor moisture can cause some problems on moisture sensitive floors, some floor sealers, or sensitive equipment in direct contact with the floor, in addition to mildew and staining on slabs, walls and carpets.

13. The common practice in Southern California is to place vapor retarders made of PVC, or of polyethylene. PVC retarders are made in thickness ranging from 10- to 60-mil. Polyethylene retarders, called visqueen, range from 5-

to 10-mil in thickness. The thicker the plastic, the stronger the resistance will be against puncturing.

14. Although polyethylene (visqueen) products are most commonly used, products such as Vaporshield possess much higher tensile strength and are more specifically designed for and intended to retard moisture transmission into concrete slabs. The use of Vaporshield or equivalent is highly recommended when a structure is intended for moisture-sensitive floor coverings or uses.

15. The vapor retarders need to have joints lapped and sealed with mastic or manufacturer's recommended tape for additional protection. To provide some protection to the moisture retarder, a layer of at least 2 inches of clean sand on top and 2 inches at the bottom shall also be provided. No heavy equipment, stakes or other puncturing instruments shall be used on top of the liner before or during concrete placement. In actual practice, stakes are often driven through the retarder material, equipment is dragged or rolled across the retarder, overlapping or jointing is not properly implemented, etc. All these construction deficiencies reduce the retarder's effectiveness.

    The vapor retarders are not waterproof. They are intended to help prevent or reduce capillary migration of vapor through the soil into the pores of concrete slabs. Other waterproofing systems must supplement vapor retarders if full waterproofing is desired. The owner should be consulted to determine the specific level of protection required.

D. <u>Retaining Walls</u>

16. The active earth pressure (to be utilized in the design of retaining walls utilizing low expansive soils [EI less than 50] as backfill) shall be based on an

Equivalent Fluid Weight of **38** pounds per cubic foot (for level backfill and properly drained retaining wall backfill only). Medium to highly expansive clayey soils should not be used for retaining wall backfill.

In the event that a retaining wall is surcharged by sloping backfill (of the same soil type), the design active earth pressure shall be based on the appropriate Equivalent Fluid Weight presented in the following table:

	Height of Slope/Height of Wall*			
Slope Ratio	0.25	0.50	0.75	1.00(+)
2.0:1.0	44	48	50	52

**Utilization of other than clean sandy soils as backfill or any encountered adverse geologic conditions in the cut slopes behind walls will require the use of higher equivalent fluid weights.*

The civil engineer's plans and/or architectural plans shall indicate that the retaining wall backfill shall consist of low expansive soils with EI less than 50. The backfill shall be measured from the back face of the wall to a plane inclined at least 32 degrees from vertical, passing through the heel of the wall foundation.

In the event that a retaining wall is to be designed for a restrained condition, a uniform pressure equal to 9xH (nine times the total height of retained wall, considered in pounds per square foot) shall be considered as acting everywhere on the back of the wall in addition to the design **Equivalent Fluid Weight.**

Any additional load or surcharge located within a horizontal distance equal to the height of the wall shall be included as extra pressure.

17. Proper waterproofing and subdrains with free-draining backwall material or geodrains shall be installed behind all retaining walls on the subject project. ***Geotechnical Exploration, Inc.*** will assume no liability for damage to structures that is attributable to poor drainage nor for damage due to improperly backfilled trenches or retaining walls with fill soils placed without our observations and testing. Subdrains consisting of perforated pipes placed in an envelope of gravel and wrapped with filtercloth shall be installed at the bottom of retaining walls.

E. Slopes

Based on the topography of the site, it appears that some of the building pad areas may be separated by relatively small fill slopes.

18. Shallow footings of proposed structures, walls, fences, swimming pools, etc., when founded 8 feet and farther away from the top or face of slopes, may be of standard design in conformance with the recommended load-bearing value. If the proposed foundations and footings are located closer than 8 feet inside the top or face of slopes, they shall be deepened to 1½ feet below a line beginning at a point 8 feet horizontally inside the slopes and projected outward and downward, parallel to the face of the slope and into firm soils (see Figure No. VII).

19. A representative of ***Geotechnical Exploration, Inc.*** must observe any steep temporary slopes ***during construction***. In the event that soils and formational material comprising a slope are not as anticipated, any required slope design changes would be presented at that time.

20. Where not superseded by specific recommendations presented in this report, trenches, excavations and temporary slopes at the subject site shall be

constructed in accordance with Title 8, Construction Safety Orders, issued by Cal-OSHA.

F. Site Drainage Considerations

21. Groundwater was not encountered during the course of our field investigation, and we do not expect groundwater to cause significant problems if the property is developed as presently designed. It should be kept in mind, however, that any required additional grading operations may change surface drainage patterns and/or reduce permeabilities due to the densification of compacted soils. Such changes of surface and subsurface hydrologic conditions, plus irrigation of landscaping or significant increases in rainfall, may result in the appearance of minor amounts of surface or near-surface water at locations where none existed previously. The damage from such water is expected to be minor and cosmetic in nature, if good positive drainage is implemented at the completion of construction. Corrective action should be taken on a site-specific basis if and when it becomes necessary.

22. Adequate measures shall be taken to properly finish-grade the building site after the structures and other improvements are in place. Drainage waters from this site and adjacent properties are to be directed away from the foundations, floor slabs, footings, and slopes, onto the natural drainage direction for this area or into properly designed and approved drainage facilities. Roof gutters and downspouts should be installed on the structures, with the runoff directed away from the foundations via closed drainage lines. Proper subsurface and surface drainage will help minimize the potential for waters to seek the level of the bearing soils under the foundations, footings and floor slabs. Failure to observe this recommendation could result in undermining and possible differential settlement of the structure or other improvements on the site. Currently, the Uniform Building Code requires a

minimum 2-percent surface gradient for proper drainage of building pads unless waived by the building official. Concrete pavement may have a minimum gradient of 0.5-percent.

23. Appropriate erosion control measures shall be taken at all times during and after construction to prevent surface runoff waters from entering footing excavations, ponding on finished building pad areas or running over the existing cut slopes.

24. Sediment accumulation and standing water along street curbs is a common occurrence after construction of a residential development or subdivision, most often as a result of excess irrigation and/or relatively level street grades. Continual slow water flow from yard drainage systems into street swales often results in curb areas that remain wet, muddy or support moss growth and algae. During high water flow conditions (such as during a heavy rainfall), the velocity of the water will most likely carry the sediments and clear the curb area. However, during low water flow (such as continual slow draining of yard area drains into the curb outlets), the slow velocity allows silts and fine sands to deposit and accumulate. Heavily landscaped yards, the presence of cut ground lots that create near-surface perched water conditions, and relatively level streets with shallow gradients to storm drain inlets all contribute to wet and muddy curb conditions. It is the responsibility of the project Civil Engineer or architect preparing the grading plan to design adequate street/curb surface drainage.

    It is recommended that the owners of the property be advised as to the irrigation-related cause(s) of persistent water and sedimentation in the street curb areas. If street curb flow from yard area drains is not considered acceptable, we may be contacted by the project Civil Engineer to discuss the design of a yard area discharge collection system.

25. Planter areas, flower beds and planter boxes shall be sloped to drain away from the foundations, footings, and floor slabs at a gradient of at least 5 percent within 5 feet from the perimeter walls. Any planter areas adjacent to the buildings or surrounded by concrete improvements shall be provided with sufficient area drains to help with rapid runoff disposal. No water shall be allowed to pond adjacent to the buildings or other improvements. Planter boxes shall be constructed with a closed bottom and a subsurface drain, installed in gravel, with the direction of subsurface and surface flow away from the slopes, foundations, footings, and floor slabs, to an adequate drainage facility. Sufficient area drains and proper surface gradient shall be provided to reduce water ponding throughout the project. Roof gutter and downspouts shall be tied to storm drain lines.

G. General Recommendations

26. In order to reduce any work delays at the subject site during site development, this firm should be contacted at least 24 hours prior to any need for observation of slopes or field density testing.

XI. LIMITATIONS

It should be noted that all recommendations are of a preliminary nature and subject to change, based upon review of your final grading and building plans, and our observations during grading. Our preliminary conclusions and recommendations have been based on the available data obtained from our report reviews, field investigation and laboratory analysis, as well as our experience with the soils and formation materials in the Golden Hill area of the City of San Diego. *Of necessity, we must assume a certain degree of continuity between exploratory excavations and/or natural exposures. It is, therefore, necessary that all observations, conclusions, and recommendations be verified at the time grading operations begin.*

In the event discrepancies are noted, additional recommendations may be issued, if required. This report has been prepared for preliminary design purposes only, and may not be sufficient to prepare an accurate bid for the grading work.

The work performed and recommendations presented herein are the result of an investigation and analysis that meet the contemporary standard of care in our profession within the County of San Diego. No warranty is provided.

This report should be considered valid for a period of two (2) years, and is subject to review by our firm following that time. If significant modifications are made to the grading plans, especially with respect to the height and location of any proposed cuts and fills, this report should be presented to us for immediate review and possible revision. The firm of ***Geotechnical Exploration, Inc.*** shall not be held responsible for changes to the physical condition of the property, such as addition of fill soils or changing drainage patterns, which occur subsequent to issuance of this report.

This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for the safety of personnel other than our own on the site; the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe.

It is the responsibility of the owner and/or developer to ensure that the recommendations summarized in the report are carried out in the field operations and that our recommendations for design of the project are incorporated in the building and grading plans. Our firm should review the grading and the building plans when they become available and before grading starts.

This opportunity to be of service is sincerely appreciated. Should you have any questions regarding this matter, please contact the undersigned. Reference to our **Job No. 02-8263** will help to expedite a response to your inquiries.

Respectfully submitted,

GEOTECHNICAL EXPLORATION, INC.

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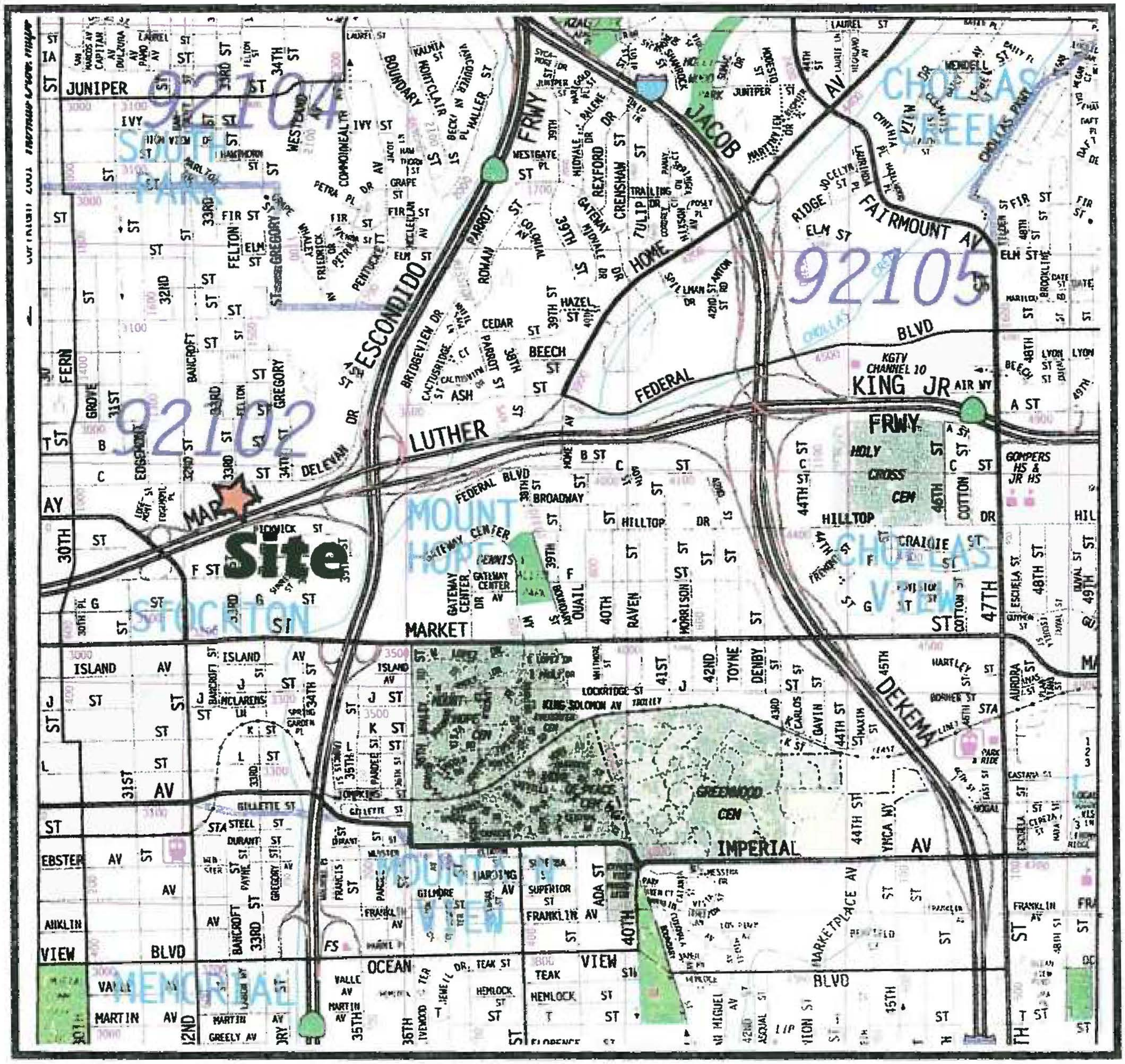
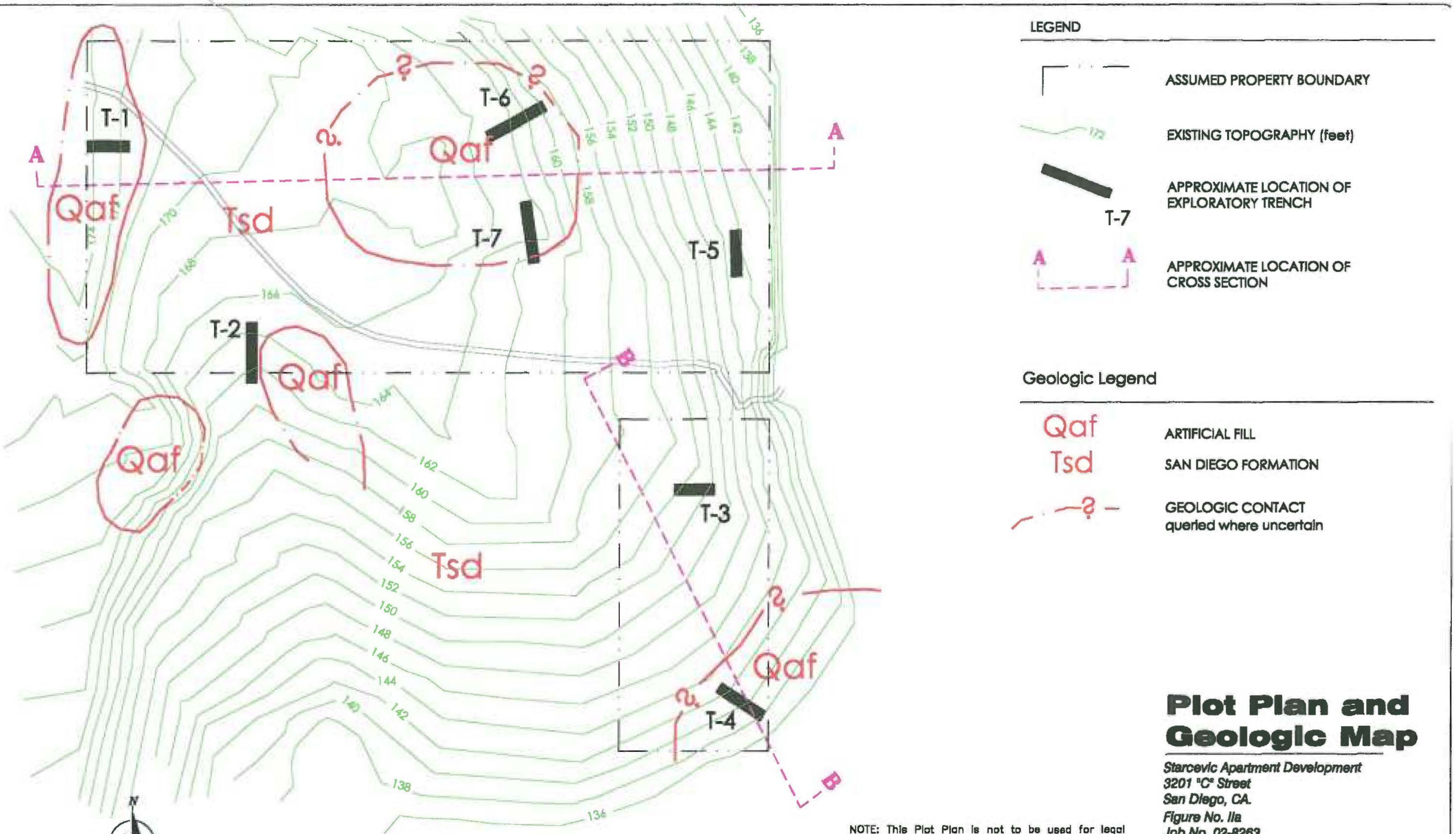
VICINITY MAP



Starcevic Apartment Development
3201 "C" Street
San Diego, CA.

Figure No. I
Job No.02-8263



Plot Plan and Geologic Map

Starcevic Apartment Development
3201 "C" Street
San Diego, CA.
Figure No. IIa
Job No. 02-8263

Geotechnical Exploration, Inc.

