Appendix H

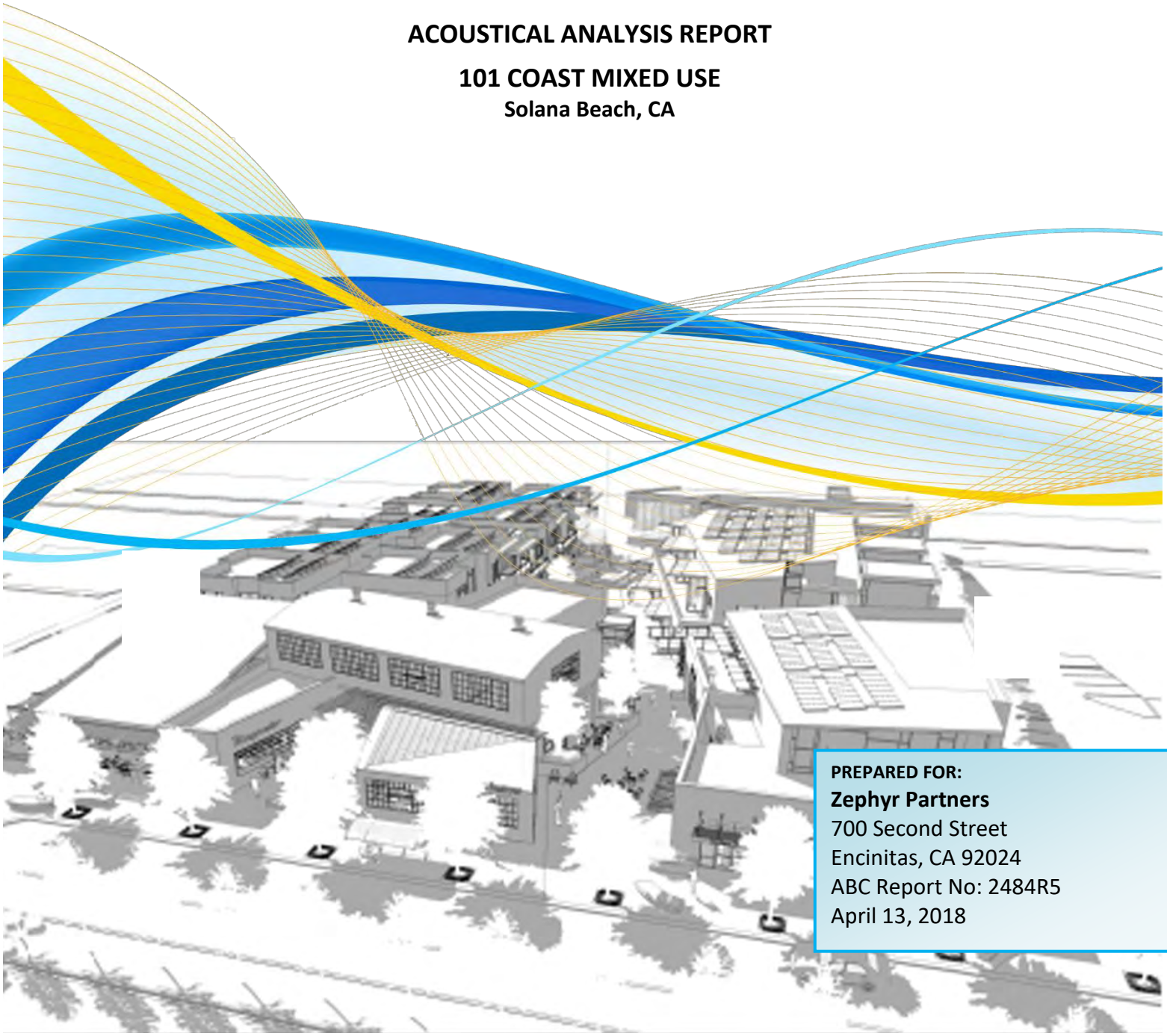
Acoustical Analysis Report

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

ACOUSTICAL ANALYSIS REPORT

101 COAST MIXED USE

Solana Beach, CA



PREPARED FOR:

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ABC Report No: 2484R5
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1.0 INTRODUCTION:

This Acoustical Analysis Report provides an assessment of noise impacts associated with the proposed 101 Coast Mixed-Use project. The project site is located at the northwest corner of Highway 101 and Dahlia Drive intersection (Figure 1). The proposed project is a two-story mixed-use project organized around substantial public open space. Apartments, offices, and retail are located on the east-west open space spine that also serves as a public way from Pacific Coast Hwy through the development to Sierra Avenue, Solana Beach.

Existing land uses in the immediate vicinity of project site include residential, restaurant and office/commercial. The existing noise levels impacting the site and vicinity uses stem primarily from vehicular traffic. Noise levels relating to railroad tracks located east of Highway 101 and an existing loading dock to the north of the site (i.e., at CVS/Pharmacy) also contribute to ambient sound levels.

This report was prepared as a part of project's approval process to address the traffic-related noise impacts upon project as well as noise impacts from on-site noise sources upon existing land uses in the immediate vicinity. On-site sources of potential significance are rooftop equipment and an enclosed loading dock. Parking for the project is underground.

This Acoustical Analysis is based upon noise surveys conducted by ABC Acoustics, Inc. and information provided by the project's mechanical engineer (Fashandi & Associate). It also makes use of the project's architectural plans (Architects MW Steele Group Inc., January 23 2017) and Traffic Impact Analysis Report (Urban Systems Associates, Inc., November 15, 2016).

FIGURE 1: VICINITY MAP

2.0 PROJECT DESCRIPTION:

The proposed 101 Coast Mixed-Use project site is bound by Highway 101 to the east, Dahlia Drive to the South and Sierra Avenue to the West. A restaurant and a retail store are located on the property abutting the east side. A site plan for the AAT Solana 101 design is presented in Figure 2. A site plan for the Zephyr Alternative is presented in Figure 3.

The site itself is flat and 84,956 square feet. The proposed 101 Coast project includes two separate designs: the original design (aka: American Assets Main Project) and an alternative design. As shown below, the new alternative does not include the Supermarket which was the primary source of project-related vehicular traffic/noise. According to the Traffic Impact Analysis Report prepared for the project, "the alternative project would generate approximately 1,167 fewer primary trips" (Urban Systems Associates, Inc., November 15, 2016)

The Supermarket was also the primary source of rooftop equipment and included a loading dock which was larger than the one proposed by the new alternative.

American Assets Main Project	Alternative Project
31 Apartments	25 Apartments
24,284 square feet (s.f.) of Supermarket	5,331 s.f. of Retail
14,137 s. f. of Commercial Office	45,632 s. f. of Commercial Office
5,125 s.f. of High Turnover Restaurant	3,000 s.f. of High Turnover Restaurant
5,090 s.f. of Quality Restaurant	9,204 s.f. of Quality Restaurant

Existing land uses in the immediate vicinity of the site include the "Seascape Shores" and "Solana Beach Tennis Club" residential complexes to the west, across from Sierra Avenue. Other uses abutting the site include a CVS pharmacy to the immediate north and an office building and a bank to the south.