NOTE: This Plot Plan is not to be used for legal purposes. Locations and dimensions are approximate. Actual property dimensions and locations of utilities may be obtained from the Approved Building Plans or the "As-Built" Grading Plans.

REFERENCE: This PLot Plan was prepared from an existing SANGIS Topographic Map provided by the client and from on-site field reconnaissance performed by GEI.

02-8263-p

SCALE: 1" = 40'

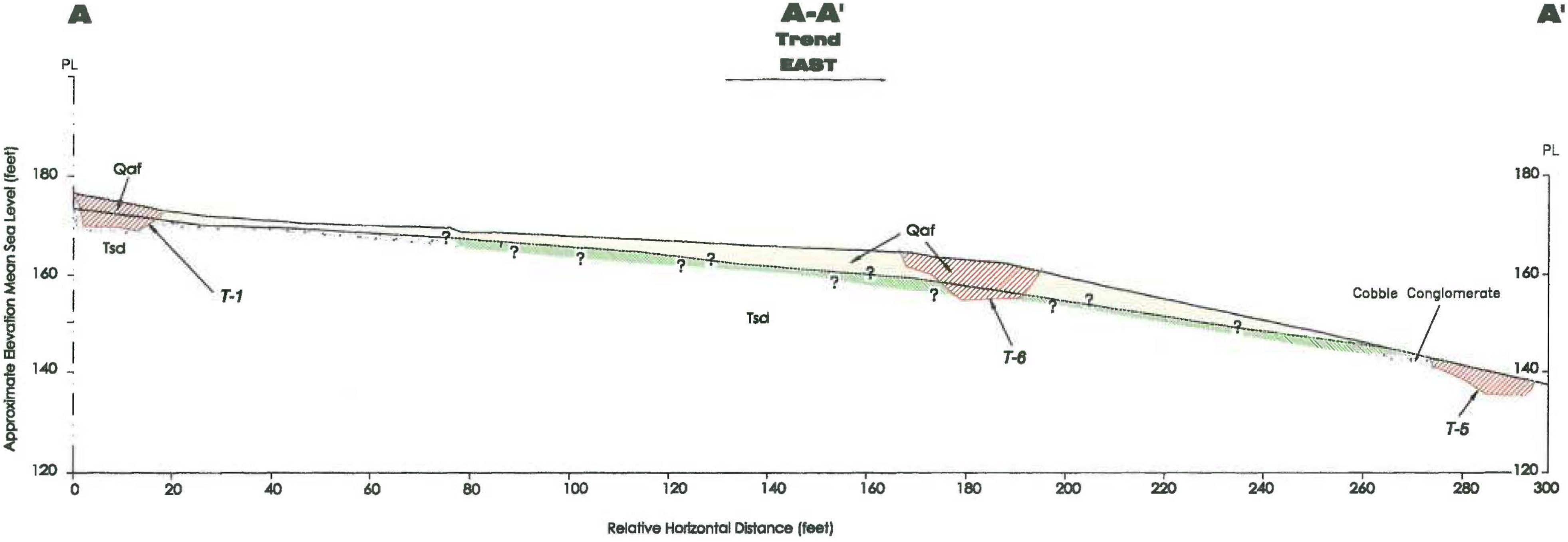
August 2002

GEOLOGIC CROSS SECTION

A-A'

Trend

EAST



Starcevic Apartment Development
C Street Project
3201 C Street
San Diego, CA.
Figure No. IIb
Job No. 02-8263

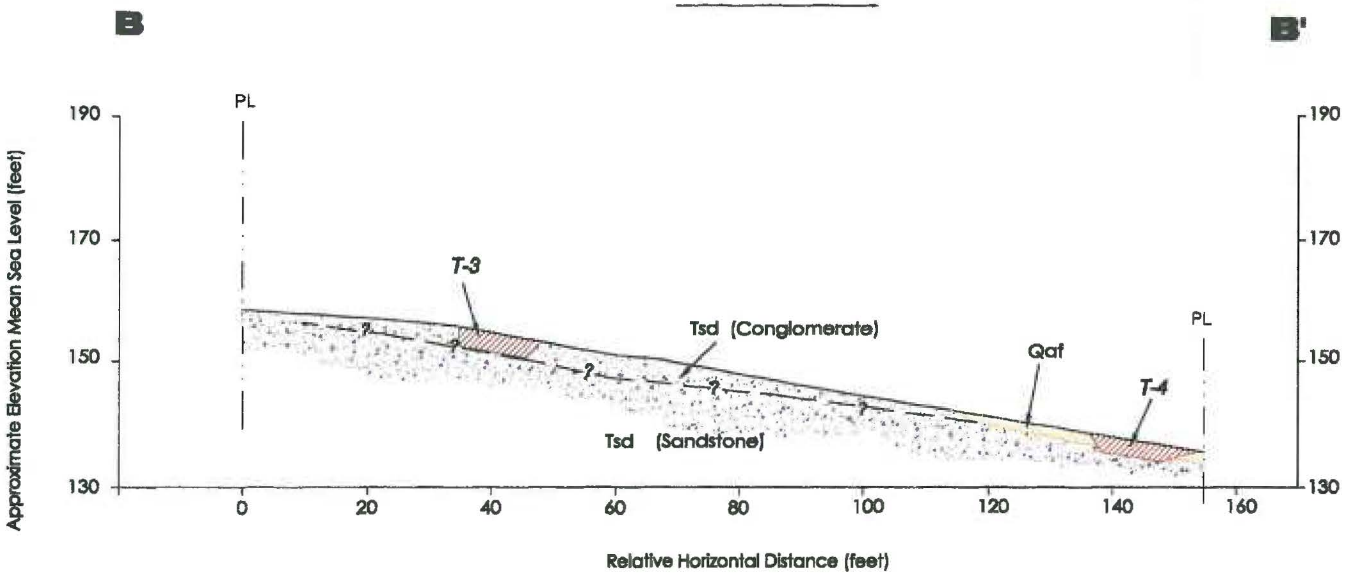
Geotechnical Exploration, Inc.

August 2002

02-8263-aa

GEOLOGIC CROSS SECTION
B-B'

Trend
EAST



Starcevic Apartment Development
C Street Project
3201 C Street
San Diego, CA.
Figure No. IIc
Job No. 02-8263

Geotechnical Exploration, Inc.

NOTE: This Cross Section is not to be used for legal purposes. Locations and dimensions are approximate. Actual property dimensions and locations of utilities may be obtained from the Approved Building Plans or the "As-Built" Grading Plans.

August 2002

02-8263-bb

EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Rubber-tire Backhoe	**2' X 12' X 5.5' Trench**	**6-27-02**
SURFACE ELEVATION	GROUNDWATER DEPTH	LOGGED BY
± 174' Mean Sea Level	**Not Encountered**	**SCB**

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	EXPANSION INDEX	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
1 2		1	**SILTY FINE SAND**. Loose. Dry. Light brown. **FILL (Qaf)**	SM									
3		2	**CLAYEY SAND**, w/ few rounded gravels. Dense. Damp. Orange/ dark brown. **SAN DIEGO FORMATION (Tsd)**	SC	9.9	117.0	14.5	114.5			11		
4 5		3	**SILTY MEDIUM TO COARSE SAND**, w/ gravels and few cobbles. Dense. Damp. Light orange-brown. **SAN DIEGO FORMATION (Tsd)**	GM	9.6	124.7							
6 7 8 9			Bottom @ 5.5'										

▼ WATER TABLE
☒ LOOSE BAG SAMPLE
☐1 IN-PLACE SAMPLE
■ DRIVE SAMPLE
☐S SAND CONE/F.D.T.
▨ STANDARD PENETRATION TEST

JOB NAME **Starcevic Apartment Development**		
SITE LOCATION **3201 "C" Street, San Diego, California**		
JOB NUMBER **02-8263**	REVIEWED BY **LDR/JAC**	LOG No. **T-1**
FIGURE NUMBER **IIIa**	Geotechnical Exploration, Inc.	

EXPLORATION LOG 8263 STARCEVIC.GPJ GEO_EXPL.GDT 8/21/02

EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Rubber-tire Backhoe	**2' X 12' X 6' Trench**	**6-27-02**
SURFACE ELEVATION	GROUNDWATER DEPTH	LOGGED BY
± 162' Mean Sea Level	**Not Encountered**	**SCB**

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	EXPANSION INDEX	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
0–2		☒	**SILTY FINE TO MEDIUM SAND**, w/ abundant rounded gravels and few cobbles. Loose. Dry. Gray-brown. **FILL (Qaf)**	SM			10.5	125.0			4		
2–3			**SILTY FINE TO MEDIUM SAND**, w/ few gravel lenses. Dense. Damp. Light orange-brown. **SAN DIEGO FORMATION (Tsd)**	SM									
3–5		☒					12.0	120.0					
5–6		1			7.5	111.0							
6–10			Bottom @ 6'										

▼ WATER TABLE
☒ LOOSE BAG SAMPLE
[1] IN-PLACE SAMPLE
■ DRIVE SAMPLE
[S] SAND CONE/F.D.T.
▨ STANDARD PENETRATION TEST

JOB NAME		
Starcevic Apartment Development		
SITE LOCATION		
3201 "C" Street, San Diego, California		
JOB NUMBER **02-8263**	REVIEWED BY **LDR/JAC**	LOG No.
FIGURE NUMBER **IIIb**	**Geotechnical Exploration, Inc.**	**T-2**

EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Rubber-tire Backhoe	**2' X 12' X 5' Trench**	**6-27-02**
SURFACE ELEVATION	GROUNDWATER DEPTH	LOGGED BY
± 151' Mean Sea Level	**Not Encountered**	**SCB**

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION: DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
			FINE SILTY SAND MATRIX WITH 85% GRAVELS, rounded, to 3" maximum diameter. Loose. Dry. Gray-brown. **HIGHLY WEATHERED SAN DIEGO FORMATION (CONGLOMERATE) (Tsd)**	GP								
1 2			**CLAYEY FINE TO MEDIUM SAND MATRIX W/ ABUNDANT GRAVELS/COBBLES**. Medium dense. Dry. Medium to dark gray-brown. **WEATHERED SAN DIEGO FORMATION (CONGLOMERATE) (Tsd)**	GP-GC								
3 4		1	**SILTY FINE TO MEDIUM SANDSTONE**, cemented. Very dense. Damp. Orange-brown. **SAN DIEGO FORMATION (Tsd)**	SM	6.4	115.8						
5 6 7 8 9			Bottom @ 5'									

- ▼ WATER TABLE
- ☒ LOOSE BAG SAMPLE
- 1 IN-PLACE SAMPLE
- ■ DRIVE SAMPLE
- S SAND CONE/F.D.T.
- ▨ STANDARD PENETRATION TEST

JOB NAME
Starcevic Apartment Development

SITE LOCATION
3201 "C" Street, San Diego, California

JOB NUMBER	REVIEWED BY	LOG No.
02-8263	**LDR/JAC**	**T-3**
FIGURE NUMBER	Geotechnical Exploration, Inc.	
IIIc		

EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Rubber-tire Backhoe	**2' X 10' X 6.5' Trench**	**6-27-02**
SURFACE ELEVATION	GROUNDWATER DEPTH	LOGGED BY
± 140' Mean Sea Level	**Not Encountered**	**SCB**

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
1 2			**SILTY FINE TO MEDIUM SAND**, w/ clay, gravels and glass fragments. Loose. Dry. Medium gray-brown. **FILL (Qaf)**	SM-SC								
3 4 5 6			**SILTY FINE TO MEDIUM SANDSTONE**, very light cementation. Dense. Damp. Light orange-brown. **SAN DIEGO FORMATION (Tsd)**	SM								
7 8 9			Bottom @ 6.5'									

▼ WATER TABLE

☒ LOOSE BAG SAMPLE

1 IN-PLACE SAMPLE

■ DRIVE SAMPLE

S SAND CONE/F.D.T.

▨ STANDARD PENETRATION TEST

JOB NAME
Starcevic Apartment Development

SITE LOCATION
3201 "C" Street, San Diego, California

JOB NUMBER
02-8263

FIGURE NUMBER
IIId

REVIEWED BY **LDR/JAC**

Geotechnical Exploration, Inc.

LOG No.
T-4

EQUIPMENT **Rubber-tire Backhoe**	DIMENSION & TYPE OF EXCAVATION **2' X 10' X 5' Trench**	DATE LOGGED **6-27-02**
SURFACE ELEVATION **± 145' Mean Sea Level**	GROUNDWATER DEPTH **Not Encountered**	LOGGED BY **SCB**

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
0–2			**SILTY FINE TO MEDIUM SAND W/ ABUNDANT COBBLES/ GRAVELS**, rounded. Loose. Dry. Gray-brown. **HIGHLY WEATHERED SAN DIEGO FORMATION (CONGLOMERATE) (Tsd)**	GP								
2–2.6			**SILTY FINE TO MEDIUM SANDSTONE**, fractured. Medium dense. Dry. Light orange-brown. **WEATHERED SAN DIEGO FORMATION (Tsd)**	SM								
2.6–5			**SILTY FINE SAND**, light cementation. Dense. Damp. Light orange-brown. **SAN DIEGO FORMATION (Tsd)**	SM								
5–10			Bottom @ 5'									

EXPLORATION LOG 8263 STARCEVIC.GPJ GEO_EXPL.GDT 8/21/02

▼ WATER TABLE
☒ LOOSE BAG SAMPLE
1 IN-PLACE SAMPLE
■ DRIVE SAMPLE
S SAND CONE/F.D.T.
▨ STANDARD PENETRATION TEST

JOB NAME **Starcevic Apartment Development**		
SITE LOCATION **3201 "C" Street, San Diego, California**		
JOB NUMBER **02-8263** FIGURE NUMBER **IIIe**	REVIEWED BY **LDR/JAC** **Geotechnical Exploration, Inc.**	LOG No. **T-5**

EQUIPMENT **Rubber-tire Backhoe**	DIMENSION & TYPE OF EXCAVATION **2' X 15' X 7' Trench**	DATE LOGGED **6-27-02**
SURFACE ELEVATION **± 163' Mean Sea Level**	GROUNDWATER DEPTH **Not Encountered**	LOGGED BY **SCB**

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
1 2 3 4			**SILTY FINE TO MEDIUM SAND**, w/ minor construction debris. Very loose. Very dry. Gray-brown. **FILL (Qaf)** – fill thins to 2 feet thick in a northeasterly direction.	SM								
5 6			**SANDY CLAY/ CLAYEY SAND**, w/ silt. Very stiff. Slightly damp. Dark brown. **WEATHERED SAN DIEGO FORMATION (Tsd)** – thins to 1.5 feet thick in a northeasterly direction.	SC-CH								
7			**SILTY FINE TO MEDIUM SAND**, slightly cemented. Dense. Damp. Light orange-brown. **SAN DIEGO FORMATION (Tsd)**	SM								
8 9			Bottom @ 7'									

EXPLORATION LOG 8263 STARCEVIC.GPJ GEO_EXPL.GDT 8/21/02

▼ WATER TABLE
☒ LOOSE BAG SAMPLE
1 IN-PLACE SAMPLE
■ DRIVE SAMPLE
S SAND CONE/F.D.T.
▨ STANDARD PENETRATION TEST

JOB NAME **Starcevic Apartment Development**		
SITE LOCATION **3201 "C" Street, San Diego, California**		
JOB NUMBER **02-8263**	REVIEWED BY **LDR/JAC**	LOG No. **T-6**
FIGURE NUMBER **IIIf**	GEI Geotechnical Exploration, Inc.	

EQUIPMENT	DIMENSION & TYPE OF EXCAVATION	DATE LOGGED
Rubber-tire Backhoe	**2' X 16' X 20.5' Trench**	**6-27-02**
SURFACE ELEVATION	GROUNDWATER DEPTH	LOGGED BY
± 164' Mean Sea Level	**Not Encountered**	**SCB**

DEPTH FT.	SYMBOL	SAMPLE	FIELD DESCRIPTION AND CLASSIFICATION DESCRIPTION AND REMARKS (Grain size, Density, Moisture, Color)	U.S.C.S.	IN-PLACE MOISTURE (%)	IN-PLACE DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)	DENSITY (% of M.D.D.)	EXPAN. + CONSOL. - (%)	BLOW COUNTS/FT.	SAMPLE O.D. (INCHES)
2 4			**FINE TO MEDIUM SILTY SAND**, w/ some clay and cobbles. Loose. Dry. Gray-brown. **FILL (Qaf)**	SM								
6			**MEDIUM SANDY CLAY**. Very stiff. Damp. Dark brown. **SAN DIEGO FORMATION (Tsd)**	SC-CH								
			CLAYEY FINE TO MEDIUM SAND. Medium dense (stiff). Damp. Light brown to dark brown.	SC								
8 10 12 14 16 18 20			**SILTY FINE TO MEDIUM SANDSTONE**, cemented. Very dense. Damp. Light brown. **SAN DIEGO FORMATION (Tsd)**	SM								
22			**SILTY MEDIUM TO COARSE SAND**, w/ rounded gravel. Very dense. Damp. Light brown. **SAN DIEGO FORMATION (Tsd)**	SM								
			Bottom @ 20.5'									

- ▼ WATER TABLE
- ☒ LOOSE BAG SAMPLE
- 1 IN-PLACE SAMPLE
- ■ DRIVE SAMPLE
- S SAND CONE/F.D.T.
- ▨ STANDARD PENETRATION TEST

JOB NAME
Starcevic Apartment Development

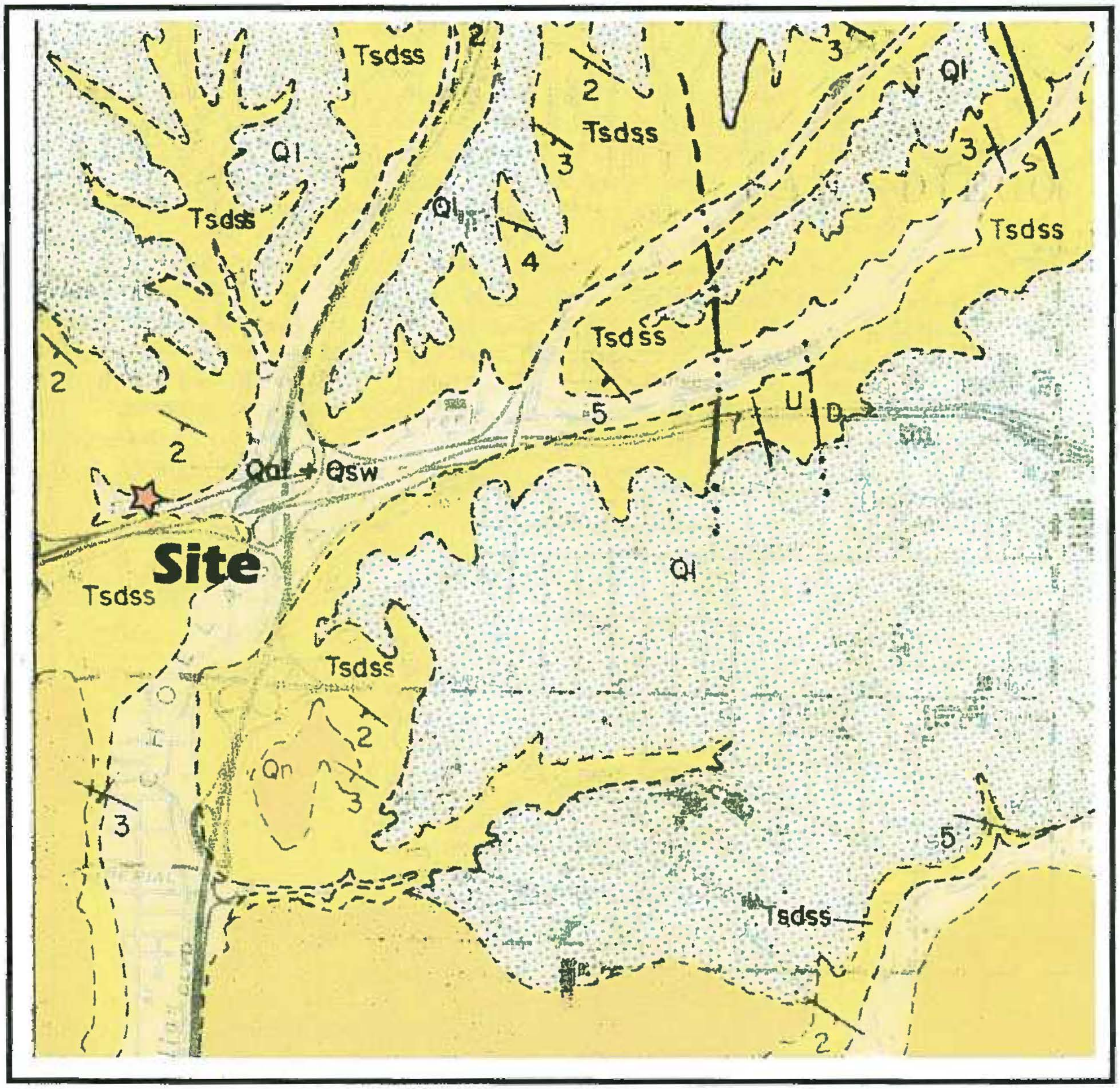
SITE LOCATION
3201 "C" Street, San Diego, California

JOB NUMBER	REVIEWED BY	LOG No.
02-8263	**LDR/JAC**	**T-7**
FIGURE NUMBER	Geotechnical Exploration, Inc.	
IIIg		

GEOLOGY MAP

1977

by Michael P. Kennedy and Siang S. Tan



Starcevic Apartment Development
3201 "C" Street
San Diego, CA.

Figure No. IVa
Job No. 02-8263

August 2002

AND OTAY MESA QUADRANGLES, SOUTHERN SAN DIEGO METROPOLITAN AREA, CALIFORNIA

By Michael P. Kennedy and Siang S. Tan
1977

EXPLANATION

CENOZOIC

QUATERNARY

Holocene

Qaf
Artificial fill

Beach deposits

Qal+Qsw
Alluvium and slope wash undifferentiated

Qls
Landslide deposit

Pleistocene

Qt
Stream-terrace deposits

Qbp Qn
Qbp+Qn
Bay Point Formation and unnamed, nearshore, marine sandstone
Qbp *Bay Point Formation.*
Qn. *unnamed, nearshore, marine sandstone*
Qbp+Qn. *Bay Point Formation and unnamed, nearshore marine sandstone undifferentiated.*

Ql
Lindavista Formation

TERTIARY

Pliocene

Tsdcg
Tsdss
San Diego Formation
Tsdcg, *conglomerate part.* Tsdss, *sandstone part.*

Otay Formation

Tfg
Unnamed fanglomerate deposits

Eocene

Tp
Pomerado Conglomerate

Tmv
Mission Valley Formation

Tst
Stadium Conglomerate

MESOZOIC

JURASSIC

Upper Jurassic

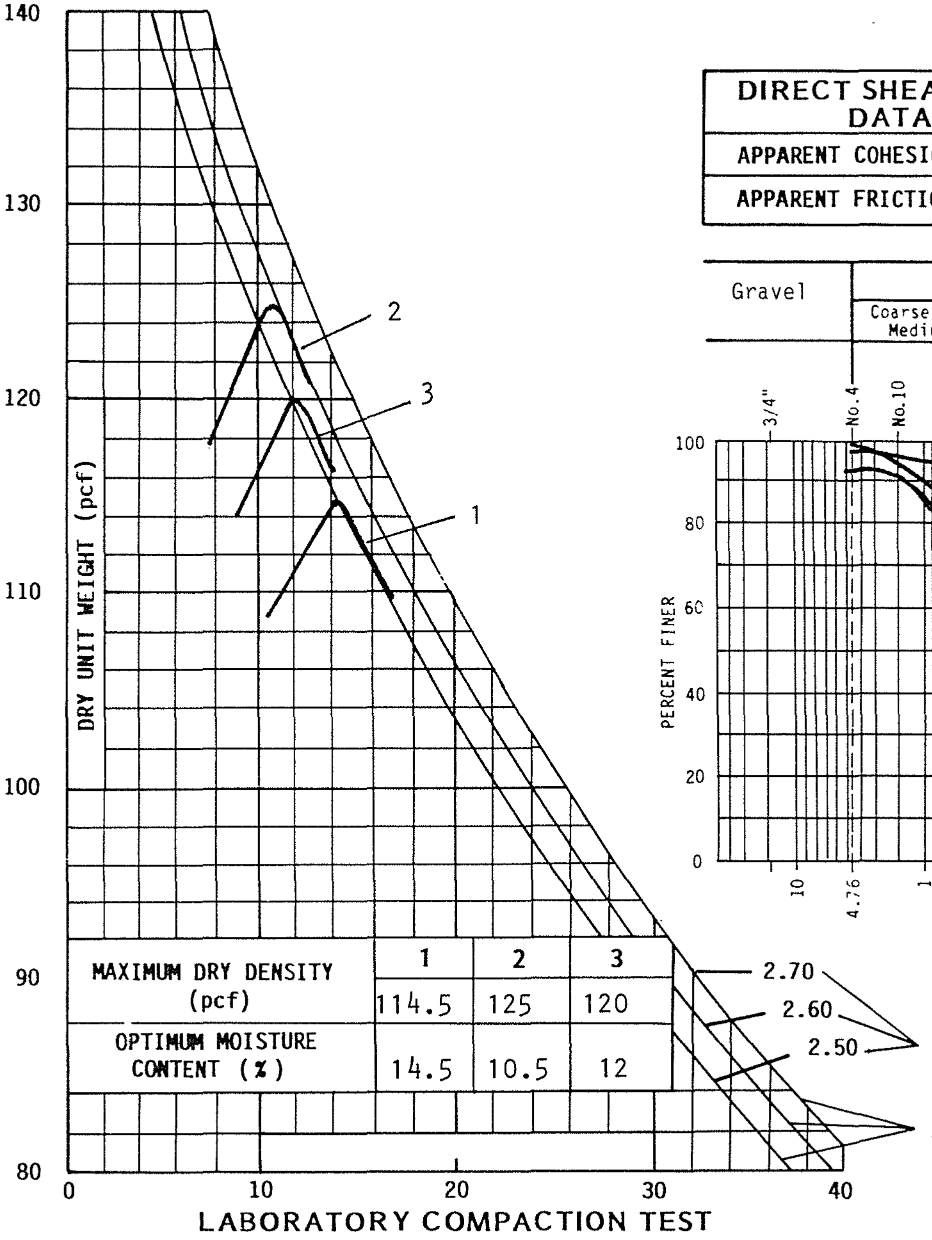
Jsp
Santiago Peak Volcanics

Figure No. IVb
Job No. 02-8263

August 2002

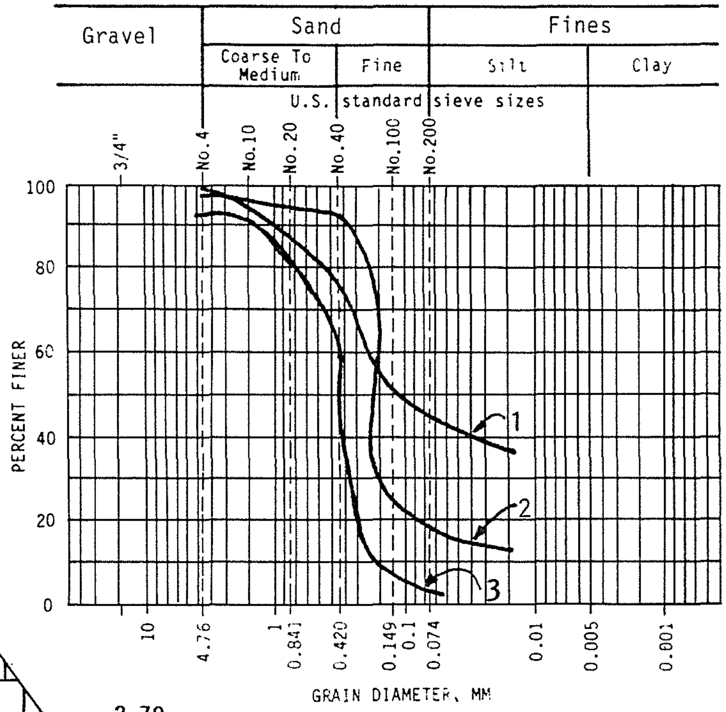
LABORATORY SOIL DATA SUMMARY

DIRECT SHEAR TEST DATA	1	2	3
APPARENT COHESION (psf)			
APPARENT FRICTION ANGLE			



MAXIMUM DRY DENSITY (pcf)	1	2	3
	114.5	125	120
OPTIMUM MOISTURE CONTENT (%)	14.5	10.5	12

LABORATORY COMPACTION TEST

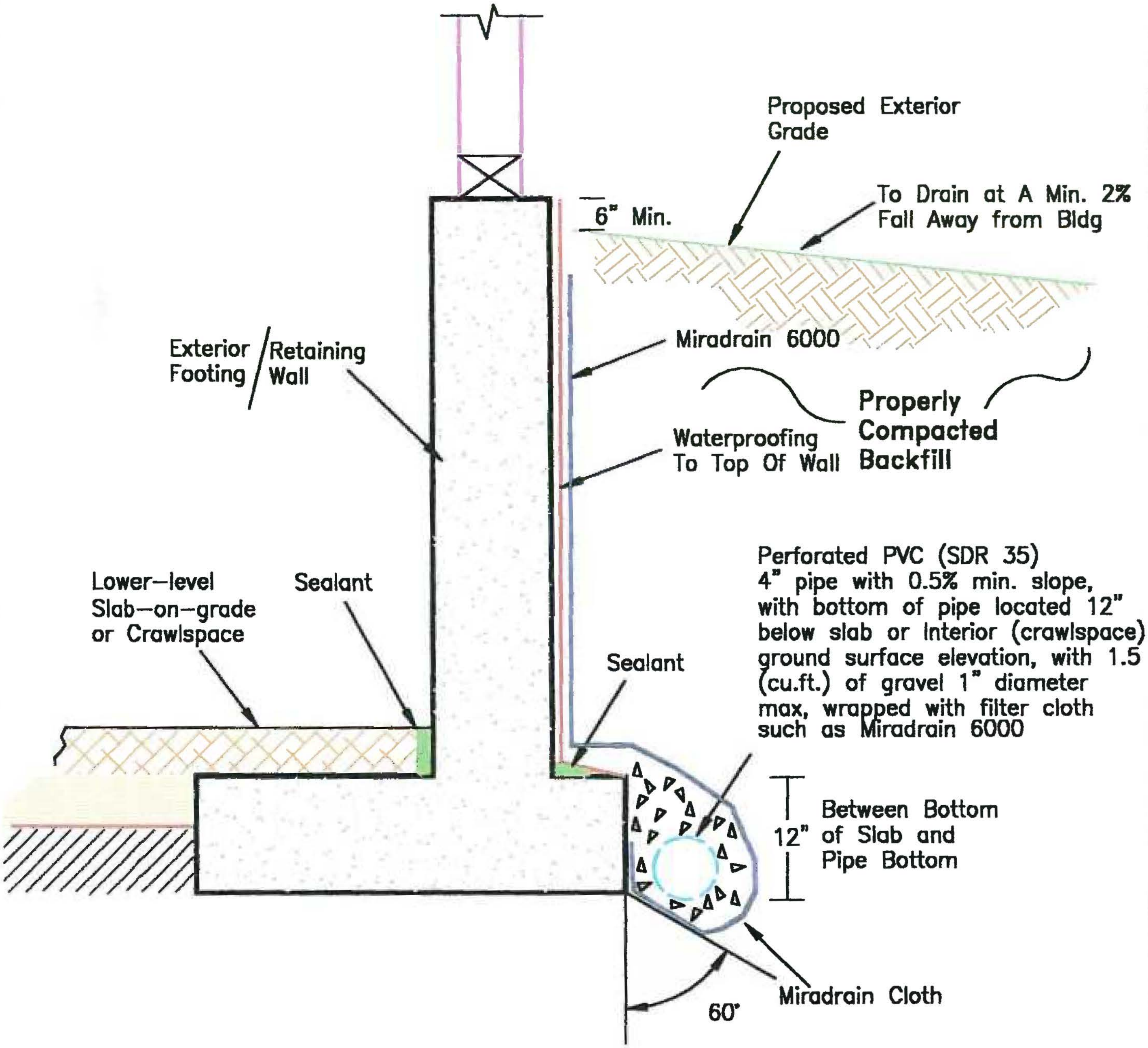


SOIL TYPE	SOIL CLASSIFICATION	BORING No.	TRENCH No.	DEPTH
1	Darkbrown clayey sand		T-1	3'-4'
2	Gray-brown silty sand		T-2	0-2'
3	Light orang-brown silty sand		T-2	3'-5'

SWELL TEST DATA	1	2	3
INITIAL DRY DENSITY (pcf)	97	116	104
INITIAL WATER CONTENT (%)	11.1	10.1	10
LOAD (psf)	144	144	144
EXPANSION INDEX (EI)	11	4	29

FIGURE NUMBER V
JOB NUMBER 02-8263

TYPICAL SUBGRADE RETAINING WALL DRAINAGE RECOMMENDATIONS



NOT TO SCALE

Figure No. VI

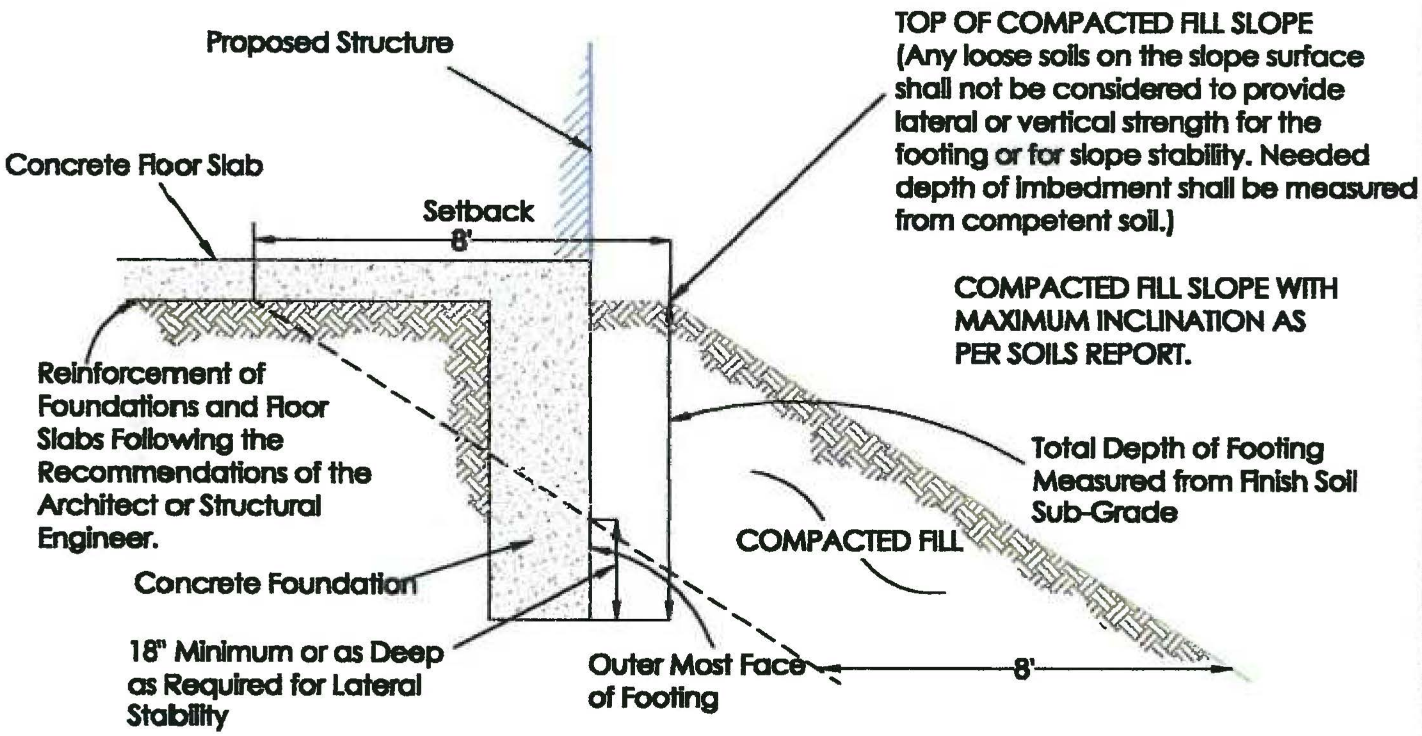
Job No. 02-8263

NOTE: As an option to Miradrain 6000, Gravel or Crushed rock 3/4" maximum diameter may be used with a minimum 12" thickness along the interior face of the wall and 2.0 cu.ft./ft. of pipe gravel envelope.