Existing noise levels impacting the area stem from vehicular traffic along area roadways and, to a lesser degree, railroad traffic, loading activities at CVS/Pharmacy and an occasional overfly. Highway 101 is the primary source of noise in the area; it runs along the eastern property line.

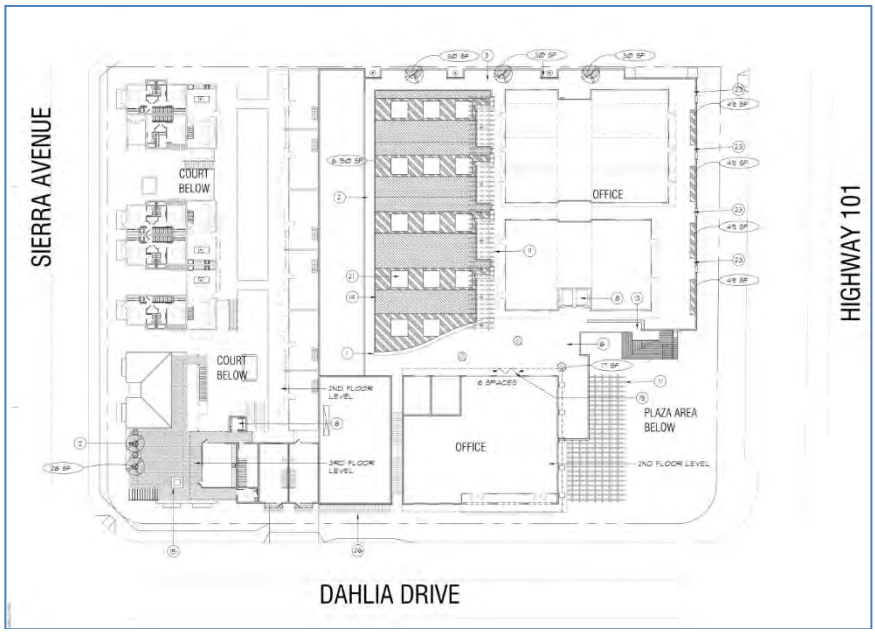


FIGURE 2: AAT SOLANA 101 PROJECT

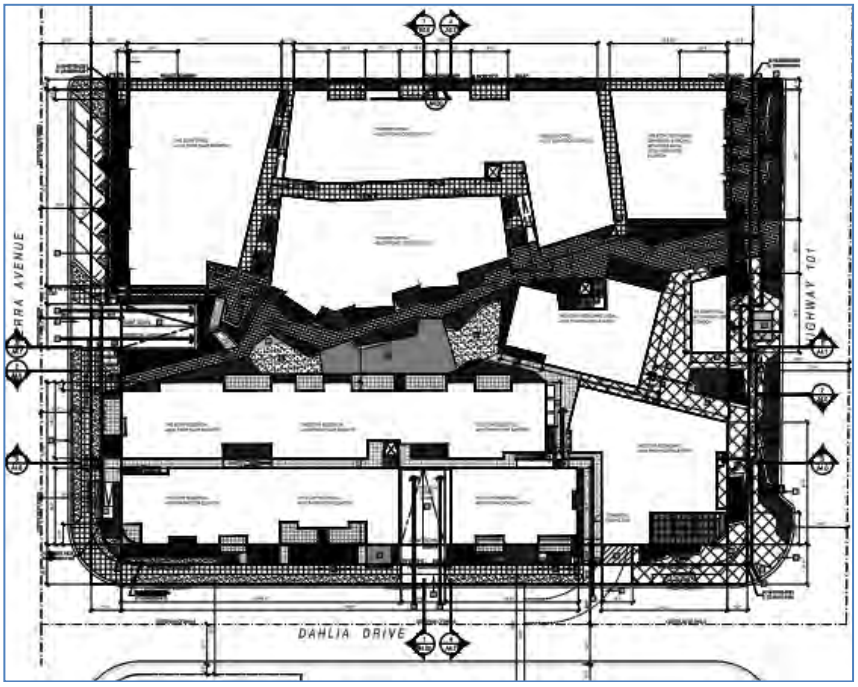


FIGURE 3: ZEPHYR ALTERNATIVE

3.0 APPLICABLE STANDARDS:

Sound limits for stationary (point) sources are normally included in the Noise Ordinance of a regulating agency. The City of Solana Beach, in Chapter 7.34 of the City's Municipal Codes (SBMC) has established a set of guidelines which include hourly sound limits for various stationary sources (such as roof-top mechanical equipment). Section 7.34.040 of SBMC includes average hourly sound level (Leqh) limits which are established for various land zones.

Units of sound levels are expressed as decibels (dB) and the "A"-weighted scale is used because it closely approximates the perception of loudness by humans. In this report, dB refers to dBA unless otherwise indicated.

The hourly average sound limit (Leqh) for medium-density residential zones in Solana Beach is 55 dB during daytime hours (i.e., 7 am to 10 pm) and 45 dB during nighttime hours (i.e., 10 pm and 7 am). Similarly, the daytime and nighttime sound limits for office/commercial zones are 60 and 55 dB, respectively.

As indicated in Subsection “C” of Section 7.34.040 of SBMC, “the sound level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts”. Therefore, noise impacts related to commercial uses shall comply with daytime and nighttime limits of 57.5 and 50 dBA, respectively, at existing residential uses in the area.

3.1 Exterior Noise Limits:

The City of Solana Beach has established a set of community noise guidelines identifying compatible outdoor and indoor noise levels for various land uses. The City considers new multiple family residential development located within an exterior noise environment of 65 dBA CNEL or below to be normally acceptable. Similarly, the City considers new commercial development located within an exterior noise environment of 70 dBA CNEL or below to be normally acceptable (Table 1).

3.2 Interior Noise Limits:

The City of Solana Beach, in Policy 1.b of its Noise Element, specifies that interior noise levels for residential living (i.e., habitable) spaces shall not exceed 45 Ldn/CNEL.

TABLE 1: CITY OF SOLANA BEACH LAND USE – NOISE COMPATIBILITY GUIDELINE

Land Use Category	Exterior Noise Exposure (dBA CNEL)						
	55	60	65	70	75	80	
Residential-Low Density Single Family, Duplex, Mobile Home							
Residential Multiple Family							
Hotel, Motel, Transient Lodging							
Institutional – General Hospital, Church, Library, Schools, Nursing Homes							
Commercial – Recreation Amphitheater, Concert Hall, Auditorium							
Sports arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial And Residential							
Industrial, Manufacturing, Utilities, Agriculture							

	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
	Normally Unacceptable	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and the needed noise insulation features included in design.
	Clearly Unacceptable	New construction or development should generally not be undertaken.

3.3 Construction-Related Noise Standards:

The anticipated noise levels during the construction phase of the project must comply with the City of Solana Beach's Noise Ordinance, as established in Section 7.34.100 of City's Municipal Codes, which reads as follows:

A. The erection, demolition, alteration or repair of any building structure or the grading or excavation of land in such a manner as to create disturbing, excessive, or offensive noise during the following hours, except as hereinafter provided, is a violation of this code:
   1. Before 7:00 a.m. or after 7:00 p.m., Monday through Friday, and before 8:00 a.m. or after 7:00 p.m. on Saturday;
   2. All day on Sunday, New Year's Day, Martin Luther King Day, President's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day.