Geotechnical Exploration, Inc.

02-8198-V

FOUNDATION REQUIREMENTS NEAR SLOPES



TYPICAL SECTION

(Showing Proposed Foundation Located Within 8 Feet of Top of Slope)

18" FOOTING / 8' SETBACK

Total Depth of Footing

Distance From Top of Slope	1.5:1.0 SLOPE #	2.0:1.0 SLOPE
0	82"	66"
2'	66"	54"
4'	51"	42"
6'	34"	30"
8'	18"	18"

\# when applicable

Figure No. VII
Job No. 02-8263

Geotechnical Exploration, Inc.

APPENDIX A
UNIFIED SOIL CLASSIFICATION CHART

SOIL DESCRIPTION

Coarse-grained (More than half of material is larger than a No. 200 sieve)

GRAVELS, CLEAN GRAVELS (More than half of coarse fraction is larger than No. 4 sieve size, but smaller than 3")	GW	Well-graded gravels, gravel and sand mixtures, little or no fines.
	GP	Poorly graded gravels, gravel and sand mixtures, little or no fines.
GRAVELS WITH FINES (Appreciable amount)	GC	Clay gravels, poorly graded gravel-sand-silt mixtures
SANDS, CLEAN SANDS (More than half of coarse fraction is smaller than a No. 4 sieve)	SW	Well-graded sand, gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines.
SANDS WITH FINES (Appreciable amount)	SM	Silty sands, poorly graded sand and silty mixtures.
	SC	Clayey sands, poorly graded sand and clay mixtures.

FINE-GRAINED (More than half of material is smaller than a No. 200 sieve)

SILTS AND CLAYS	ML	Inorganic silts and very fine sands, rock flour, sandy silt and clayey-silt sand mixtures with a slight plasticity.
Liquid Limit Less than 50	CL	Inorganic clays of low to medium plasticity, gravelly clays, silty clays, clean clays.
	OL	Organic silts and organic silty clays of low plasticity.
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
Liquid Limit Greater than 50	CH	Inorganic clays of high plasticity, fat clays.
	OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils

APPENDIX B

EQ FAULT TABLES

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                         *                     *
                         *      E Q F A U L T  *
                         *                     *
                         *     Version 3.00    *
                         *                     *
                         ***********************

                         DETERMINISTIC ESTIMATION OF
                    PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 02-8263
                                                 DATE: 08-19-2002

JOB NAME: Starcevic eqf Test Run

CALCULATION NAME: Starcevic eqf Test Run Analysis

FAULT-DATA-FILE NAME: CDMGFLTE.DAT


SITE COORDINATES:
   SITE LATITUDE:  32.7167
   SITE LONGITUDE:  117.1236

SEARCH RADIUS:   100  mi

ATTENUATION RELATION:  10) Bozorgnia Campbell Niazi (1999) Hor.-Holocene Soil-Cor.
   UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
   DISTANCE MEASURE:  cdist
   SCOND:   0
   Basement Depth:  5.00 km     Campbell SSR:  0     Campbell SHR:  0
   COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED:  CDMGFLTE.DAT


MINIMUM DEPTH VALUE (km):  3.0
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                              EQFAULT SUMMARY
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                       DETERMINISTIC SITE PARAMETERS
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Page  1
-------------------------------------------------------------------------------
                                |              |ESTIMATED MAX. EARTHQUAKE EVENT
                                | APPROXIMATE  |-------------------------------
         ABBREVIATED            |  DISTANCE    | MAXIMUM  |   PEAK    |EST. SITE
          FAULT  NAME           |  mi    (km)  |EARTHQUAKE|   SITE    |INTENSITY
                                |              | MAG.(Mw) | ACCEL. g  |MOD.MERC.
================================|==============|==========|===========|=========
ROSE CANYON                     |   2.1(   3.3)|   6.9    |   0.487   |    X
CORONADO BANK                   |  15.0(  24.1)|   7.4    |   0.227   |   IX
NEWPORT-INGLEWOOD (Offshore)    |  35.2(  56.7)|   6.9    |   0.072   |   VI
ELSINORE-JULIAN                 |  40.4(  65.0)|   7.1    |   0.071   |   VI
EARTHQUAKE VALLEY               |  45.0(  72.5)|   6.5    |   0.042   |   VI
ELSINORE-TEMECULA               |  46.1(  74.2)|   6.8    |   0.051   |   VI
ELSINORE-COYOTE MOUNTAIN        |  47.5(  76.5)|   6.8    |   0.049   |   VI
PALOS VERDES                    |  61.5(  98.9)|   7.1    |   0.046   |   VI
SAN JACINTO-COYOTE CREEK        |  61.6(  99.2)|   6.8    |   0.037   |    V
SAN JACINTO-ANZA                |  62.6( 100.8)|   7.2    |   0.048   |   VI
SAN JACINTO - BORREGO           |  63.6( 102.3)|   6.6    |   0.032   |    V
ELSINORE-GLEN IVY               |  65.4( 105.2)|   6.8    |   0.035   |    V
SAN JACINTO-SAN JACINTO VALLEY  |  71.8( 115.5)|   6.9    |   0.034   |    V
LAGUNA SALADA                   |  72.2( 116.2)|   7.0    |   0.036   |    V
SUPERSTITION MTN. (San Jacinto) |  72.5( 116.6)|   6.6    |   0.027   |    V
ELMORE RANCH                    |  76.9( 123.8)|   6.6    |   0.026   |    V
NEWPORT-INGLEWOOD (L.A.Basin)   |  77.1( 124.1)|   6.9    |   0.032   |    V
SUPERSTITION HILLS (San Jacinto)|  77.5( 124.7)|   6.6    |   0.026   |    V
CHINO-CENTRAL AVE. (Elsinore)   |  80.3( 129.3)|   6.7    |   0.037   |    V
WHITTIER                        |  84.1( 135.3)|   6.8    |   0.027   |    V
COMPTON THRUST                  |  86.6( 139.3)|   6.8    |   0.037   |    V
SAN ANDREAS - Southern          |  88.6( 142.6)|   7.4    |   0.039   |    V
SAN ANDREAS - Coachella         |  88.6( 142.6)|   7.1    |   0.031   |    V
SAN ANDREAS - San Bernardino    |  89.8( 144.5)|   7.3    |   0.036   |    V
SAN JACINTO-SAN BERNARDINO      |  90.1( 145.0)|   6.7    |   0.023   |   IV
ELYSIAN PARK THRUST             |  90.9( 146.3)|   6.7    |   0.033   |    V
IMPERIAL                        |  91.5( 147.3)|   7.0    |   0.028   |    V
BRAWLEY SEISMIC ZONE            |  92.9( 149.5)|   6.4    |   0.018   |   IV
BURNT MTN.                      |  95.4( 153.5)|   6.4    |   0.018   |   IV
PINTO MOUNTAIN                  |  95.6( 153.8)|   7.0    |   0.027   |    V
EUREKA PEAK                     |  97.9( 157.5)|   6.4    |   0.017   |   IV
*******************************************************************************




-END OF SEARCH-   31 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE ROSE CANYON                      FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 2.1 MILES (3.3 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.4875 g
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                     ***********************
                     *                     *
                     *     E Q F A U L T   *
                     *                     *
                     *     Version 3.00    *
                     *                     *
                     ***********************

                DETERMINISTIC ESTIMATION OF
           PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 02-8263
                                                    DATE: 08-19-2002

JOB NAME: Starcevic eqf Test Run

CALCULATION NAME: Starcevic eqf Test Run Analysis

FAULT-DATA-FILE NAME: CDMGFLTE.DAT


SITE COORDINATES:
   SITE LATITUDE:  32.7167
   SITE LONGITUDE:  117.1236

SEARCH RADIUS:   100  mi

ATTENUATION RELATION:  10) Bozorgnia Campbell Niazi (1999) Hor.-Holocene Soil-Cor.
   UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
   DISTANCE MEASURE:  cdist
   SCOND:   0
   Basement Depth:  5.00 km     Campbell SSR:  0     Campbell SHR:  0
   COMPUTE RHGA HORIZ. ACCEL. (FACTOR:   0.65    DISTANCE:   20  miles)

FAULT-DATA FILE USED:  CDMGFLTE.DAT


MINIMUM DEPTH VALUE (km):  3.0
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                              EQFAULT SUMMARY
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                              DETERMINISTIC SITE PARAMETERS
                              -----------------------------

Page  1
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                                |               |ESTIMATED MAX. EARTHQUAKE EVENT
                                |  APPROXIMATE  |-------------------------------
          ABBREVIATED           |   DISTANCE    | MAXIMUM   |   RHGA    |EST. SITE
          FAULT  NAME           |   mi    (km)  |EARTHQUAKE|   SITE    |INTENSITY
                                |               | MAG.(Mw)  | ACCEL. g  |MOD.MERC.
================================|===============|===========|===========|=========
ROSE CANYON                     |   2.1(   3.3) |    6.9    |   0.317   |   IX
CORONADO BANK                   |  15.0(  24.1) |    7.4    |   0.227   |   IX
NEWPORT-INGLEWOOD (Offshore)    |  35.2(  56.7) |    6.9    |   0.072   |   VI
ELSINORE-JULIAN                 |  40.4(  65.0) |    7.1    |   0.071   |   VI
EARTHQUAKE VALLEY               |  45.0(  72.5) |    6.5    |   0.042   |   VI
ELSINORE-TEMECULA               |  46.1(  74.2) |    6.8    |   0.051   |   VI
ELSINORE-COYOTE MOUNTAIN        |  47.5(  76.5) |    6.8    |   0.049   |   VI
PALOS VERDES                    |  61.5(  98.9) |    7.1    |   0.046   |   VI
SAN JACINTO-COYOTE CREEK        |  61.6(  99.2) |    6.8    |   0.037   |   V
SAN JACINTO-ANZA                |  62.6( 100.8) |    7.2    |   0.048   |   VI
SAN JACINTO - BORREGO           |  63.6( 102.3) |    6.6    |   0.032   |   V
ELSINORE-GLEN IVY               |  65.4( 105.2) |    6.8    |   0.035   |   V
SAN JACINTO-SAN JACINTO VALLEY  |  71.8( 115.5) |    6.9    |   0.034   |   V
LAGUNA SALADA                   |  72.2( 116.2) |    7.0    |   0.036   |   V
SUPERSTITION MTN. (San Jacinto) |  72.5( 116.6) |    6.6    |   0.027   |   V
ELMORE RANCH                    |  76.9( 123.8) |    6.6    |   0.026   |   V
NEWPORT-INGLEWOOD (L.A.Basin)   |  77.1( 124.1) |    6.9    |   0.032   |   V
SUPERSTITION HILLS (San Jacinto)|  77.5( 124.7) |    6.6    |   0.026   |   V
CHINO-CENTRAL AVE. (Elsinore)   |  80.3( 129.3) |    6.7    |   0.037   |   V
WHITTIER                        |  84.1( 135.3) |    6.8    |   0.027   |   V
COMPTON THRUST                  |  86.6( 139.3) |    6.8    |   0.037   |   V
SAN ANDREAS - Southern          |  88.6( 142.6) |    7.4    |   0.039   |   V
SAN ANDREAS - Coachella         |  88.6( 142.6) |    7.1    |   0.031   |   V
SAN ANDREAS - San Bernardino    |  89.8( 144.5) |    7.3    |   0.036   |   V
SAN JACINTO-SAN BERNARDINO      |  90.1( 145.0) |    6.7    |   0.023   |   IV
ELYSIAN PARK THRUST             |  90.9( 146.3) |    6.7    |   0.033   |   V
IMPERIAL                        |  91.5( 147.3) |    7.0    |   0.028   |   V
BRAWLEY SEISMIC ZONE            |  92.9( 149.5) |    6.4    |   0.018   |   IV
BURNT MTN.                      |  95.4( 153.5) |    6.4    |   0.018   |   IV
PINTO MOUNTAIN                  |  95.6( 153.8) |    7.0    |   0.027   |   V
EUREKA PEAK                     |  97.9( 157.5) |    6.4    |   0.017   |   IV
*******************************************************************************




-END OF SEARCH-   31 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE ROSE CANYON                       FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 2.1 MILES (3.3 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.3169 g
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APPENDIX C

EQ SEARCH TABLES

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                         *                       *
                         *     E Q S E A R C H   *
                         *                       *
                         *     Version 3.00      *
                         *                       *
                         *************************

                              ESTIMATION OF
                          PEAK ACCELERATION FROM
                      CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 02-8263
                                                  DATE: 08-19-2002

JOB NAME: Starcevic eqs Test Run

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT


MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  5.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  32.7167
   SITE LONGITUDE:  117.1236

SEARCH DATES:
           START DATE:   1800
           END DATE:   2002

SEARCH RADIUS:
           100.0 mi
           160.9 km

ATTENUATION RELATION:  10) Bozorgnia Campbell Niazi (1999) Hor.-Holocene Soil-Cor.
   UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
   ASSUMED SOURCE TYPE:  DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   0  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:  0     Campbell SHR:  0
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km):  3.0
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                         EARTHQUAKE SEARCH RESULTS
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Page  1
-------------------------------------------------------------------------------
    |       |        |          |  TIME   |     |     |  SITE  |SITE|  APPROX.
FILE|  LAT. |  LONG. |   DATE   |  (UTC)  |DEPTH|QUAKE|  ACC.  | MM |  DISTANCE
CODE| NORTH |  WEST  |          | H M Sec | (km)| MAG.|   g    |INT.|  mi   [km]
----+-------+--------+----------+---------+-----+-----+--------+----+-----------
DMG |33.0000|117.3000|11/22/1800|2130 0.0|  0.0| 6.50|  0.125 | VII|  22.1( 35.5)
MGI |32.8000|117.1000|05/25/1803| 0 0 0.0|  0.0| 5.00|  0.157 |VIII|   5.9(  9.5)
MGI |33.0000|117.0000|09/21/1856| 730 0.0|  0.0| 5.00|  0.053 | VI |  20.8( 33.5)
T-A |32.6700|117.1700|12/00/1856| 0 0 0.0|  0.0| 5.00|  0.189 |VIII|   4.2(  6.8)
MGI |34.0000|117.5000|12/16/1858|10 0 0.0|  0.0| 7.00|  0.040 |  V |  91.2(146.8)
DMG |32.7000|117.2000|05/27/1862|20 0 0.0|  0.0| 5.90|  0.346 | IX |   4.6(  7.4)
T-A |32.6700|117.1700|10/21/1862| 0 0 0.0|  0.0| 5.00|  0.189 |VIII|   4.2(  6.8)
T-A |32.6700|117.1700|05/24/1865| 0 0 0.0|  0.0| 5.00|  0.189 |VIII|   4.2(  6.8)
T-A |33.5000|115.8200|05/00/1868| 0 0 0.0|  0.0| 6.30|  0.024 |  V |  92.8(149.3)
T-A |32.2500|117.5000|01/13/1877|20 0 0.0|  0.0| 5.00|  0.028 |  V |  39.0( 62.7)
DMG |33.9000|117.2000|12/19/1880| 0 0 0.0|  0.0| 6.00|  0.023 | IV |  81.8(131.7)
DMG |34.1000|116.7000|02/07/1889| 520 0.0|  0.0| 5.30|  0.012 | III|  98.6(158.6)
DMG |33.4000|116.3000|02/09/1890|12 6 0.0|  0.0| 6.30|  0.034 |  V |  67.1(107.9)
DMG |32.7000|116.3000|02/24/1892| 720 0.0|  0.0| 6.70|  0.064 | VI |  47.9( 77.0)
DMG |33.2000|116.2000|05/28/1892|1115 0.0|  0.0| 6.30|  0.037 |  V |  63.1(101.5)
DMG |32.8000|116.8000|10/23/1894|23 3 0.0|  0.0| 5.70|  0.085 | VII|  19.6( 31.6)
DMG |33.8000|117.0000|12/25/1899|1225 0.0|  0.0| 6.40|  0.033 |  V |  75.1(120.9)
MGI |34.1000|117.3000|07/15/1905|2041 0.0|  0.0| 5.30|  0.013 | III|  96.0(154.6)
DMG |32.5000|115.5000|04/19/1906| 030 0.0|  0.0| 6.00|  0.020 | IV |  95.6(153.9)
DMG |33.7000|117.4000|04/11/1910| 757 0.0|  0.0| 5.00|  0.015 | IV |  69.7(112.2)
DMG |33.7000|117.4000|05/13/1910| 620 0.0|  0.0| 5.00|  0.015 | IV |  69.7(112.2)
DMG |33.7000|117.4000|05/15/1910|1547 0.0|  0.0| 6.00|  0.027 |  V |  69.7(112.2)
DMG |32.8000|115.5000|06/23/1915| 359 0.0|  0.0| 6.25|  0.023 | IV |  94.4(152.0)
DMG |32.8000|115.5000|06/23/1915| 456 0.0|  0.0| 6.25|  0.023 | IV |  94.4(152.0)
DMG |33.5000|116.5000|09/30/1916| 211 0.0|  0.0| 5.00|  0.016 | IV |  65.0(104.6)
DMG |33.7500|117.0000|04/21/1918|223225.0|  0.0| 6.80|  0.045 | VI |  71.7(115.4)
MGI |33.8000|117.6000|04/22/1918|2115 0.0|  0.0| 5.00|  0.013 | III|  79.7(128.2)
DMG |32.5000|115.5000|05/01/1918| 432 0.0|  0.0| 5.00|  0.011 | III|  95.6(153.9)
DMG |33.7500|117.0000|06/06/1918|2232 0.0|  0.0| 5.00|  0.015 | IV |  71.7(115.4)
DMG |33.2000|116.7000|01/01/1920| 235 0.0|  0.0| 5.00|  0.026 |  V |  41.4( 66.7)
MGI |33.2000|116.6000|10/12/1920|1748 0.0|  0.0| 5.30|  0.028 |  V |  45.1( 72.6)
DMG |32.5000|115.5000|09/08/1921|1924 0.0|  0.0| 5.00|  0.011 | III|  95.6(153.9)
DMG |34.0000|117.2500|07/23/1923| 73026.0|  0.0| 6.25|  0.025 |  V |  88.9(143.1)
DMG |32.5000|115.5000|11/05/1923|22 7 0.0|  0.0| 5.00|  0.011 | III|  95.6(153.9)
DMG |32.5000|115.5000|11/07/1923|2357 0.0|  0.0| 5.50|  0.014 | IV |  95.6(153.9)
MGI |32.5000|115.5000|04/16/1925| 330 0.0|  0.0| 5.00|  0.011 | III|  95.6(153.9)
MGI |32.5000|115.5000|04/16/1925| 520 0.0|  0.0| 5.30|  0.013 | III|  95.6(153.9)
DMG |32.5000|115.5000|01/01/1927| 81645.0|  0.0| 5.75|  0.017 | IV |  95.6(153.9)
DMG |32.5000|115.5000|01/01/1927| 91330.0|  0.0| 5.50|  0.014 | IV |  95.6(153.9)
MGI |32.7000|115.5000|01/01/1927|13 0 0.0|  0.0| 5.30|  0.013 | III|  94.3(151.8)
DMG |32.9000|115.7000|10/02/1928|19 1 0.0|  0.0| 5.00|  0.012 | III|  83.6(134.5)
DMG |33.0000|115.5000|02/26/1930| 230 0.0|  0.0| 5.00|  0.011 | III|  96.2(154.8)
DMG |33.6170|117.9670|03/11/1933| 154 7.8|  0.0| 6.30|  0.029 |  V |  79.0(127.1)
DMG |33.7500|118.0830|03/11/1933| 2 9 0.0|  0.0| 5.00|  0.011 | III|  90.3(145.4)
DMG |33.7500|118.0830|03/11/1933| 230 0.0|  0.0| 5.10|  0.012 | III|  90.3(145.4)
DMG |33.7500|118.0830|03/11/1933| 323 0.0|  0.0| 5.00|  0.011 | III|  90.3(145.4)
DMG |33.7000|118.0670|03/11/1933| 51022.0|  0.0| 5.10|  0.013 | III|  87.1(140.1)
DMG |33.5750|117.9830|03/11/1933| 518 4.0|  0.0| 5.20|  0.015 | IV |  77.3(124.4)
DMG |33.6830|118.0500|03/11/1933| 658 3.0|  0.0| 5.50|  0.016 | IV |  85.5(137.6)
DMG |33.7000|118.0670|03/11/1933| 85457.0|  0.0| 5.10|  0.013 | III|  87.1(140.1)
DMG |33.7500|118.0830|03/11/1933| 910 0.0|  0.0| 5.10|  0.012 | III|  90.3(145.4)
DMG |33.7500|118.0830|03/13/1933|131828.0|  0.0| 5.30|  0.014 | III|  90.3(145.4)
DMG |33.6170|118.0170|03/14/1933|19 150.0|  0.0| 5.10|  0.014 | III|  80.8(130.0)
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                         EARTHQUAKE SEARCH RESULTS
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Page  2
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    |       |        |          |  TIME  |     |     | SITE  |SITE|  APPROX.
FILE| LAT.  | LONG.  |   DATE   | (UTC)  |DEPTH|QUAKE| ACC.  | MM | DISTANCE
CODE| NORTH | WEST   |          | H M Sec| (km)| MAG.|   g   |INT.| mi  [km]
----+-------+--------+----------+--------+-----+-----+-------+----+-----------
DMG |33.7830|118.1330|10/02/1933| 91017.6|  0.0| 5.40| 0.014 | IV | 93.9(151.1)
DMG |32.0830|116.6670|11/25/1934| 818 0.0|  0.0| 5.00| 0.021 | IV | 51.2( 82.4)
DMG |32.2500|115.5000|12/30/1934|1352 0.0|  0.0| 6.50| 0.026 |  V | 99.9(160.8)
DMG |31.7500|116.5000|04/29/1935|20 8 0.0|  0.0| 5.00| 0.014 | III| 76.0(122.4)
DMG |34.1000|116.8000|10/24/1935|1448 7.6|  0.0| 5.10| 0.011 | III| 97.3(156.6)
DMG |33.1670|115.5000|12/20/1935| 745 0.0|  0.0| 5.00| 0.010 | III| 99.1(159.4)
DMG |31.8670|116.5710|02/27/1937| 12918.4| 10.0| 5.00| 0.016 | IV | 66.9(107.7)
DMG |33.4080|116.2610|03/25/1937|1649 1.8| 10.0| 6.00| 0.028 |  V | 69.1(111.1)
DMG |33.6990|117.5110|05/31/1938| 83455.4| 10.0| 5.50| 0.020 | IV | 71.4(114.9)
DMG |32.0000|117.5000|05/01/1939|2353 0.0|  0.0| 5.00| 0.020 | IV | 54.1( 87.1)
DMG |32.0000|117.5000|06/24/1939|1627 0.0|  0.0| 5.00| 0.020 | IV | 54.1( 87.1)
DMG |32.7330|115.5000|05/19/1940| 43640.9|  0.0| 6.70| 0.031 |  V | 94.3(151.8)
DMG |32.7670|115.4830|05/19/1940| 455 0.0|  0.0| 5.50| 0.014 | IV | 95.3(153.4)
DMG |32.7670|115.4830|05/19/1940| 55134.0|  0.0| 5.50| 0.014 | IV | 95.3(153.4)
DMG |32.7670|115.4830|05/19/1940| 63320.0|  0.0| 5.00| 0.011 | III| 95.3(153.4)
DMG |32.7670|115.4830|05/19/1940| 63540.0|  0.0| 5.50| 0.014 | IV | 95.3(153.4)
DMG |33.0000|116.4330|06/04/1940|1035 8.3|  0.0| 5.10| 0.025 |  V | 44.6( 71.7)
DMG |33.7830|118.2500|11/14/1941| 84136.3|  0.0| 5.40| 0.013 | III| 98.2(158.1)
DMG |32.9830|115.9830|05/23/1942|154729.0|  0.0| 5.00| 0.015 | IV | 68.7(110.5)
DMG |32.9670|116.0000|10/21/1942|162213.0|  0.0| 6.50| 0.039 |  V | 67.4(108.5)
DMG |32.9670|116.0000|10/21/1942|162519.0|  0.0| 5.00| 0.016 | IV | 67.4(108.5)
DMG |32.9670|116.0000|10/21/1942|162654.0|  0.0| 5.00| 0.016 | IV | 67.4(108.5)
DMG |33.2330|115.7170|10/22/1942| 15038.0|  0.0| 5.50| 0.015 | IV | 88.9(143.1)
DMG |32.9670|116.0000|10/22/1942|181326.0|  0.0| 5.00| 0.016 | IV | 67.4(108.5)
DMG |33.9760|116.7210|06/12/1944|104534.7| 10.0| 5.10| 0.012 | III| 90.0(144.8)
DMG |33.9940|116.7120|06/12/1944|111636.0| 10.0| 5.30| 0.013 | III| 91.3(147.0)
DMG |33.2170|116.1330|08/15/1945|175624.0|  0.0| 5.70| 0.024 | IV | 67.0(107.8)
DMG |33.0000|115.8330|01/08/1946|185418.0|  0.0| 5.40| 0.017 | IV | 77.4(124.5)
DMG |33.9500|116.8500|09/28/1946| 719 9.0|  0.0| 5.00| 0.012 | III| 86.6(139.4)
DMG |34.0170|116.5000|07/24/1947|221046.0|  0.0| 5.50| 0.014 | IV | 96.7(155.6)
DMG |34.0170|116.5000|07/25/1947| 04631.0|  0.0| 5.00| 0.011 | III| 96.7(155.6)
DMG |34.0170|116.5000|07/25/1947| 61949.0|  0.0| 5.20| 0.012 | III| 96.7(155.6)
DMG |34.0170|116.5000|07/26/1947| 24941.0|  0.0| 5.10| 0.011 | III| 96.7(155.6)
DMG |32.5000|118.5500|02/24/1948| 81510.0|  0.0| 5.30| 0.015 | IV | 84.3(135.7)
DMG |33.9330|116.3830|12/04/1948|234317.0|  0.0| 6.50| 0.027 |  V | 94.2(151.6)
DMG |32.2000|116.5500|11/04/1949|204238.0|  0.0| 5.70| 0.033 |  V | 48.9( 78.7)
DMG |32.2000|116.5500|11/05/1949| 43524.0|  0.0| 5.10| 0.023 | IV | 48.9( 78.7)
DMG |33.1170|115.5670|07/28/1950|175048.0|  0.0| 5.40| 0.014 | III| 94.4(151.8)
DMG |33.1170|115.5670|07/29/1950|143632.0|  0.0| 5.50| 0.015 | IV | 94.4(151.8)
DMG |32.9830|115.7330|01/24/1951| 717 2.6|  0.0| 5.60| 0.018 | IV | 82.7(133.1)
DMG |32.8170|118.3500|12/26/1951| 04654.0|  0.0| 5.90| 0.025 |  V | 71.5(115.1)
DMG |32.9500|115.7170|06/14/1953| 41729.9|  0.0| 5.50| 0.017 | IV | 83.2(133.9)
DMG |31.8000|116.1000|10/10/1953|1849 6.0|  0.0| 5.00| 0.012 | III| 87.0(140.1)
DMG |33.2830|116.1830|03/19/1954| 95429.0|  0.0| 6.20| 0.032 |  V | 67.0(107.9)
DMG |33.2830|116.1830|03/19/1954| 95556.0|  0.0| 5.00| 0.016 | IV | 67.0(107.9)
DMG |33.2830|116.1830|03/19/1954|102117.0|  0.0| 5.50| 0.021 | IV | 67.0(107.9)
DMG |33.2830|116.1830|03/23/1954| 41450.0|  0.0| 5.10| 0.017 | IV | 67.0(107.9)
DMG |31.5000|116.5000|10/17/1954|225718.0|  0.0| 5.70| 0.017 | IV | 91.6(147.4)
DMG |31.6000|116.1000|11/26/1955|1736 0.0|  0.0| 5.40| 0.013 | III| 97.6(157.0)
DMG |33.0000|115.5000|12/17/1955| 6 729.0|  0.0| 5.40| 0.013 | III| 96.2(154.8)
DMG |31.7500|115.9170|02/09/1956|143238.0|  0.0| 6.80| 0.033 |  V | 97.1(156.2)
DMG |31.7500|115.9170|02/09/1956|152426.0|  0.0| 6.10| 0.020 | IV | 97.1(156.2)
DMG |31.7500|115.9170|02/09/1956|165953.0|  0.0| 5.70| 0.016 | IV | 97.1(156.2)
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                         EARTHQUAKE SEARCH RESULTS
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Page  3
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    |        |        |          |   TIME  |     |     |  SITE  |SITE|  APPROX.
FILE|  LAT.  |  LONG. |   DATE   |  (UTC)  |DEPTH|QUAKE|  ACC.  | MM |  DISTANCE
CODE| NORTH  |  WEST  |          | H M Sec | (km)| MAG.|   g    |INT.|  mi  [km]
----+--------+--------+----------+---------+-----+-----+--------+----+-----------
DMG |31.7500|115.9170|02/09/1956|184845.0|  0.0| 5.70| 0.016  | IV | 97.1(156.2)
DMG |31.7500|115.9170|02/10/1956|15 929.0|  0.0| 5.00| 0.011  | III| 97.1(156.2)
DMG |31.7500|115.9170|02/10/1956|181254.0|  0.0| 5.50| 0.014  | IV | 97.1(156.2)
DMG |31.7500|115.9170|02/11/1956| 25746.0|  0.0| 5.10| 0.011  | III| 97.1(156.2)
DMG |31.7500|115.9170|02/11/1956| 61124.0|  0.0| 5.00| 0.011  | III| 97.1(156.2)
DMG |31.7500|115.9170|03/09/1956| 03240.0|  0.0| 5.00| 0.011  | III| 97.1(156.2)
DMG |31.8330|116.0000|05/10/1956|114854.0|  0.0| 5.00| 0.012  | III| 89.6(144.2)
DMG |33.2160|115.8080|04/25/1957|215738.7| -0.3| 5.20| 0.014  | IV | 83.6(134.6)
DMG |33.1830|115.8500|04/25/1957|222412.0|  0.0| 5.10| 0.014  | III| 80.5(129.6)
DMG |33.2310|116.0040|05/26/1957|155933.6| 15.1| 5.00| 0.014  | IV | 73.9(119.0)
DMG |32.2500|115.7500|12/01/1958| 32118.0|  0.0| 5.80| 0.019  | IV | 86.2(138.8)
DMG |32.2500|115.7500|12/01/1958| 350 0.0|  0.0| 5.00| 0.012  | III| 86.2(138.8)
DMG |32.2500|115.7500|12/01/1958| 6 2 0.0|  0.0| 5.50| 0.016  | IV | 86.2(138.8)
DMG |31.7960|116.2690|06/11/1963|152338.3| -2.0| 5.80| 0.021  | IV | 80.8(130.0)
DMG |33.7100|116.9250|09/23/1963|144152.6| 16.5| 5.00| 0.015  | IV | 69.5(111.9)
DMG |31.8110|117.1310|12/22/1964|205433.2|  2.3| 5.60| 0.024  | IV | 62.5(100.6)
DMG |33.1900|116.1290|04/09/1968| 22859.1| 11.1| 6.40| 0.037  |  V | 66.2(106.6)
DMG |33.1130|116.0370|04/09/1968| 3 353.5|  5.0| 5.20| 0.017  | IV | 68.7(110.5)
DMG |33.3430|116.3460|04/28/1969|232042.9| 20.0| 5.80| 0.027  |  V | 62.4(100.4)
DMG |31.6250|116.2110|06/10/1969| 34132.7| -2.0| 5.00| 0.011  | III| 92.3(148.6)
DMG |33.0330|115.8210|09/30/1971|224611.3|  8.0| 5.10| 0.014  | IV | 78.6(126.5)
PAS |31.9270|115.7770|07/17/1975|182447.0| 17.3| 5.00| 0.011  | III| 95.6(153.9)
PAS |32.7660|115.4410|10/15/1979|231930.0|  9.3| 5.20| 0.012  | III| 97.8(157.3)
PAS |32.9270|115.5400|10/16/1979| 54910.2| 10.4| 5.10| 0.012  | III| 93.0(149.7)
PAS |32.9280|115.5390|10/16/1979| 61948.7|  9.2| 5.10| 0.012  | III| 93.1(149.8)
PAS |33.0140|115.5550|10/16/1979| 65842.8|  9.1| 5.50| 0.015  | IV | 93.3(150.1)
PAS |33.5010|116.5130|02/25/1980|104738.5| 13.6| 5.50| 0.022  | IV | 64.6(104.0)
PAS |33.0980|115.6320|04/26/1981|12 928.4|  3.8| 5.70| 0.017  | IV | 90.4(145.4)
PAS |31.8900|115.8210|05/08/1985|234020.8|  6.0| 5.00| 0.011  | III| 95.1(153.0)
PAS |33.9980|116.6060|07/08/1986| 92044.5| 11.7| 5.60| 0.016  | IV | 93.4(150.2)
PAS |32.9710|117.8700|07/13/1986|1347 8.2|  6.0| 5.30| 0.027  |  V | 46.7( 75.2)
PAS |33.0820|115.7750|11/24/1987| 15414.5|  4.9| 5.80| 0.020  | IV | 82.1(132.2)
PAS |33.0130|115.8390|11/24/1987|131556.5|  2.4| 6.00| 0.024  |  V | 77.3(124.3)
GSP |31.7030|115.9100|12/03/1991|175435.8|  5.0| 5.30| 0.012  | III| 99.6(160.3)
GSP |33.9610|116.3180|04/23/1992|045023.0| 12.0| 6.10| 0.020  | IV | 97.7(157.2)
GSP |33.8760|116.2670|06/29/1992|160142.8|  1.0| 5.20| 0.012  | III| 94.1(151.4)
GSP |33.9020|116.2840|07/24/1992|181436.2|  9.0| 5.00| 0.011  | III| 95.1(153.0)
GSG |31.8060|116.1280|03/23/1994|025916.2| 22.0| 5.00| 0.012  | III| 85.6(137.8)