B. Exceptions.
   1. An owner/occupant or resident/tenant of residential property may engage in home improvement or a home construction project involving the erection, demolition, alteration or repair of a building or structure or the grading or excavation of land on any weekday between the hours of 7:00 a.m. and 7:00 p.m., and on weekends between the hours of 8:00 a.m. and 7:00 p.m.; provided such project is for the benefit of the residential property and is personally carried out by said owner/occupant or resident/tenant.
   2. The city manager may grant exceptions of this section by issuing a permit in the following circumstances:
      a. When emergency repairs are required to protect the health and safety of any member of the community;
      b. In nonresidential zones, provided there are not inhabited dwellings within 1,500 feet of the building or structure being erected, demolished, altered, or repaired or the exterior boundaries of the site being graded or excavated.

C. Construction noise levels shall not exceed 75 decibels for more than eight hours [Leq (8)] during any 24-hour period when measured at or within property lines of any property which is developed and used either in part or in whole for residential purposes.

In the event that lower noise limit standards are established for such construction activity pursuant to state or federal law, such lower limits shall be used as a basis for revising and amending the noise level limits specified in subsection C of this section. (Ord. 147 § 1, 1991)

4.0 NOISE ANALYSIS TECHNIQUE:

This acoustical analysis report is based on noise measurements conducted by ABC Acoustics, Inc., architectural plans prepared for the project by Architects MW Steele Group Inc. (January 23, 2017), Traffic Impact Analysis Report prepared for the project (Urban Systems Associates, Inc., November 15, 2016) and rooftop equipment data provided by project's mechanical engineer (Fashandi & Associates).

Ambient noise levels at the project site and abutting land uses were monitored at selected locations to establish ambient noise levels of the site and existing noise-sensitive residential land uses in the immediate vicinity.

This report includes results of traffic noise calculations for both the original design and the new alternative. The existing, near future and year 2035 noise contours were generated for both without and with project scenarios. Vehicular traffic related noise levels were calculated and noise contour maps were generated using the SoundPlan Computer Model.

To assess the "point source" noise impacts due to loading dock activities and rooftop equipment at the project site, noise levels were measured at a similar existing loading dock during unloading activities. Results of the noise measurements were then used in conjunction with the mechanical equipment data provided by Fashandi & Associates to assess the project-generated impacts upon land uses in the area.

Noise measurements were conducted using a calibrated Brüel and Kjær (B&K) hand-held analyzer Type 2250 which is equipped with a Type 1 Precision Integrating Sound Level Meter. Units of measurement are expressed as decibels (dB) and the "A"-weighted noise scale is used because it closely approximates the perception of loudness by humans.

5.0 PROJECT-RELATED NOISE IMPACTS:

Existing noise levels impacting the project site and vicinity land uses stem from area circulation network. Ambient noise levels at the project site and abutting land uses were measured by ABC Acoustics, Inc. during daytime and nighttime hours. Monitoring locations are shown in Figure 4 below (i.e., R1-R4).

Daytime noise levels were approximately 59 dB Leq along Sierra Avenue (i.e., location R1 in Figure 3), 62 dB Leq at Dahlia (i.e., R2), 65 dB Leq along Hwy 101 (i.e., R3) and 60 dBA Leq at the Commercial/Retail property to the north with minimal traffic in the parking lot (i.e., R4).

Existing nighttime noise levels at the site range between 55 dBA Leq along Sierra Avenue and 65 dBA Leq along Highway 101.

FIGURE 4: EXISTING NOISE SURVEY LOCATIONS

5.1 Vehicular Traffic Noise:

Exterior noise levels impacting the project site from traffic along Highway 101, Dahlia Drive and Sierra Avenue were calculated using the SoundPlan Computer model and traffic data provided by the City of Solana Beach. Details of noise modeling are presented in Attachment "A". The calculated noise levels are in

general agreement with the noise survey results. Figure 5 below shows the noise contours for 3 scenarios: A) existing without project, B) existing with AAT Solana 101 design, and C) existing with Zephyr Alternative. Figures 6 and 7 present the near-term and long-term future scenarios.

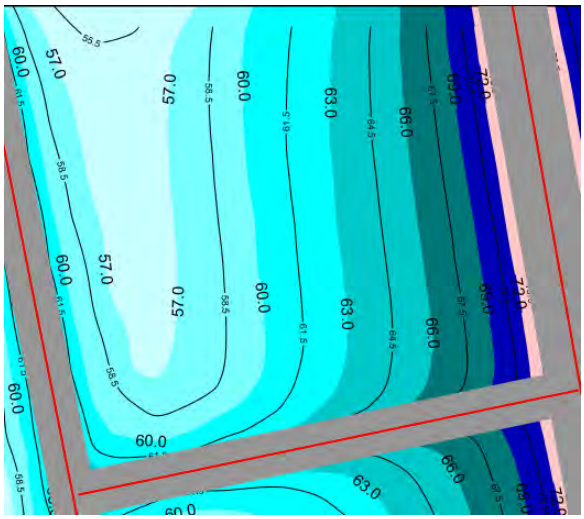
As presented in Table 2 below, project-generated traffic would increase noise levels along Highway 101 and Sierra Avenue by less than 0.2 dB or less. Such increases is noise level are not noticeable. As for Dahlia Drive, the AAT 101 Coast Design, and the Zephyr Alternative would increase noise levels by 2.4 and 4.2 dB, respectively. This increase would occur primarily along eastern half of Dahlia, (east of Dahlia parking entrance). The impacts on existing residential uses along Sierra Avenue would be less than 1 dB. **Note:** Increased roadway noise due to increased traffic volume is independent of distance and applies to all receiver locations.

TABLE 2: TRAFFIC AND NOISE CONTRIBUTION						
	Average Daily Traffic			Increased Noise (dBA)		
	101 Hwy	Dahlia Dr	Sierra Ave	101 Hwy	Dahlia Dr	Sierra Ave
Existing	18127	2405	3966	0	0	0
AAT Solana	18719	4295	4074	0.5	1.7	0.1
Zephyr Alternative	19157	5786	4074	0.5	2.9	0.1

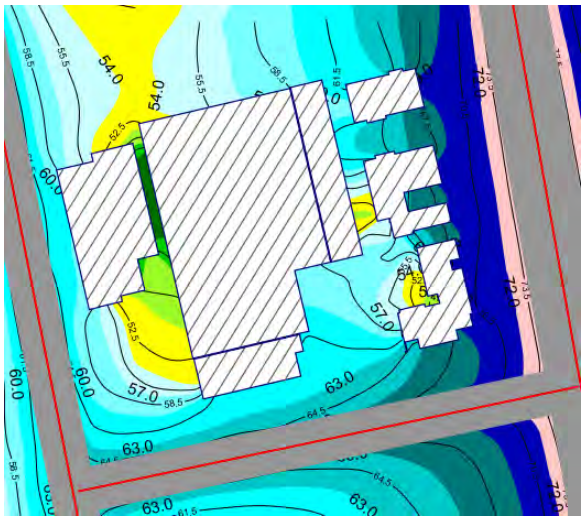
Exterior noise levels impacting the residential portion of the project would be within the applicable limit of 65 dBA CNEL for both alternatives. Therefore, no exterior noise attenuation is required. The commercial uses along Hwy 101 would be impacted by approximately 70 dBA CNEL which is also in compliance with the City of Solana Beach noise limit.

Exterior noise impacts within all residential units of AAT 101 Coast design and majority of the Zephyr Alternative would be 60 dBA CNEL or lower. The resulting interior noise impacts would be 45 dBA CNEL or lower. Exterior noise levels exceed the state-mandated limit of 60 dBA CNEL, at the façade of one residential building in the Zephyr Alternative (i.e., the building along the southeastern portion of the site). Therefore, measures must be examined to ensure that interior noise levels do not exceed 45 dBA CNEL in units within this building.

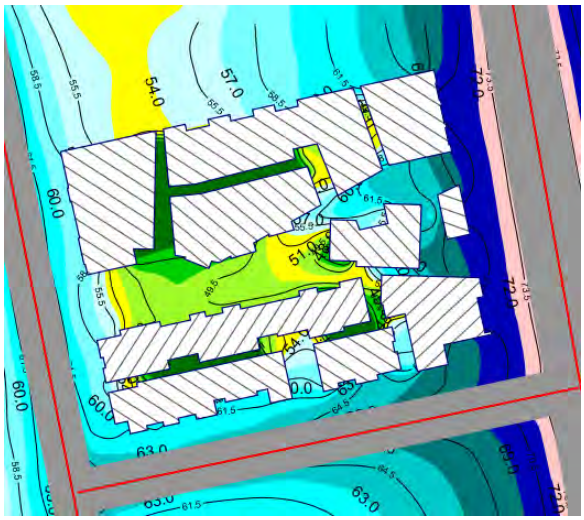
The most cost-effective method of reducing interior noise in a residential unit is to install mechanical ventilation (i.e., forced air). Therefore, the proposed residential units located in the building located at southeastern corner of the site in Zephyr Alternative shall include the appropriate air-conditioning systems, installed in accordance with applicable California Building Codes to provide for closed-window conditions. Since all units equipped with mechanical ventilation, no additional acoustical treatment measures are recommended. The resulting interior noise levels within residential portion of the project would be 45 dBA CNEL or lower.