*******************************************************************************
-END OF SEARCH-   144 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH:   1800  TO  2002

LENGTH OF SEARCH TIME:   203  years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 4.2 MILES (6.8 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.0

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.346 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
  a-value=  1.499
  b-value=  0.375
  beta-value=  0.863
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TABLE OF MAGNITUDES AND EXCEEDANCES:
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  Earthquake | Number of Times | Cumulative
   Magnitude |    Exceeded     | No. / Year
  -----------+-----------------+------------
     4.0     |      144        |   0.70936
     4.5     |      144        |   0.70936
     5.0     |      144        |   0.70936
     5.5     |       59        |   0.29064
     6.0     |       26        |   0.12808
     6.5     |        9        |   0.04433
     7.0     |        1        |   0.00493
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                        *************************
                        *                       *
                        *     E Q S E A R C H   *
                        *                       *
                        *     Version 3.00      *
                        *                       *
                        *************************

                             ESTIMATION OF
                          PEAK ACCELERATION FROM
                      CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 02-8263
                                                     DATE: 08-19-2002

JOB NAME: Starcevic eqs Test Run

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT


MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  5.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  32.7167
   SITE LONGITUDE:  117.1236

SEARCH DATES:
              START DATE:   1800
              END DATE:   2002

SEARCH RADIUS:
              100.0 mi
              160.9 km

ATTENUATION RELATION:  10) Bozorgnia Campbell Niazi (1999) Hor.-Holocene Soil-Cor.
   UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
   ASSUMED SOURCE TYPE:  DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   0  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:  0     Campbell SHR:  0
   COMPUTE RHGA HORIZ. ACCEL. (FACTOR:   0.65    DISTANCE:   20  miles)

MINIMUM DEPTH VALUE (km):  3.0
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                    EARTHQUAKE SEARCH RESULTS
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    |        |         |          |   TIME   |     |     |  SITE  |SITE|  APPROX.
FILE|  LAT.  |  LONG.  |   DATE   |  (UTC)   |DEPTH|QUAKE|  ACC.  | MM |  DISTANCE
CODE| NORTH  |  WEST   |          | H M Sec  | (km)| MAG.|    g   |INT.|  mi   [km]
----+--------+---------+----------+--------+-----+-----+--------+----+-----------
DMG |33.0000|117.3000|11/22/1800|2130 0.0|  0.0| 6.50|  0.125 | VII|  22.1( 35.5)
MGI |32.8000|117.1000|05/25/1803| 0 0 0.0|  0.0| 5.00|  0.102 | VII|   5.9(  9.5)
MGI |33.0000|117.0000|09/21/1856| 730 0.0|  0.0| 5.00|  0.053 | VI |  20.8( 33.5)
T-A |32.6700|117.1700|12/00/1856| 0 0 0.0|  0.0| 5.00|  0.123 | VII|   4.2(  6.8)
MGI |34.0000|117.5000|12/16/1858|10 0 0.0|  0.0| 7.00|  0.040 |  V |  91.2(146.8)
DMG |32.7000|117.2000|05/27/1862|20 0 0.0|  0.0| 5.90|  0.225 | IX |   4.6(  7.4)
T-A |32.6700|117.1700|10/21/1862| 0 0 0.0|  0.0| 5.00|  0.123 | VII|   4.2(  6.8)
T-A |32.6700|117.1700|05/24/1865| 0 0 0.0|  0.0| 5.00|  0.123 | VII|   4.2(  6.8)
T-A |33.5000|115.8200|05/00/1868| 0 0 0.0|  0.0| 6.30|  0.024 |  V |  92.8(149.3)
T-A |32.2500|117.5000|01/13/1877|20 0 0.0|  0.0| 5.00|  0.028 |  V |  39.0( 62.7)
DMG |33.9000|117.2000|12/19/1880| 0 0 0.0|  0.0| 6.00|  0.023 | IV |  81.8(131.7)
DMG |34.1000|116.7000|02/07/1889| 520 0.0|  0.0| 5.30|  0.012 | III|  98.6(158.6)
DMG |33.4000|116.3000|02/09/1890|12 6 0.0|  0.0| 6.30|  0.034 |  V |  67.1(107.9)
DMG |32.7000|116.3000|02/24/1892| 720 0.0|  0.0| 6.70|  0.064 | VI |  47.9( 77.0)
DMG |33.2000|116.2000|05/28/1892|1115 0.0|  0.0| 6.30|  0.037 |  V |  63.1(101.5)
DMG |32.8000|116.8000|10/23/1894|23 3 0.0|  0.0| 5.70|  0.085 | VII|  19.6( 31.6)
DMG |33.8000|117.0000|12/25/1899|1225 0.0|  0.0| 6.40|  0.033 |  V |  75.1(120.9)
MGI |34.1000|117.3000|07/15/1905|2041 0.0|  0.0| 5.30|  0.013 | III|  96.0(154.6)
DMG |32.5000|115.5000|04/19/1906| 030 0.0|  0.0| 6.00|  0.020 | IV |  95.6(153.9)
DMG |33.7000|117.4000|04/11/1910| 757 0.0|  0.0| 5.00|  0.015 | IV |  69.7(112.2)
DMG |33.7000|117.4000|05/13/1910| 620 0.0|  0.0| 5.00|  0.015 | IV |  69.7(112.2)
DMG |33.7000|117.4000|05/15/1910|1547 0.0|  0.0| 6.00|  0.027 |  V |  69.7(112.2)
DMG |32.8000|115.5000|06/23/1915| 359 0.0|  0.0| 6.25|  0.023 | IV |  94.4(152.0)
DMG |32.8000|115.5000|06/23/1915| 456 0.0|  0.0| 6.25|  0.023 | IV |  94.4(152.0)
DMG |33.5000|116.5000|09/30/1916| 211 0.0|  0.0| 5.00|  0.016 | IV |  65.0(104.6)
DMG |33.7500|117.0000|04/21/1918|223225.0|  0.0| 6.80|  0.045 | VI |  71.7(115.4)
MGI |33.8000|117.6000|04/22/1918|2115 0.0|  0.0| 5.00|  0.013 | III|  79.7(128.2)
DMG |32.5000|115.5000|05/01/1918| 432 0.0|  0.0| 5.00|  0.011 | III|  95.6(153.9)
DMG |33.7500|117.0000|06/06/1918|2232 0.0|  0.0| 5.00|  0.015 | IV |  71.7(115.4)
DMG |33.2000|116.7000|01/01/1920| 235 0.0|  0.0| 5.00|  0.026 |  V |  41.4( 66.7)
MGI |33.2000|116.6000|10/12/1920|1748 0.0|  0.0| 5.30|  0.028 |  V |  45.1( 72.6)
DMG |32.5000|115.5000|09/08/1921|1924 0.0|  0.0| 5.00|  0.011 | III|  95.6(153.9)
DMG |34.0000|117.2500|07/23/1923| 73026.0|  0.0| 6.25|  0.025 |  V |  88.9(143.1)
DMG |32.5000|115.5000|11/05/1923|22 7 0.0|  0.0| 5.00|  0.011 | III|  95.6(153.9)
DMG |32.5000|115.5000|11/07/1923|2357 0.0|  0.0| 5.50|  0.014 | IV |  95.6(153.9)
MGI |32.5000|115.5000|04/16/1925| 330 0.0|  0.0| 5.00|  0.011 | III|  95.6(153.9)
MGI |32.5000|115.5000|04/16/1925| 520 0.0|  0.0| 5.30|  0.013 | III|  95.6(153.9)
DMG |32.5000|115.5000|01/01/1927| 81645.0|  0.0| 5.75|  0.017 | IV |  95.6(153.9)
DMG |32.5000|115.5000|01/01/1927| 91330.0|  0.0| 5.50|  0.014 | IV |  95.6(153.9)
MGI |32.7000|115.5000|01/01/1927|13 0 0.0|  0.0| 5.30|  0.013 | III|  94.3(151.8)
DMG |32.9000|115.7000|10/02/1928|19 1 0.0|  0.0| 5.00|  0.012 | III|  83.6(134.5)
DMG |33.0000|115.5000|02/26/1930| 230 0.0|  0.0| 5.00|  0.011 | III|  96.2(154.8)
DMG |33.6170|117.9670|03/11/1933| 154 7.8|  0.0| 6.30|  0.029 |  V |  79.0(127.1)
DMG |33.7500|118.0830|03/11/1933| 2 9 0.0|  0.0| 5.00|  0.011 | III|  90.3(145.4)
DMG |33.7500|118.0830|03/11/1933| 230 0.0|  0.0| 5.10|  0.012 | III|  90.3(145.4)
DMG |33.7500|118.0830|03/11/1933| 323 0.0|  0.0| 5.00|  0.011 | III|  90.3(145.4)
DMG |33.7000|118.0670|03/11/1933| 51022.0|  0.0| 5.10|  0.013 | III|  87.1(140.1)
DMG |33.5750|117.9830|03/11/1933| 518 4.0|  0.0| 5.20|  0.015 | IV |  77.3(124.4)
DMG |33.6830|118.0500|03/11/1933| 658 3.0|  0.0| 5.50|  0.016 | IV |  85.5(137.6)
DMG |33.7000|118.0670|03/11/1933| 85457.0|  0.0| 5.10|  0.013 | III|  87.1(140.1)
DMG |33.7500|118.0830|03/11/1933| 910 0.0|  0.0| 5.10|  0.012 | III|  90.3(145.4)
DMG |33.7500|118.0830|03/13/1933|131828.0|  0.0| 5.30|  0.014 | III|  90.3(145.4)
DMG |33.6170|118.0170|03/14/1933|19 150.0|  0.0| 5.10|  0.014 | III|  80.8(130.0)
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                   EARTHQUAKE SEARCH RESULTS
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    |       |        |          |  TIME   |     |     | SITE  |SITE|  APPROX.
FILE| LAT.  | LONG.  |   DATE   |  (UTC)  |DEPTH|QUAKE|  ACC. | MM |  DISTANCE
CODE| NORTH | WEST   |          | H M Sec | (km)| MAG.|   g   |INT.|  mi  [km]
----+-------+--------+----------+---------+-----+-----+-------+----+-----------
DMG |33.7830|118.1330|10/02/1933| 91017.6|  0.0| 5.40| 0.014 | IV | 93.9(151.1)
DMG |32.0830|116.6670|11/25/1934| 818 0.0|  0.0| 5.00| 0.021 | IV | 51.2( 82.4)
DMG |32.2500|115.5000|12/30/1934|1352 0.0|  0.0| 6.50| 0.026 |  V | 99.9(160.8)
DMG |31.7500|116.5000|04/29/1935|20 8 0.0|  0.0| 5.00| 0.014 | III| 76.0(122.4)
DMG |34.1000|116.8000|10/24/1935|1448 7.6|  0.0| 5.10| 0.011 | III| 97.3(156.6)
DMG |33.1670|115.5000|12/20/1935| 745 0.0|  0.0| 5.00| 0.010 | III| 99.1(159.4)
DMG |31.8670|116.5710|02/27/1937| 12918.4| 10.0| 5.00| 0.016 | IV | 66.9(107.7)
DMG |33.4080|116.2610|03/25/1937|1649 1.8| 10.0| 6.00| 0.028 |  V | 69.1(111.1)
DMG |33.6990|117.5110|05/31/1938| 83455.4| 10.0| 5.50| 0.020 | IV | 71.4(114.9)
DMG |32.0000|117.5000|05/01/1939|2353 0.0|  0.0| 5.00| 0.020 | IV | 54.1( 87.1)
DMG |32.0000|117.5000|06/24/1939|1627 0.0|  0.0| 5.00| 0.020 | IV | 54.1( 87.1)
DMG |32.7330|115.5000|05/19/1940| 43640.9|  0.0| 6.70| 0.031 |  V | 94.3(151.8)
DMG |32.7670|115.4830|05/19/1940| 455 0.0|  0.0| 5.50| 0.014 | IV | 95.3(153.4)
DMG |32.7670|115.4830|05/19/1940| 55134.0|  0.0| 5.50| 0.014 | IV | 95.3(153.4)
DMG |32.7670|115.4830|05/19/1940| 63320.0|  0.0| 5.00| 0.011 | III| 95.3(153.4)
DMG |32.7670|115.4830|05/19/1940| 63540.0|  0.0| 5.50| 0.014 | IV | 95.3(153.4)
DMG |33.0000|116.4330|06/04/1940|1035 8.3|  0.0| 5.10| 0.025 |  V | 44.6( 71.7)
DMG |33.7830|118.2500|11/14/1941| 84136.3|  0.0| 5.40| 0.013 | III| 98.2(158.1)
DMG |32.9830|115.9830|05/23/1942|154729.0|  0.0| 5.00| 0.015 | IV | 68.7(110.5)
DMG |32.9670|116.0000|10/21/1942|162213.0|  0.0| 6.50| 0.039 |  V | 67.4(108.5)
DMG |32.9670|116.0000|10/21/1942|162519.0|  0.0| 5.00| 0.016 | IV | 67.4(108.5)
DMG |32.9670|116.0000|10/21/1942|162654.0|  0.0| 5.00| 0.016 | IV | 67.4(108.5)
DMG |33.2330|115.7170|10/22/1942| 15038.0|  0.0| 5.50| 0.015 | IV | 88.9(143.1)
DMG |32.9670|116.0000|10/22/1942|181326.0|  0.0| 5.00| 0.016 | IV | 67.4(108.5)
DMG |33.9760|116.7210|06/12/1944|104534.7| 10.0| 5.10| 0.012 | III| 90.0(144.8)
DMG |33.9940|116.7120|06/12/1944|111636.0| 10.0| 5.30| 0.013 | III| 91.3(147.0)
DMG |33.2170|116.1330|08/15/1945|175624.0|  0.0| 5.70| 0.024 | IV | 67.0(107.8)
DMG |33.0000|115.8330|01/08/1946|185418.0|  0.0| 5.40| 0.017 | IV | 77.4(124.5)
DMG |33.9500|116.8500|09/28/1946| 719 9.0|  0.0| 5.00| 0.012 | III| 86.6(139.4)
DMG |34.0170|116.5000|07/24/1947|221046.0|  0.0| 5.50| 0.014 | IV | 96.7(155.6)
DMG |34.0170|116.5000|07/25/1947| 04631.0|  0.0| 5.00| 0.011 | III| 96.7(155.6)
DMG |34.0170|116.5000|07/25/1947| 61949.0|  0.0| 5.20| 0.012 | III| 96.7(155.6)
DMG |34.0170|116.5000|07/26/1947| 24941.0|  0.0| 5.10| 0.011 | III| 96.7(155.6)
DMG |32.5000|118.5500|02/24/1948| 81510.0|  0.0| 5.30| 0.015 | IV | 84.3(135.7)
DMG |33.9330|116.3830|12/04/1948|234317.0|  0.0| 6.50| 0.027 |  V | 94.2(151.6)
DMG |32.2000|116.5500|11/04/1949|204238.0|  0.0| 5.70| 0.033 |  V | 48.9( 78.7)
DMG |32.2000|116.5500|11/05/1949| 43524.0|  0.0| 5.10| 0.023 | IV | 48.9( 78.7)
DMG |33.1170|115.5670|07/28/1950|175048.0|  0.0| 5.40| 0.014 | III| 94.4(151.8)
DMG |33.1170|115.5670|07/29/1950|143632.0|  0.0| 5.50| 0.015 | IV | 94.4(151.8)
DMG |32.9830|115.7330|01/24/1951| 717 2.6|  0.0| 5.60| 0.018 | IV | 82.7(133.1)
DMG |32.8170|118.3500|12/26/1951| 04654.0|  0.0| 5.90| 0.025 |  V | 71.5(115.1)
DMG |32.9500|115.7170|06/14/1953| 41729.9|  0.0| 5.50| 0.017 | IV | 83.2(133.9)
DMG |31.8000|116.1000|10/10/1953|1849 6.0|  0.0| 5.00| 0.012 | III| 87.0(140.1)
DMG |33.2830|116.1830|03/19/1954| 95429.0|  0.0| 6.20| 0.032 |  V | 67.0(107.9)
DMG |33.2830|116.1830|03/19/1954| 95556.0|  0.0| 5.00| 0.016 | IV | 67.0(107.9)
DMG |33.2830|116.1830|03/19/1954|102117.0|  0.0| 5.50| 0.021 | IV | 67.0(107.9)
DMG |33.2830|116.1830|03/23/1954| 41450.0|  0.0| 5.10| 0.017 | IV | 67.0(107.9)
DMG |31.5000|116.5000|10/17/1954|225718.0|  0.0| 5.70| 0.017 | IV | 91.6(147.4)
DMG |31.6000|116.1000|11/26/1955|1736 0.0|  0.0| 5.40| 0.013 | III| 97.6(157.0)
DMG |33.0000|115.5000|12/17/1955| 6 729.0|  0.0| 5.40| 0.013 | III| 96.2(154.8)
DMG |31.7500|115.9170|02/09/1956|143238.0|  0.0| 6.80| 0.033 |  V | 97.1(156.2)
DMG |31.7500|115.9170|02/09/1956|152426.0|  0.0| 6.10| 0.020 | IV | 97.1(156.2)
DMG |31.7500|115.9170|02/09/1956|165953.0|  0.0| 5.70| 0.016 | IV | 97.1(156.2)
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                         EARTHQUAKE SEARCH RESULTS
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    |        |         |          |   TIME   |     |     | SITE  |SITE|  APPROX.
FILE|  LAT.  |  LONG.  |   DATE   |  (UTC)   |DEPTH|QUAKE| ACC.  | MM |  DISTANCE
CODE| NORTH  |  WEST   |          | H M Sec  | (km)| MAG.|   g   |INT.|  mi  [km]
----+--------+---------+----------+----------+-----+-----+-------+----+------------
DMG |31.7500|115.9170|02/09/1956|184845.0|  0.0| 5.70| 0.016 | IV | 97.1(156.2)
DMG |31.7500|115.9170|02/10/1956|15 929.0|  0.0| 5.00| 0.011 | III| 97.1(156.2)
DMG |31.7500|115.9170|02/10/1956|181254.0|  0.0| 5.50| 0.014 | IV | 97.1(156.2)
DMG |31.7500|115.9170|02/11/1956| 25746.0|  0.0| 5.10| 0.011 | III| 97.1(156.2)
DMG |31.7500|115.9170|02/11/1956| 61124.0|  0.0| 5.00| 0.011 | III| 97.1(156.2)
DMG |31.7500|115.9170|03/09/1956| 03240.0|  0.0| 5.00| 0.011 | III| 97.1(156.2)
DMG |31.8330|116.0000|05/10/1956|114854.0|  0.0| 5.00| 0.012 | III| 89.6(144.2)
DMG |33.2160|115.8080|04/25/1957|215738.7| -0.3| 5.20| 0.014 | IV | 83.6(134.6)
DMG |33.1830|115.8500|04/25/1957|222412.0|  0.0| 5.10| 0.014 | III| 80.5(129.6)
DMG |33.2310|116.0040|05/26/1957|155933.6| 15.1| 5.00| 0.014 | IV | 73.9(119.0)
DMG |32.2500|115.7500|12/01/1958| 32118.0|  0.0| 5.80| 0.019 | IV | 86.2(138.8)
DMG |32.2500|115.7500|12/01/1958| 350 0.0|  0.0| 5.00| 0.012 | III| 86.2(138.8)
DMG |32.2500|115.7500|12/01/1958| 6 2 0.0|  0.0| 5.50| 0.016 | IV | 86.2(138.8)
DMG |31.7960|116.2690|06/11/1963|152338.3| -2.0| 5.80| 0.021 | IV | 80.8(130.0)
DMG |33.7100|116.9250|09/23/1963|144152.6| 16.5| 5.00| 0.015 | IV | 69.5(111.9)
DMG |31.8110|117.1310|12/22/1964|205433.2|  2.3| 5.60| 0.024 | IV | 62.5(100.6)
DMG |33.1900|116.1290|04/09/1968| 22859.1| 11.1| 6.40| 0.037 |  V | 66.2(106.6)
DMG |33.1130|116.0370|04/09/1968| 3 353.5|  5.0| 5.20| 0.017 | IV | 68.7(110.5)
DMG |33.3430|116.3460|04/28/1969|232042.9| 20.0| 5.80| 0.027 |  V | 62.4(100.4)
DMG |31.6250|116.2110|06/10/1969| 34132.7| -2.0| 5.00| 0.011 | III| 92.3(148.6)
DMG |33.0330|115.8210|09/30/1971|224611.3|  8.0| 5.10| 0.014 | IV | 78.6(126.5)
PAS |31.9270|115.7770|07/17/1975|182447.0| 17.3| 5.00| 0.011 | III| 95.6(153.9)
PAS |32.7660|115.4410|10/15/1979|231930.0|  9.3| 5.20| 0.012 | III| 97.8(157.3)
PAS |32.9270|115.5400|10/16/1979| 54910.2| 10.4| 5.10| 0.012 | III| 93.0(149.7)
PAS |32.9280|115.5390|10/16/1979| 61948.7|  9.2| 5.10| 0.012 | III| 93.1(149.8)
PAS |33.0140|115.5550|10/16/1979| 65842.8|  9.1| 5.50| 0.015 | IV | 93.3(150.1)
PAS |33.5010|116.5130|02/25/1980|104738.5| 13.6| 5.50| 0.022 | IV | 64.6(104.0)
PAS |33.0980|115.6320|04/26/1981|12 928.4|  3.8| 5.70| 0.017 | IV | 90.4(145.4)
PAS |31.8900|115.8210|05/08/1985|234020.8|  6.0| 5.00| 0.011 | III| 95.1(153.0)
PAS |33.9980|116.6060|07/08/1986| 92044.5| 11.7| 5.60| 0.016 | IV | 93.4(150.2)
PAS |32.9710|117.8700|07/13/1986|1347 8.2|  6.0| 5.30| 0.027 |  V | 46.7( 75.2)
PAS |33.0820|115.7750|11/24/1987| 15414.5|  4.9| 5.80| 0.020 | IV | 82.1(132.2)
PAS |33.0130|115.8390|11/24/1987|131556.5|  2.4| 6.00| 0.024 |  V | 77.3(124.3)
GSP |31.7030|115.9100|12/03/1991|175435.8|  5.0| 5.30| 0.012 | III| 99.6(160.3)
GSP |33.9610|116.3180|04/23/1992|045023.0| 12.0| 6.10| 0.020 | IV | 97.7(157.2)
GSP |33.8760|116.2670|06/29/1992|160142.8|  1.0| 5.20| 0.012 | III| 94.1(151.4)
GSP |33.9020|116.2840|07/24/1992|181436.2|  9.0| 5.00| 0.011 | III| 95.1(153.0)
GSG |31.8060|116.1280|03/23/1994|025916.2| 22.0| 5.00| 0.012 | III| 85.6(137.8)

******************************************************************************
-END OF SEARCH-   144 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH:   1800  TO  2002

LENGTH OF SEARCH TIME:   203  years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 4.2 MILES (6.8 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.0

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.225 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
  a-value=  1.499
  b-value=  0.375
  beta-value=  0.863
```

```
-----------------------------------
TABLE OF MAGNITUDES AND EXCEEDANCES:
-----------------------------------

  Earthquake | Number of Times | Cumulative
   Magnitude |    Exceeded     | No. / Year
  -----------+-----------------+------------
     4.0     |      144        |   0.70936
     4.5     |      144        |   0.70936
     5.0     |      144        |   0.70936
     5.5     |       59        |   0.29064
     6.0     |       26        |   0.12808
     6.5     |        9        |   0.04433
     7.0     |        1        |   0.00493
```

APPENDIX D

MODIFIED MERCALLI INTENSITY INDEX

APPENDIX D

MODIFIED MERCALLI INTENSITY SCALE OF 1931

(Excerpted from the California Division of Conservation Division of Mines and Geology DMG Note 32)

The first scale to reflect earthquake intensities was developed by deRossi of Italy, and Forel of Switzerland, in the 1880s, and is known as the Rossi-Forel Scale. This scale, with values from I to X, was used for about two decades. A need for a more refined scale increased with the advancement of the science of seismology, and in 1902, the Italian seismologist Mercalli devised a new scale on a I to XII range. The Mercalli Scale was modified in 1931 by American seismologists Harry O. Wood and Frank Neumann to take into account modern structural features.

The Modified Mercalli Intensity Scale measures the intensity of an earthquake's effects in a given locality, and is perhaps much more meaningful to the layman because it is based on actual observations of earthquake effects at specific places. It should be noted that because the damage used for assigning intensities can be obtained only from direct firsthand reports, considerable time -- weeks or months -- is sometimes needed before an intensity map can be assembled for a particular earthquake.

On the Modified Mercalli Intensity Scale, values range from I to XII. The most commonly used adaptation covers the range of intensity from the conditions of *"I -- not felt except by very few, favorably situated,"* to *"XII -- damage total, lines of sight disturbed, objects thrown into the air."* While an earthquake has only one magnitude, it can have many intensities, which decrease with distance from the epicenter.

It is difficult to compare magnitude and intensity because intensity is linked with the particular ground and structural conditions of a given area, as well as distance from the earthquake epicenter, while magnitude depends on the energy released at the focus of the earthquake.

I	Not felt except by a very few under especially favorable circumstances.
II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
III	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration like passing of truck. Duration estimated.
IV	During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.
VII	Everybody runs outdoors. Damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.
XI	Few, if any, masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects thrown upward into the air.

APPENDIX E

GENERAL EARTHWORK SPECIFICATIONS

APPENDIX E
GENERAL EARTHWORK SPECIFICATIONS

General

The objective of these specifications is to properly establish procedures for the clearing and preparation of the existing natural ground or properly compacted fill to receive new fill; for the selection of the fill material; and for the fill compaction and testing methods to be used.

Scope of Work

The earthwork includes all the activities and resources provided by the contractor to construct in a good workmanlike manner all the grades of the filled areas shown in the plans. The major items of work covered in this section include all clearing and grubbing, removing and disposing of materials, preparing areas to be filled, compacting of fill, compacting of backfills, subdrain installations, and all other work necessary to complete the grading of the filled areas.

Site Visit and Site Investigation

1. The contractor shall visit the site and carefully study it, and make all inspections necessary in order to determine the full extent of the work required to complete all grading in conformance with the drawings and specifications. The contractor shall satisfy himself as to the nature, location, and extent of the work conditions, the conformation and condition of the existing ground surface; and the type of equipment, labor, and facilities needed prior to and during prosecution of the work. The contractor shall satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered. Any inaccuracies or discrepancies between the actual field conditions and the drawings, or between the drawings and specifications, must be brought to the engineer's attention in order to clarify the exact nature of the work to be performed.

2. A soils investigation report has been prepared for this project by GEI. It is available for review and should be used as a reference to the surface and subsurface soil and bedrock conditions on this project. Any recommendations made in the report of the soil investigation or subsequent reports shall become an addendum to these specifications.

Authority of the Soils Engineer and Engineering Geologist

The soils engineer shall be the owner's representative to observe and test the construction of fills. Excavation and the placing of fill shall be under the observation of the soils engineer and his/her representative, and he/she shall give a written opinion regarding conformance with the specifications upon completion of grading. The soils engineer shall have the authority to cause the removal and replacement of porous topsoils, uncompacted or improperly compacted fills, disturbed bedrock materials, and soft alluvium, and shall have the authority to approve or reject materials proposed for use in the compacted fill areas.

The soils engineer shall have, in conjunction with the engineering geologist, the authority to approve the preparation of natural ground and toe-of-fill benches to receive fill material. The engineering geologist shall have the authority to evaluate the stability of the existing or proposed slopes, and to evaluate the necessity of remedial measures. If any unstable condition is being created by cutting or filling, the engineering geologist and/or soils engineer shall advise the contractor and owner immediately, and prohibit grading in the affected area until such time as corrective measures are taken.

The owner shall decide all questions regarding: (1) the interpretation of the drawings and specifications, (2) the acceptable fulfillment of the contract on the part of the contractor, and (3) the matter of compensation.

Clearing and Grubbing

1. Clearing and grubbing shall consist of the removal from all areas to be graded of all surface trash, abandoned improvements, paving, culverts, pipe, and vegetation (including -- but not limited to -- heavy weed growth, trees, stumps, logs and roots larger than 1-inch in diameter).

2. All organic and inorganic materials resulting from the clearing and grubbing operations shall be collected, piled, and disposed of by the contractor to give the cleared areas a neat and finished appearance. Burning of combustible materials on-site shall not be permitted unless allowed by local regulations, and at such times and in such a manner to prevent the fire from spreading to areas adjoining the property or cleared area.

3. It is understood that minor amounts of organic materials may remain in the fill soils due to the near impossibility of complete removal. The amount remaining, however, must be considered negligible, and in no case can be allowed to occur in concentrations or total quantities sufficient to contribute to settlement upon decomposition.

Preparation of Areas to be Filled

1. After clearing and grubbing, all uncompacted or improperly compacted fills, soft or loose soils, or unsuitable materials, shall be removed to expose competent natural ground, undisturbed bedrock, or properly compacted fill as indicated in the soils investigation report or by our field representative. Where the unsuitable materials are exposed in final graded areas, they shall be removed and replaced as compacted fill.

2. The ground surface exposed after removal of unsuitable soils shall be scarified to a depth of at least 6 inches, brought to the specified moisture content, and then the scarified ground compacted to at least the specified density. Where undisturbed bedrock is exposed at the surface, scarification and recompaction shall not be required.

3. All areas to receive compacted fill, including all removal areas and toe-of-fill benches, shall be observed and approved by the soils engineer and/or engineering geologist prior to placing compacted fill.

4. Where fills are made on hillsides or exposed slope areas with gradients greater than 20 percent, horizontal benches shall be cut into firm, undisturbed, natural ground in order to provide both lateral and vertical stability. This is to provide a horizontal base so that each layer is placed and compacted on a horizontal plane. The initial bench at the toe of the fill shall be at least 10 feet in width on firm, undisturbed, natural ground at the elevation of the toe stake placed at the bottom of the design slope. The engineer shall determine the width and frequency of all succeeding benches, which will vary with the soil conditions and the steepness of the slope. Ground slopes flatter than 20 percent (5.0:1.0) shall be benched when considered necessary by the soils engineer.

Fill and Backfill Material

Unless otherwise specified, the on-site material obtained from the project excavations may be used as fill or backfill, provided that all organic material, rubbish, debris, and other objectionable material contained therein is first removed. In the event that expansive materials are encountered during foundation excavations within 3 feet of finished grade and they have not been properly processed, they shall be entirely removed or thoroughly mixed with good, granular material before incorporating them in fills. No footing shall be allowed to bear on soils which, in the opinion of the soils engineer, are detrimentally expansive -- unless designed for this clayey condition.

However, rocks, boulders, broken Portland cement concrete, and bituminous-type pavement obtained from the project excavations may be permitted in the backfill or fill with the following limitations:

1. The maximum dimension of any piece used in the top 10 feet shall be no larger than 6 inches.

2 Clods or hard lumps of earth of 6 inches in greatest dimension shall be broken up before compacting the material in fill.

3. If the fill material originating from the project excavation contains large rocks, boulders, or hard lumps that cannot be broken readily, pieces ranging from 6 inches in diameter to 2 feet in maximum dimension may be used in fills below final subgrade if all pieces are placed in such a manner (such as windrows) as to eliminate nesting or voids between them. No rocks over 4 feet will be allowed in the fill.

4. Pieces larger than 6 inches shall not be placed within 12 inches of any structure.

5. Pieces larger than 3 inches shall not be placed within 12 inches of the subgrade for paving.

6. Rockfills containing less than 40 percent of soil passing 3/4-inch sieve may be permitted in designated areas. Specific recommendations shall be made by the soils engineer and be subject to approval by the city engineer.

7. Continuous observation by the soils engineer is required during rock placement.

8. Special and/or additional recommendations may be provided in writing by the soils engineer to modify, clarify, or amplify these specifications.

9. During grading operations, soil types other than those analyzed in the soil investigation report may be encountered by the contractor. The soils engineer shall be consulted to evaluate the suitability of these soils as fill materials.

<u>Placing and Compacting Fill Material</u>

1. After preparing the areas to be filled, the approved fill material shall be placed in approximately horizontal layers, with lift thickness compatible to the material being placed and the type of equipment being used. Unless otherwise approved by the soils engineer, each layer spread for compaction shall not exceed 8 inches of loose thickness. Adequate drainage of the fill shall be provided at all times during the construction period.

2. When the moisture content of the fill material is below that specified by the engineer, water shall be added to it until the moisture content is as specified.

3. When the moisture content of the fill material is above that specified by the engineer, resulting in inadequate compaction or unstable fill, the fill material shall be aerated by blading and scarifying or other satisfactory methods until the moisture content is as specified.

4. After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted to not less than the density set forth in the specifications. Compaction shall be accomplished with sheepsfoot rollers, multiple-wheel pneumatic-tired rollers, or other approved types of acceptable compaction equipment. Equipment shall be of such design that it will be able to compact the fill to the specified relative compaction. Compaction shall cover the entire fill area, and the equipment shall make sufficient trips to ensure that the desired density has been obtained throughout the entire fill. At locations where it would be impractical due to inaccessibility of rolling compacting equipment, fill layers shall be compacted to the specified requirements by hand-directed compaction equipment.

5. When soil types or combination of soil types are encountered which tend to develop densely packed surfaces as a result of spreading or compacting operations, the surface of each layer of fill shall be sufficiently roughened after compaction to ensure bond to the succeeding layer.

6. Unless otherwise specified, fill slopes shall not be steeper than 2.0 horizontal to 1.0 vertical. In general, fill slopes shall be finished in conformance with the lines and grades shown on the plans. The surface of fill slopes shall be overfilled to a distance from finished slopes such that it will allow compaction equipment to operate freely within the zone of the finished slope, and then cut back to the finished grade to expose the compacted core. Alternate compaction procedures include the backrolling of slopes with sheepsfoot rollers in increments of 3 to 5 feet in elevation gain. Alternate methods may be used by the contractor, but they shall be evaluated for approval by the soils engineer.

7. Unless otherwise specified, all allowed expansive fill material shall be compacted to a moisture content of approximately 2 to 4 percent above the optimum moisture content. Nonexpansive fill shall be compacted at near-optimum moisture content. All fill shall be compacted, unless otherwise specified, to a relative compaction not less than 95 percent for fill in the upper 12 inches of subgrades under areas to be paved with asphalt concrete or Portland concrete, and not less than 90 percent for other fill. The relative compaction is the ratio of the dry unit weight of the compacted fill to the laboratory maximum dry unit weight of a sample of the same soil, obtained in accordance with A.S.T.M. D-1557 test method.

8. The observation and periodic testing by the soils engineer are intended to provide the contractor with an ongoing measure of the quality of the fill compaction operation. It is the responsibility of the grading contractor to utilize this information to establish the degrees of compactive effort required on the project. More importantly, it is the responsibility of the grading contractor to ensure that proper compactive effort is applied at all times during the grading operation, including during the absence of soils engineering representatives.

Trench Backfill

1. Trench excavations which extend under graded lots, paved areas, areas under the influence of structural loading, in slopes or close to slope areas, shall be backfilled under the observations and testing of the soils engineer. All trenches not falling within the aforementioned locations shall be backfilled in accordance with the City or County regulating agency specifications.

2. Unless otherwise specified, the minimum degree of compaction shall be 90 percent of the laboratory maximum dry density.

3. Any soft, spongy, unstable, or other similar material encountered in the trench excavation upon which the bedding material or pipe is to be placed, shall be removed to a depth recommended by the soils engineer and replaced with bedding materials suitably densified.

   Bedding material shall first be placed so that the pipe is supported for the full length of the barrel with full bearing on the bottom segment. After the needed testing of the pipe is accomplished, the bedding shall be completed to at least 1 foot on top of the pipe. The bedding shall be properly densified before backfill is placed. Bedding shall consist of granular material with a sand equivalent not less than 30, or other material approved by the engineer.

4. No rocks greater than 6 inches in diameter will be allowed in the backfill placed between 1 foot above the pipe and 1 foot below finished subgrade. Rocks greater than 2.5 inches in any dimension will not be allowed in the backfill placed within 1 foot of pavement subgrade.

5. Material for mechanically compacted backfill shall be placed in lifts of horizontal layers and properly moistened prior to compaction. In addition, the layers shall have a thickness compatible with the material being placed and the type of equipment being used. Each layer shall be evenly spread, moistened or dried, and then tamped or rolled until the specified relative compaction has been attained.

6. Backfill shall be mechanically compacted by means of tamping rollers, sheepsfoot rollers, pneumatic tire rollers, vibratory rollers, or other mechanical tampers. Impact-type pavement breakers (stompers) will not be permitted over clay, asbestos cement, plastic, cast iron, or nonreinforced concrete pipe. Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will not result in damage to adjacent ground, existing improvements, or improvements installed under the contract. The contractor shall make his/her own determination in this regard.