A. EXISTING WITHOUT PROJECT

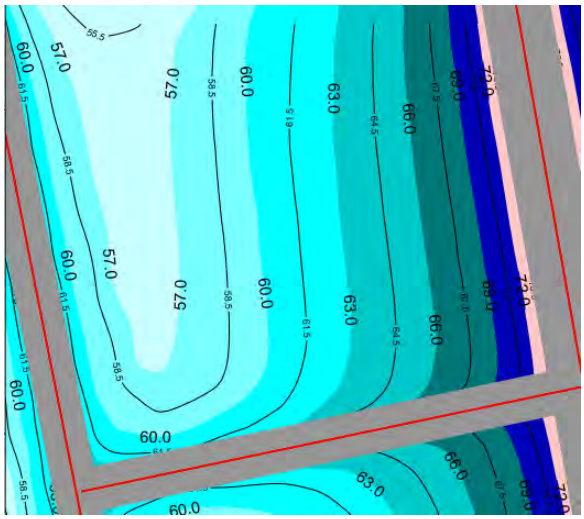


B. EXISTING WITH AAT SOLANA 101

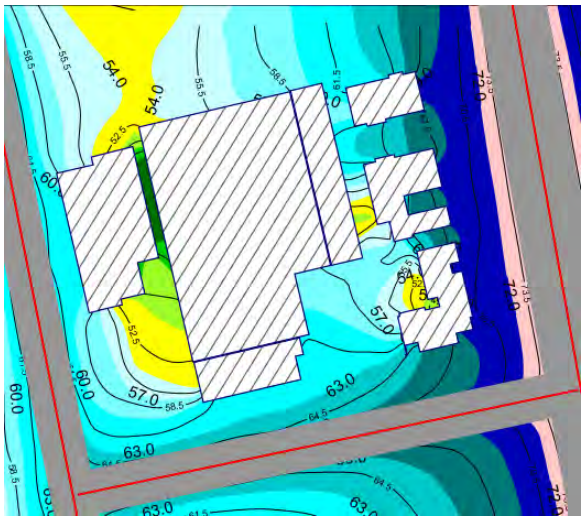


C. EXISTING WITH ZEPHYR ALTERNATIVE

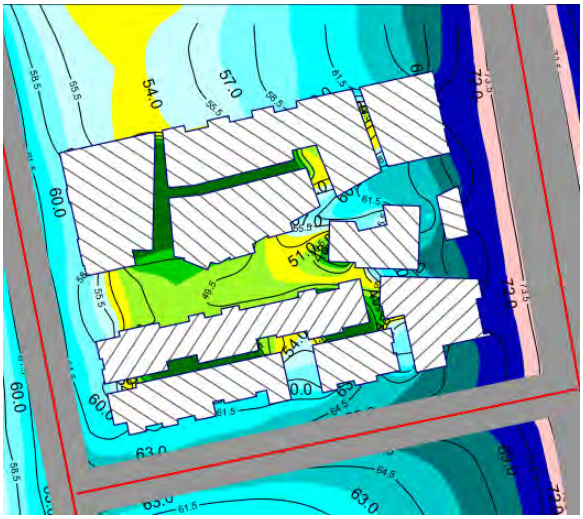
FIGURE 5: TRAFFIC NOISE CONTOURS FOR EXISTING SCENARIOS



A. NEAR TERM WITHOUT PROJECT

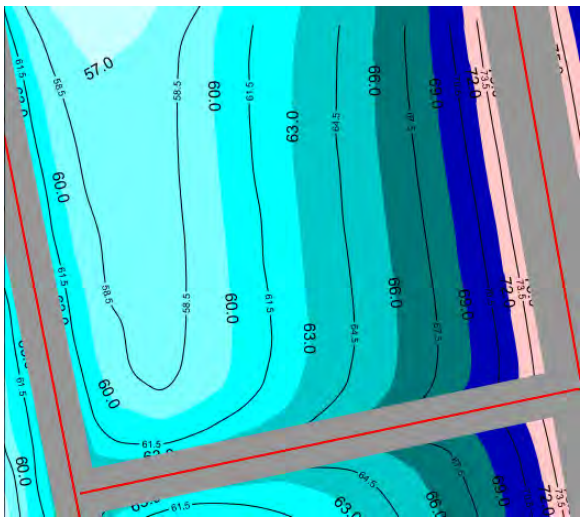


B. NEAR TERM WITH AAT SOLANA 101

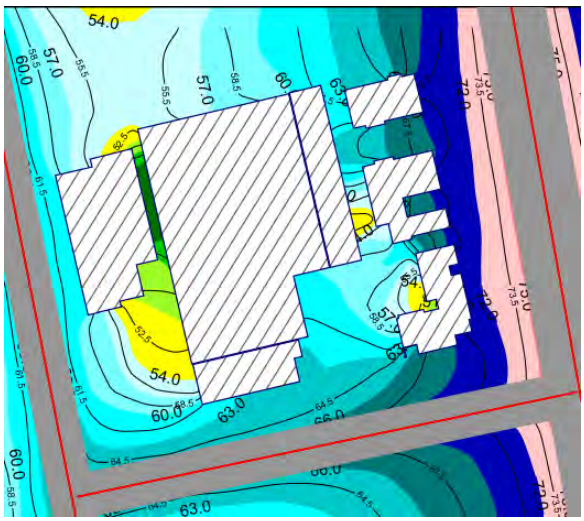


C. NEAR TERM WITH ZEPHYR ALTERNATIVE

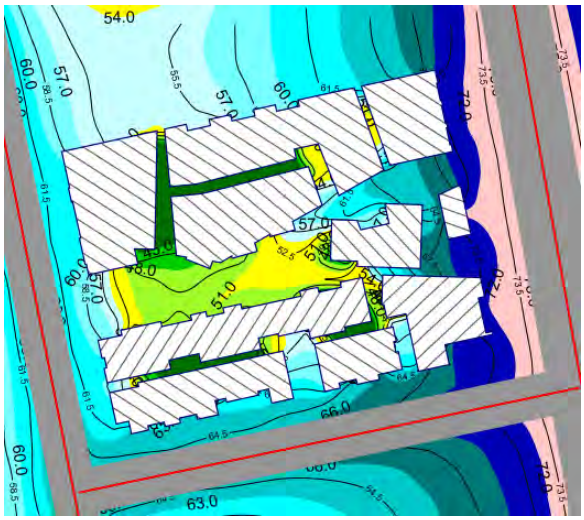
FIGURE 6: TRAFFIC NOISE CONTOURS FOR NEAR FUTURE SCENARIOS



A. YEAR 2035 WITHOUT PROJECT



B. YEAR 2035 WITH AAT SOLANA 101



C. YEAR 2035 WITH ZEPHYR ALTERNATIVE

FIGURE 7: TRAFFIC NOISE CONTOURS FOR YEAR 2035

5.2 Noise Impacts from On-Site Stationary Sources:

The primary sources of on-site noise with potentially significant impacts on existing land uses in the area would be rooftop equipment and the loading dock. According to Fashandi & Associates, the project would include 113 pieces of individual air-conditioning (AC) units on the roof. All AC units would be model 25HCE436 manufactured by Carrier. Equipment data and details of noise contour mapping is presented in Attachment "A" of this report.

Noise impacts due to rooftop equipment for the Zephyr Alternative were modeled for two scenarios: 1) Daytime with all 113 AC units in operation, and 2) nighttime with 50% of AC units in operation.

5.2.1 Daytime AC Noise Impacts:

Although it is unlikely that all residential units would be occupied and all their AC units would be in operation simultaneously, to present a worst-case scenario, noise contours were generated for such a scenario. Noise contours for this scenario are presented in Figure 8. As presented in Figure 8, the anticipated noise impacts for this scenario would be within the daytime limit of 55 dBA Leqh.

FIGURE 8: NOISE CONTOUR FOR ALL HVAC UNITS IN OPERATION

5.2.2 Nighttime AC Noise Impacts:

Nighttime noise levels were modeled assuming 50% of AC units in operation. This is more realistic because of lower nighttime temperatures. It is likely that less than 50% of ACs would be cooling at any given time.

Results of calculations and noise contour generation indicate that noise impacts due to rooftop equipment operation are not anticipated to exceed 45 dBA Leqh at noise-sensitive residential uses in immediate vicinity of the 101 Coast project site.

FIGURE 9: NOISE CONTOUR FOR 50% OF HVAC UNITS IN OPERATION (ZEPHYR)

5.2.3 Original Design Rooftop Equipment Noise:

Noise impacts due to rooftop equipment for the Original design were presented in the acoustical report prepared for the original design (ABC Acoustics Report #2216R, Date: September 21, 2015). Noise contours for the original design are presented in Figure 10. Noise contours in Figure 10 represented the worst-case scenario, when all mechanical equipment are operating simultaneously. Noise from rooftop equipment shall be in compliance if a 5-foot-high noise wall is constructed around equipment bays; the noise walls shall be solid and continuous with no opening or gaps within their entirety.