7. Jetting shall not be permitted as a compaction method unless the soils engineer allows it in writing.

8. Clean granular material shall not be used as backfill or bedding in trenches located in slope areas or within a distance of 10 feet of the top of slopes unless provisions are made for a drainage system to mitigate the potential buildup of seepage forces into the slope mass.

Observations and Testing

1. The soils engineers or their representatives shall sufficiently observe and test the grading operations so that they can state their opinion as to whether or not the fill was constructed in accordance with the specifications.

2. The soils engineers or their representatives shall take sufficient density tests during the placement of compacted fill. The contractor should assist the soils engineer and/or his/her representative by digging test pits for removal determinations and/or for testing compacted fill. In addition, the contractor should cooperate with the soils engineer by removing or shutting down equipment from the area being tested.

3. Fill shall be tested for compliance with the recommended relative compaction and moisture conditions. Field density testing should be performed by using approved methods by A.S.T.M., such as A.S.T.M. D1556, D2922, and/or D2937. Tests to evaluate density of compacted fill should be provided on the basis of not less than one test for each 2-foot vertical lift of the fill, but not less than one test for each 1,000 cubic yards of fill placed. Actual test intervals may vary as field conditions dictate. In fill slopes, approximately half of the tests shall be made at the fill slope, except that not more than one test needs to be made for each 50 horizontal feet of slope in each 2-foot vertical lift. Actual test intervals may vary as field conditions dictate.

4. Fill found not to be in conformance with the grading recommendations should be removed or otherwise handled as recommended by the soils engineer.

Site Protection

It shall be the grading contractor's obligation to take all measures deemed necessary during grading to maintain adequate safety measures and working conditions, and to provide erosion-control devices for the protection of excavated areas, slope areas, finished work on the site and adjoining properties, from storm damage and flood hazard originating on the project. It shall be the contractor's responsibility to maintain slopes in their as-graded form until all slopes are in satisfactory compliance with the job specifications, all berms and benches have been properly constructed, and all associated drainage devices have been installed and meet the requirements of the specifications.

All observations, testing services, and approvals given by the soils engineer and/or geologist shall not relieve the contractor of his/her responsibilities of performing the work in accordance with these specifications.

After grading is completed and the soils engineer has finished his/her observations and/or testing of the work, no further excavation or filling shall be done except under his/her observations.

Adverse Weather Conditions

1. Precautions shall be taken by the contractor during the performance of site clearing, excavations, and grading to protect the worksite from flooding, ponding, or inundation by poor or improper surface drainage. Temporary provisions shall be made during the rainy season to adequately direct surface drainage away from and off the worksite. Where low areas cannot be avoided, pumps should be kept on hand to continually remove water during periods of rainfall.

2. During periods of rainfall, plastic sheeting shall be kept reasonably accessible to prevent unprotected slopes from becoming saturated. Where necessary during periods of rainfall, the contractor shall install checkdams, desilting basins, rip-rap, sandbags, or other devices or methods necessary to control erosion and provide safe conditions.

3. During periods of rainfall, the soils engineer should be kept informed by the contractor as to the nature of remedial or preventative work being performed (e.g. pumping, placement of sandbags or plastic sheeting, other labor, dozing, etc.).

4. Following periods of rainfall, the contractor shall contact the soils engineer and arrange a walk-over of the site in order to visually assess rain-related damage. The soils engineer may also recommend excavations and testing in order to aid in his/her assessments. At the request of the soils engineer, the contractor shall make excavations in order to evaluate the extent of rain-related damage.

5. Rain-related damage shall be considered to include, but may not be limited to, erosion, silting, saturation, swelling, structural distress, and other adverse conditions identified by the soils engineer. Soil adversely affected shall be classified as Unsuitable Materials, and shall be subject to overexcavation and replacement with compacted fill or other remedial grading, as recommended by the soils engineer.

6. Relatively level areas, where saturated soils and/or erosion gullies exist to depths of greater than 1.0 foot, shall be overexcavated to unaffected, competent material. Where less than 1.0 foot in depth, unsuitable materials may be processed in place to achieve near-optimum moisture conditions, then thoroughly recompacted in accordance with the applicable specifications. If the desired results are not achieved, the affected materials shall be over-excavated, then replaced in accordance with the applicable specifications.

7. In slope areas, where saturated soils and/or erosion gullies exist to depths of greater than 1.0 foot, they shall be overexcavated and replaced as compacted fill in accordance with the applicable specifications. Where affected materials exist to depths of 1.0 foot or less below proposed finished grade, remedial grading by moisture-conditioning in place, followed by thorough recompaction in accordance with the applicable grading guidelines herein presented may be attempted. If materials shall be overexcavated and replaced as compacted fill, it shall be done in accordance with the slope-repair recommendations herein. As field conditions dictate, other slope-repair procedures may be recommended by the soils engineer.

APPENDIX C

INFILTRATION FEASIBILITY CONDITION LETTER AND COMPLETED WORKSHEETS

NOVA

NOVA

GEOTECHNICAL ■ MATERIALS ■ SPECIAL INSPECTIONS

SBE ■ SLBE ■ SCOOP

4373 Viewridge Avenue, Ste. B
San Diego, CA 92123
858.292.7575

Boretto + Merrill Consulting LLC
4871 Viane Way
San Diego, CA 92110

February 5, 2018
NOVA Project 2018951

Attention Mr. Brad Miller

Subject: Infiltration Feasibility Condition Letter
Proposed Residential Development
32nd and C Street, San Diego, California

References:

San Diego 2017. *The City of San Diego Storm Water Standards,* November 2017 Edition, The City of San Diego.

Hunsaker 2018. *Vesting Tentative Map/Site Development Plan, 32nd & C Street, City of San Diego, California*, Sheets C1 through C4, prepared by Hunsaker & Associates, January 19, 2018.

GEI 2002. *Report of Preliminary Geotechnical Investigation and Geologic Reconnaissance, Proposed Starcevic Apartment Development, 3201 "C" Street, San Diego, California*, Geotechnical Exploration Inc., Job No. 02-8263, 27 August 2002.

Dear Mr. Miller:

The intent of this letter is to address the infiltration conditions and related feasibility at the planned drainage management areas (DMA's) of the above-referenced site.

This letter has been prepared by NOVA Services, Inc. (NOVA) for Boretto + Merrill Consulting LLC. NOVA is retained by Boretto + Merrill Consulting LLC as Geotechnical Engineer-of-Record (GEOR) for the 32nd and C Street project.

Background

NOVA has not conducted any infiltration testing for this site; nor is it aware of other studies that may have been performed for the property.

Figure 1 (following page) provides a plan view of the southeastern portion of the site, depicting the location of two planned Drainage Management Areas (DMA's) and related permanent storm water BMP's.

As may be seen by review of Figure 1, current planning for the DMA's includes a hydromodification tank and a modular wetland. The hydromodification tank is located east of Units 14 and 15 of the planned improvements. The modular wetland is located south of Unit 15, at the south end of Private Drive C.

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions[9]

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1: Form I-8A[10]
Part 1 - Full Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	Project Phase:
Hydromodification Tank	Planning Phase
Criteria 1: Infiltration Rate Screening	
1A	Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper Type A or B and corroborated by available site soil data[11]? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing. ☐ No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B). ☐ No; the mapped soil types are C, D, or "urban/unclassified" and is corroborated by available site soil data. Answer "No" to Criteria 1 Result. ☒ No; the mapped soil types are C, D, or "urban/unclassified" but is not corroborated by available site soil data (continue to Step 1B).
1B	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1? ☒ Yes; Continue to Step 1C. ☐ No; Skip to Step 1D.
1C	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1 greater than 0.5 inches per hour? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result. ☒ No; full infiltration is not required. Answer "No" to Criteria 1 Result.
1D	**Infiltration Testing Method.** Is the selected infiltration testing method suitable during the design phase (see Appendix D.3)? Note: Alternative testing standards may be allowed with appropriate rationales and documentation. ☐ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.

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[9] Note that it is not required to investigate each and every criterion in the worksheet, a single "no" answer in Part 1, Part 2, Part 3, or Part 4 determines a full, partial, or no infiltration condition.

[10] This form must be completed each time there is a change to the site layout that would affect the infiltration feasibility condition. Previously completed forms shall be retained to document the evolution of the site storm water design.

[11] Available data includes site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

<table>
<tr><th>Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions</th><th>Worksheet C.4-1: Form I-8A[10]</th></tr>
<tr><td>1E</td><td>Number of Percolation/Infiltration Tests. Does the infiltration testing method performed satisfy the minimum number of tests specified in Table D.3-2?
☐ Yes; continue to Step 1F.
☐ No; conduct appropriate number of tests.</td></tr>
<tr><td>IF</td><td>Factor of Safety. Is the suitable Factor of Safety selected for full infiltration design? See guidance in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-9).
☐ Yes; continue to Step 1G.
☐ No; select appropriate factor of safety.</td></tr>
<tr><td>1G</td><td>Full Infiltration Feasibility. Is the average measured infiltration rate divided by the Factor of Safety greater than 0.5 inches per hour?
☐ Yes; answer “Yes” to Criteria 1 Result.
☐ No; answer “No” to Criteria 1 Result.</td></tr>
<tr><td>Criteria 1 Result</td><td>Is the estimated reliable infiltration rate greater than 0.5 inches per hour within the DMA where runoff can reasonably be routed to a BMP?
☐ Yes; the DMA may feasibly support full infiltration. Continue to Criteria 2.
☒ No; full infiltration is not required. Skip to Part 1 Result.</td></tr>
<tr><td colspan="2">Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report.
The reliable infiltration rate was calculated using planning phase methods from Table D.3-1.</td></tr>
</table>

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 2: Geologic/Geotechnical Screening			
2A	If all questions in Step 2A are answered "Yes," continue to Step 2B. For any "No" answer in Step 2A answer "No" to Criteria 2, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
2A-1	Can the proposed full infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick below the infiltrating surface?	☒ Yes	☐ No
2A-2	Can the proposed full infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☒ Yes	☐ No
2A-3	Can the proposed full infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☒ No
2B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. If all questions in Step 2B are answered "Yes," then answer "Yes" to Criteria 2 Result. If there are "No" answers continue to Step 2C.		
2B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
2B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can full infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
2B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011 or most recent edition). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can full infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
2B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can full infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
2B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can full infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
2B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can full infiltration BMPs be proposed within the DMA using established setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No

<table>
<tr><th colspan="2">Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions</th><th colspan="2">Worksheet C.4-1: Form I-8A[10]</th></tr>
<tr><td>2C</td><td>Mitigation Measures. Propose mitigation measures for each geologic/geotechnical hazard identified in Step 2B. Provide a discussion of geologic/geotechnical hazards that would prevent full infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures.
Can mitigation measures be proposed to allow for full infiltration BMPs? If the question in Step 2 is answered “Yes,” then answer “Yes” to Criteria 2 Result.
If the question in Step 2C is answered “No,” then answer “No” to Criteria 2 Result.</td><td>☐ Yes</td><td>☐ No</td></tr>
<tr><td>Criteria 2 Result</td><td>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?</td><td>☐ Yes</td><td>No</td></tr>
<tr><td colspan="4">Summarize findings and basis; provide references to related reports or exhibits.
Refer to the "Infiltration Feasibility Condition Letter," within this report.</td></tr>
<tr><th colspan="2">Part 1 Result – Full Infiltration Geotechnical Screening [12]</th><th colspan="2">Result</th></tr>
<tr><td colspan="2">If answers to both Criteria 1 and Criteria 2 are “Yes”, a full infiltration design is potentially feasible based on Geotechnical conditions only.
If either answer to Criteria 1 or Criteria 2 is “No”, a full infiltration design is not required.</td><td colspan="2">☐ Full infiltration Condition
☐ Complete Part 2</td></tr>
</table>

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[12] To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions[9]

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1: Form I-8A[10]
Part 1 - Full Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	Project Phase:
Storm Capture System	Planning Phase
Criteria 1: Infiltration Rate Screening	
1A	Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper Type A or B and corroborated by available site soil data[11]? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing. ☐ No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B). ☐ No; the mapped soil types are C, D, or "urban/unclassified" and is corroborated by available site soil data. Answer "No" to Criteria 1 Result. ☒ No; the mapped soil types are C, D, or "urban/unclassified" but is not corroborated by available site soil data (continue to Step 1B).
1B	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1? ☒ Yes; Continue to Step 1C. ☐ No; Skip to Step 1D.
1C	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1 greater than 0.5 inches per hour? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result. ☒ No; full infiltration is not required. Answer "No" to Criteria 1 Result.
1D	**Infiltration Testing Method.** Is the selected infiltration testing method suitable during the design phase (see Appendix D.3)? Note: Alternative testing standards may be allowed with appropriate rationales and documentation. ☐ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.

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[9] Note that it is not required to investigate each and every criterion in the worksheet, a single "no" answer in Part 1, Part 2, Part 3, or Part 4 determines a full, partial, or no infiltration condition.

[10] This form must be completed each time there is a change to the site layout that would affect the infiltration feasibility condition. Previously completed forms shall be retained to document the evolution of the site storm water design.

[11] Available data includes site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1: Form I-8A[10]
1E	**Number of Percolation/Infiltration Tests.** Does the infiltration testing method performed satisfy the minimum number of tests specified in Table D.3-2? ☐ Yes; continue to Step 1F. ☐ No; conduct appropriate number of tests.
IF	**Factor of Safety.** Is the suitable Factor of Safety selected for full infiltration design? See guidance in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-9). ☐ Yes; continue to Step 1G. ☐ No; select appropriate factor of safety.
1G	**Full Infiltration Feasibility.** Is the average measured infiltration rate divided by the Factor of Safety greater than 0.5 inches per hour? ☐ Yes; answer "Yes" to Criteria 1 Result. ☐ No; answer "No" to Criteria 1 Result.
Criteria 1 Result	Is the estimated reliable infiltration rate greater than 0.5 inches per hour within the DMA where runoff can reasonably be routed to a BMP? ☐ Yes; the DMA may feasibly support full infiltration. Continue to Criteria 2. ☒ No; full infiltration is not required. Skip to Part 1 Result.

Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report.

The reliable infiltration rate was calculated using planning phase methods from Table D.3-1.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 2: Geologic/Geotechnical Screening			
2A	If all questions in Step 2A are answered “Yes,” continue to Step 2B. For any “No” answer in Step 2A answer “No” to Criteria 2, and submit an “Infiltration Feasibility Condition Letter” that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
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2B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. If all questions in Step 2B are answered “Yes,” then answer “Yes” to Criteria 2 Result. If there are “No” answers continue to Step 2C.		
2B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
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