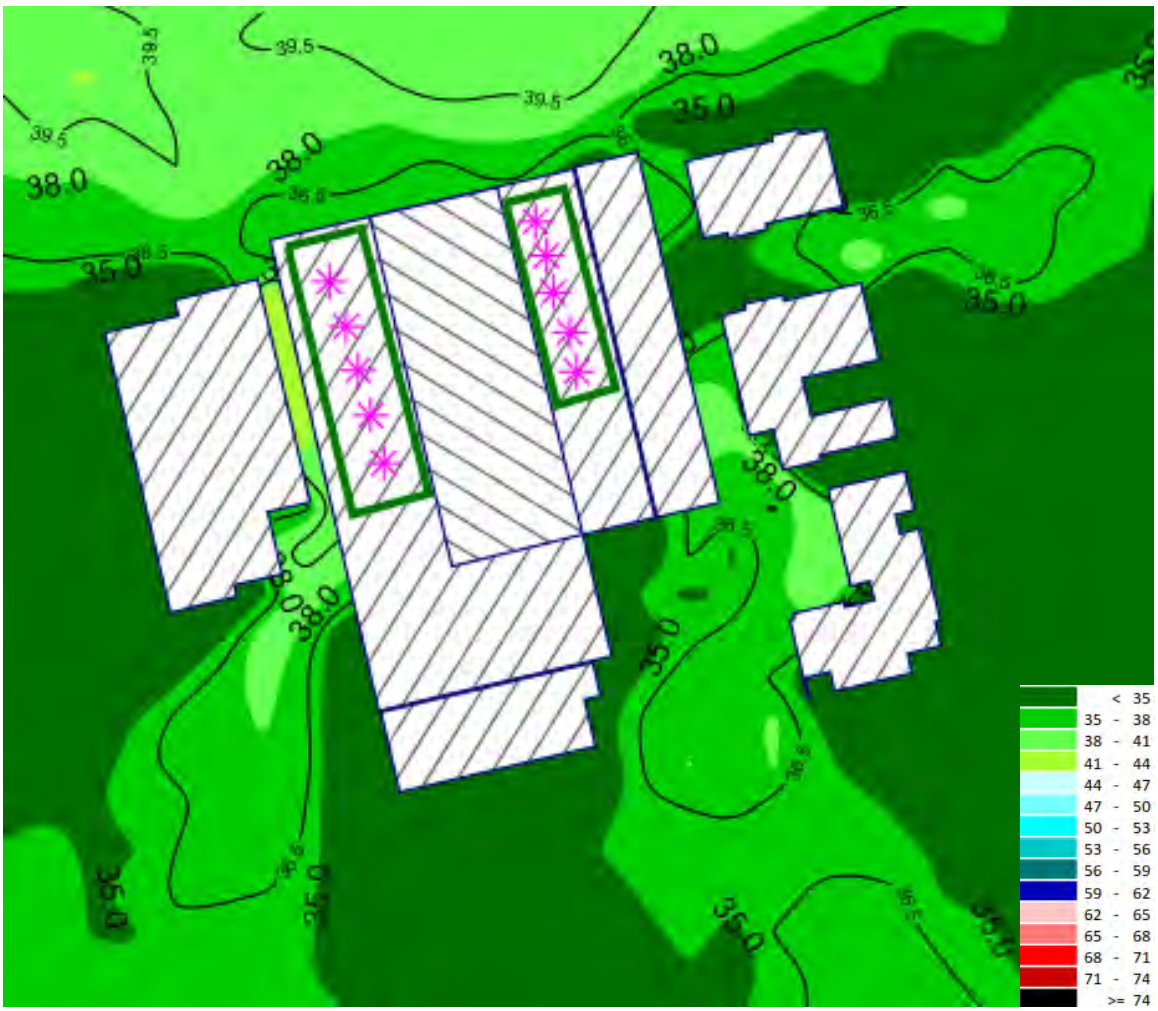


FIGURE 10: NOISE CONTOUR FOR ALL HVAC UNITS IN OPERATION (AAT SOLANA)

Notes: The equipment bays include a 5-foot-high noise barrier wall along the perimeter.

5.3 Loading Dock Noise Impacts:

Noise levels during loading activities at an existing Supermarket loading dock were measured to be 78 dB Leq at 5 feet outside the roll up door, with the door open. Similarly, noise levels were measured to be 54 dB Leq with the roll up door closed (i.e., the door provided for a noise reduction of 24 dB). Such noise impacts result in 48 dB at 10 feet and 42 feet at 20 feet (with roll up door closed).

Noise impacts from the loading dock at 101 Coast Mixed Use would be substantially lower because noise-sensitive receivers in the vicinity are more than 20 feet away. It is recommended that the loading dock includes a roll up door which shall be closed during loading/unloading. The roll up door shall have no openings or gaps within its entirety. Standard roll up doors provide for a Sound Transmission Class (STC) rating of 20-25. No additional noise reduction would be necessary if the roll up door is kept closed during loading/unloading.

The Zephyr Alternate project has a smaller loading dock because it does not include the Supermarket. Therefore, the alternative project would involve lower loading dock noise than the original design. Although noise levels at abutting residential uses would be in compliance during most loading/unloading with roll up door open, it is recommended that it be kept closed as a cautionary measure.

5.4 Parking Noise Impacts:

Parking for the project is underground. Therefore, parking-related noise impacts would be insignificant.

5.5 Noise Impacts Due to Increased Human Activity:

Noise from increased human activity within outdoor seating areas, restaurants, and public gathering places would be higher with the project. Such noise is a part of a thriving community and is often masked by ambient traffic-related noises. Noise from increased human activity along Pacific Coast Highway in Solana Beach is not considered significant as outdoor seating areas would be away from the noise-sensitive residential uses in the area.

5.6 Construction Noise Impacts:

In addition to noise impacts due to surface traffic, short-term noise impacts would occur during construction of the proposed project. Construction-related noise impacts would be similar for both project alternatives. Adjacent uses would experience temporary increases in noise levels due to construction activities. Although such noise impacts are short-term, they are considered obtrusive and may result in some annoyance to pre-existing residents in the area. According to

the applicant, construction activities at 101 Coast project would make use of the equipment listed in Table 3. A representative sample of noise levels associated with such construction equipment is presented in Table 4.

TABLE 3
TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS

Scope of Work	Duration	Anticipated Large Equipment
Site Demolition	3 weeks	1 Excavator, periodic Dumpster Removal Truck
Site Earthwork	9 weeks	1 Excavator, 1 Loader, Export Trucks
Substructure	9 weeks	1 Mobile Crane, periodic Concrete Trucks
Superstructure	19 weeks	periodic Mobile Crane, periodic Flatbed Delivery Truck
Interior Construction	20 weeks	periodic Flatbed Delivery Truck, 1 Sky track (far reach forklift)
Paving and Landscaping	3 weeks	periodic Flatbed Delivery Truck, 1 Backhoe

TABLE 4
CONSTRUCTION EQUIPMENT NOISE LEVELS
(Measured at a distance of 50 feet)

Equipment	Noise Level at 50 feet (dBA)
Backhoe	78
Concrete Mixer Truck	79
Dump Truck	76
Crane	81
Dump Truck	76
Excavator	81
Flat Bed Truck	74
Front Loader	79

1 Construction Noise Handbook (FHWA)

As indicated in Section 3.3 of this report, “Construction noise levels shall not exceed 75 decibels for more than eight hours [Leq (8)] during any 24-hour period when measured at or within property lines of any property which is developed and used either in part or in whole for residential purposes”.

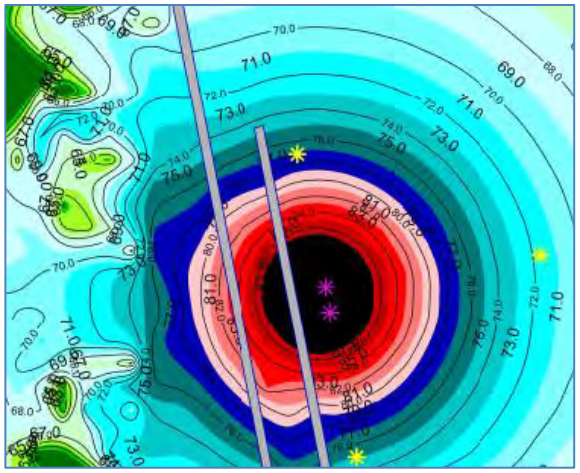
Construction noise represents a short-term impact on ambient noise levels. Actual noise level exposure generated by project construction equipment would vary greatly depending upon factors such as the type and specific model of the

equipment, location of operation on the project site, the types of equipment operating simultaneously, total operating hours for each piece of equipment, the condition of the equipment, and the prevailing wind direction.

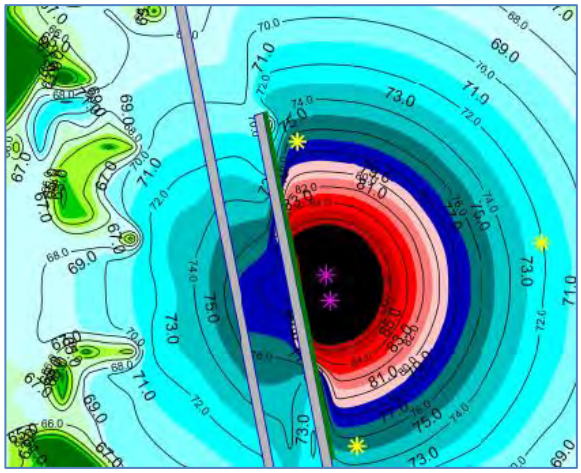
The highest noise levels associated with construction of both alternatives would occur during the 45 days of grading. During this period, construction activities would make use of an Excavator (81 dBA at 50 feet), a Loader (79 dBA at 50 feet), and an Export/Dump Truck (76 dBA at 50 feet). In a scenario when these 3 main pieces of construction machinery operated simultaneously and continuously at their maximum capacity, the cumulative unattenuated noise would be 84 dBA at 50 feet (81 dB + 79 dB + 76 dB = 84 dB).

The actual sound level of a construction site depends on the amount of time that the equipment would operate and the intensity of the activities. To present a worst-case scenario, construction equipment at the project site were assumed to be running simultaneously, continuously, at their maximum capacity, and close to western property line during an 8-hours work day. Construction-related unattenuated noise contours are presented in Attachment "A" and Figure 11A below. It shall be noted that the worst-case scenario presented in Figure 11A would occur during only a few days when all 3 main pieces of construction equipment are operating together at one location along the western property line. During this scenario, the unattenuated construction noise levels at closest residential units to the west of project site would be 80 dBA. Since construction equipment normally move about the site, the actual unattenuated construction equipment noise impacts are anticipated to be 3 dB lower at 77 dBA Leqh.

The most effective method of limiting disturbances from construction noise is through local control of construction hours and limiting construction to normal weekday working hours when residences are likely to be least sensitive to noise. Another effective noise abatement measure is installing a temporary noise barrier between the construction site and noise-sensitive receptors. The worst-case attenuated project-related construction noise contours for 45 days of grading were generated assuming an 8-foot noise barrier along the western property line. Results of attenuated noise modeling is presented in Attachment "A" and Figure 11B. As presented in Figure 11-B, construction noise levels would be 74-75 dBA Leqh at closest residential units to the west of project site during worst-case hours. Since construction equipment normally move about the site, the actual attenuated construction equipment noise impacts are anticipated to be 3 dB lower at 71-72 dBA Leqh.



A. CONSTRUCTION EQUIPMENT NOISE WITHOUT BARRIER



B. CONSTRUCTION EQUIPMENT NOISE WITH BARRIER

FIGURE 11: COSTRUCTION NOISE PREDICTION

Construction activities would add 136 heavy truck trips to the existing daily traffic volume along area roadways. Considering an 8-hour work day, the existing plus construction traffic noise levels for area roadways were calculated. Noise modeling and contours for existing traffic on area roadways are presented in Attachment "A" and Figure 5A. The existing plus construction traffic noise contours are presented in Attachment "A" and Figure 12 below. As presented, existing traffic-related noise impacts at closest residential property line to the west of project site is 58-59. The anticipated existing plus construction traffic noise during the 45 days of grading would be 68-69 dBA Leq (Figure 12). Figure 12 does not include noise due to on-site construction equipment.

The cumulative existing plus construction noise levels were calculated. Results of modeling are presented in Attachment "A" and Figures 13. As presented in Attachment "A" and Figures 13A & B, cumulative unattenuated construction noise impacts would be approximately 80 dB at closest residential property line (Figure 13A).

Noise impacts would be reduced to 74-75 dBA with the construction of an 8-foot noise barrier along the western property line (Figure 13B). Relatively lower contribution of construction traffic to the cumulative noise impacts is due to the worst-case assumption that places 3 noisiest pieces of construction equipment along the western property line. Worst-case construction noise impacts of 74-75 dBA Leq are within the applicable 8-hour limit of 75 dBA Leq. The actual impacts are anticipated to be lower.

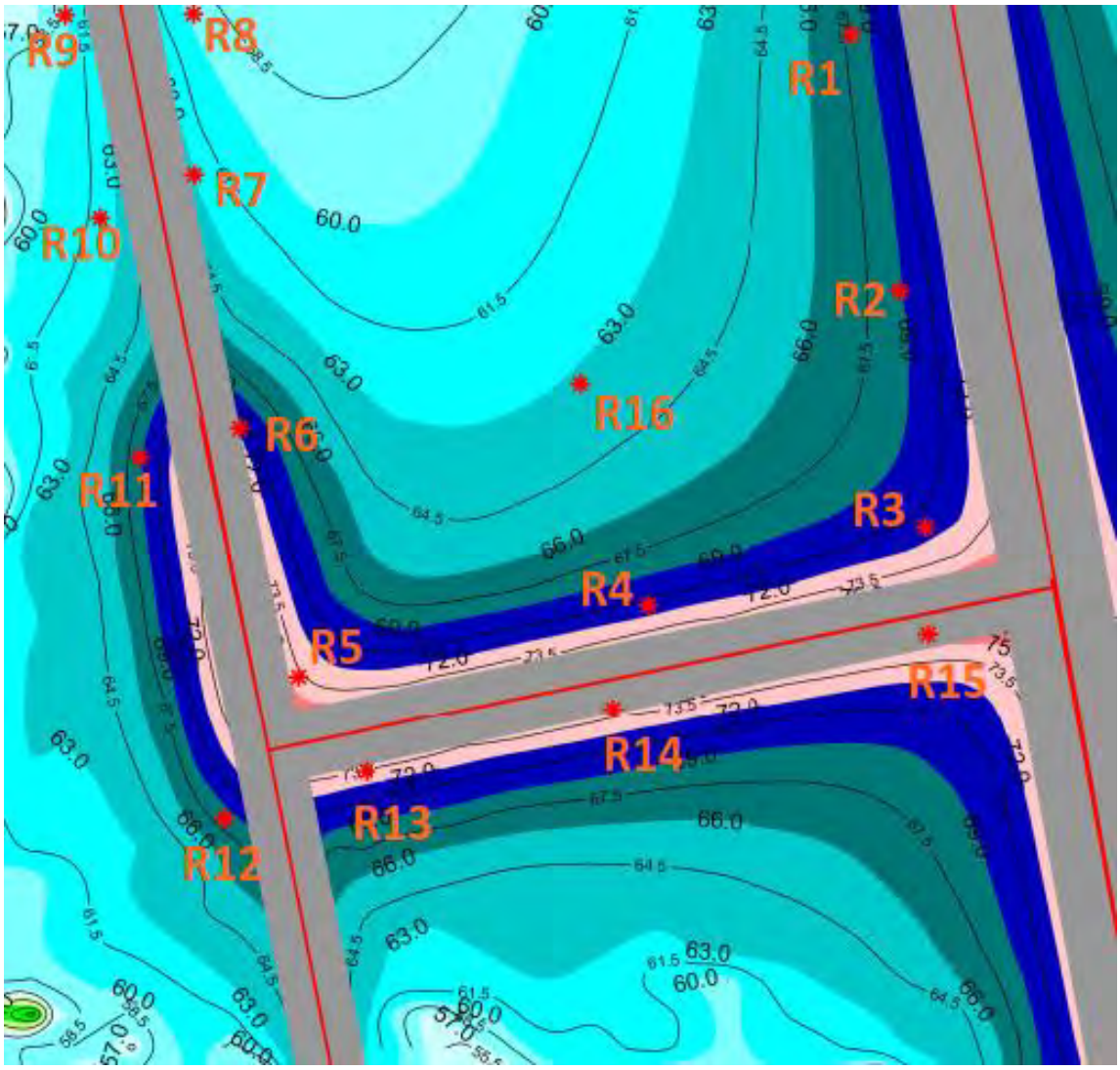
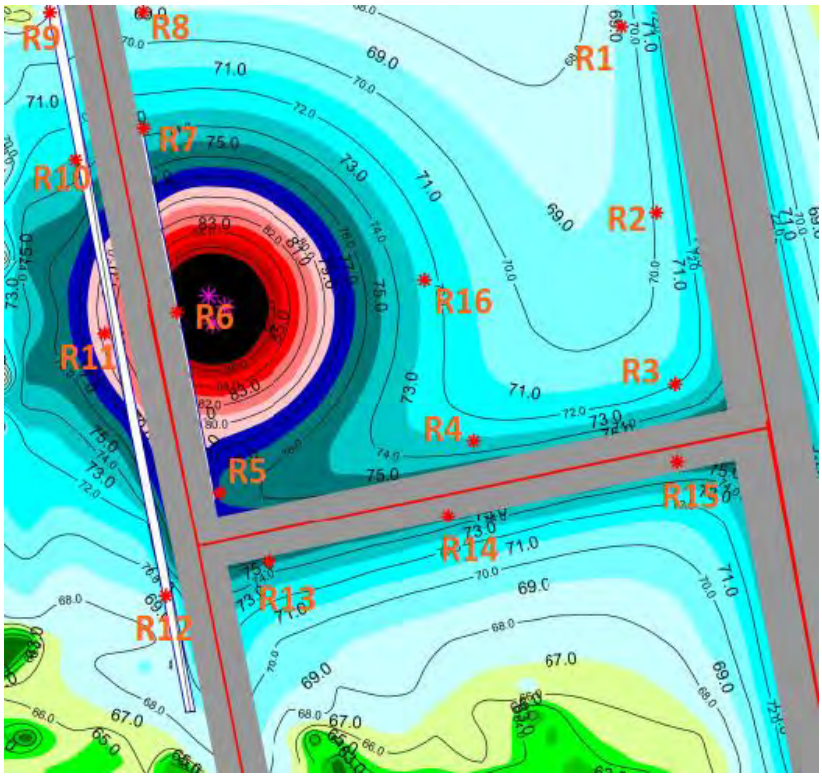
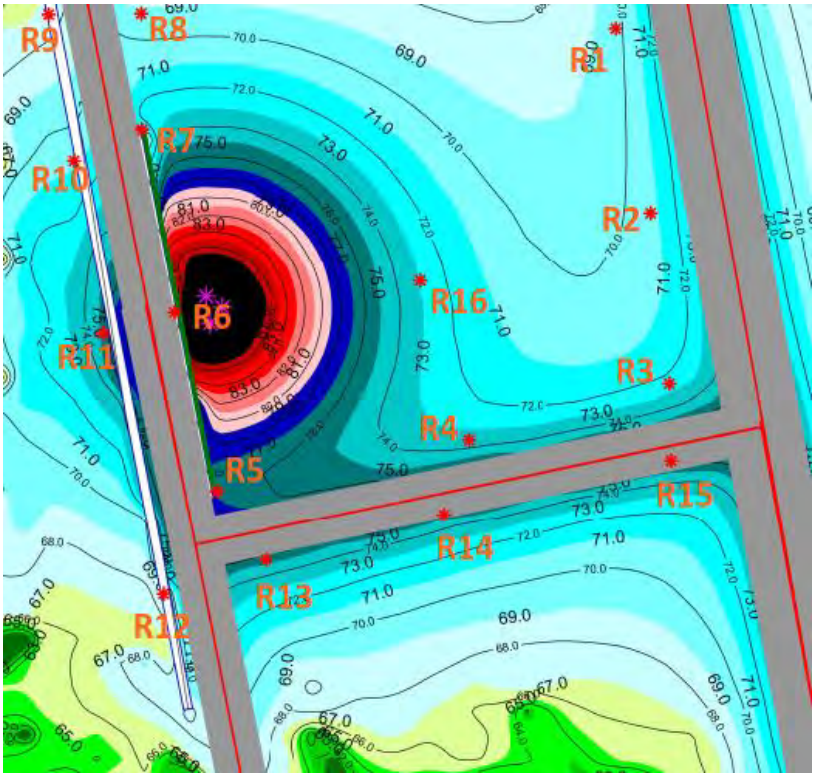


FIGURE 12: EXISTING TRAFFIC + CONSTRUCTION TRAFFIC NOISE CONTOURS



A. CUMULATIVE CONSTRUCTION NOISE WITHOUT BARRIER



B. CUMULATIVE CONSTRUCTION NOISE WITH BARRIER

FIGURE 13: CUMULATIVE EXISTING TRAFFIC + CONSTRUCTION TRAFFIC AND EQUIPMENT

6.0 CONDITIONS OF DEVELOPMENT AND MITIGATION:

The following acoustical treatment recommendations would reduce all noise impacts from on-site noise sources at 101 Coast Mixed Use to acceptable levels at the existing land uses in the area. These recommendations apply to both the AAT 101 Coast Design and the Zephyr Alternative.

1. The loading dock shall include a solid roll up door with a Sound Transmission Class (STC) rating of no less than 20.

2. An 8-foot-height construction noise barrier shall be constructed along the western property line to reduce construction noise. The noise barrier shall be continuous with no openings or gaps within its entirety. It shall be constructed of "Quilted Barrier Absorber" Type: BBC-13X manufactured by Sound Seal, or equivalent. Product specification for Type BBC-13X is presented in Attachment "B" of this report.
3. prior to issuance of any construction permits, the applicant shall ensure the following, to the satisfaction of the City of Solana Beach City Engineer:

    a. Construction noise reduction methods, such as shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and use of electric air compressors and similar power tools rather than diesel equipment, shall be used.

    b. During construction, stationary construction equipment shall be placed such that emitted noise is directed away from or shielded from sensitive noise receivers.

    c. During construction, stockpiling and vehicle staging areas shall be located as far as practical from noise-sensitive receptors.

The above acoustical treatment measures, if properly incorporated, would reduce all project-related noise impacts to acceptable levels for both the AAT 101 Coast Design and the Zephyr Alternative.

7.0 CERTIFICATION:

The findings and recommendations presented in this report are based on available information at the time of analysis. They represent a true and factual analysis of the acoustical issues within the specific scope.

There are many factors involved in actual acoustical performance of a new development. ABC Acoustics is not, and could not be held liable for final results of any recommendations presented in this report or implementation of such recommendations.

ABC Acoustics, Inc.

Sharo T. Sanavi

Sharo T. Sanavi
Principal

8.0 REFERENCES CITED:

Architects MW Steele Group I

2017 Architectural Plans for 101 Coast Mixed-Use Project.

Fashandi & Associates

2017 Roof Top Mechanical Equipment Data

Solana Beach, City of

2008 Noise Element.

2008 Noise Abatement and Control; SBMC Chapter 7.34

Urban Systems Associates, Inc.

2016 Traffic Impact Analysis Report for Solana 101, November 15, 2016

ATTACHMENT "A"

ACOUSTICAL MODELING
&
ROOFTOP EQUIPMENT DATA

Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

1

Costruction Traffic
Result number 29
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Ldn
in dB(A)

	< 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	60 - 63
	63 - 66
	66 - 69
	69 - 72
	72 - 75
	75 - 78
	78 - 81
	81 - 84
	>= 84

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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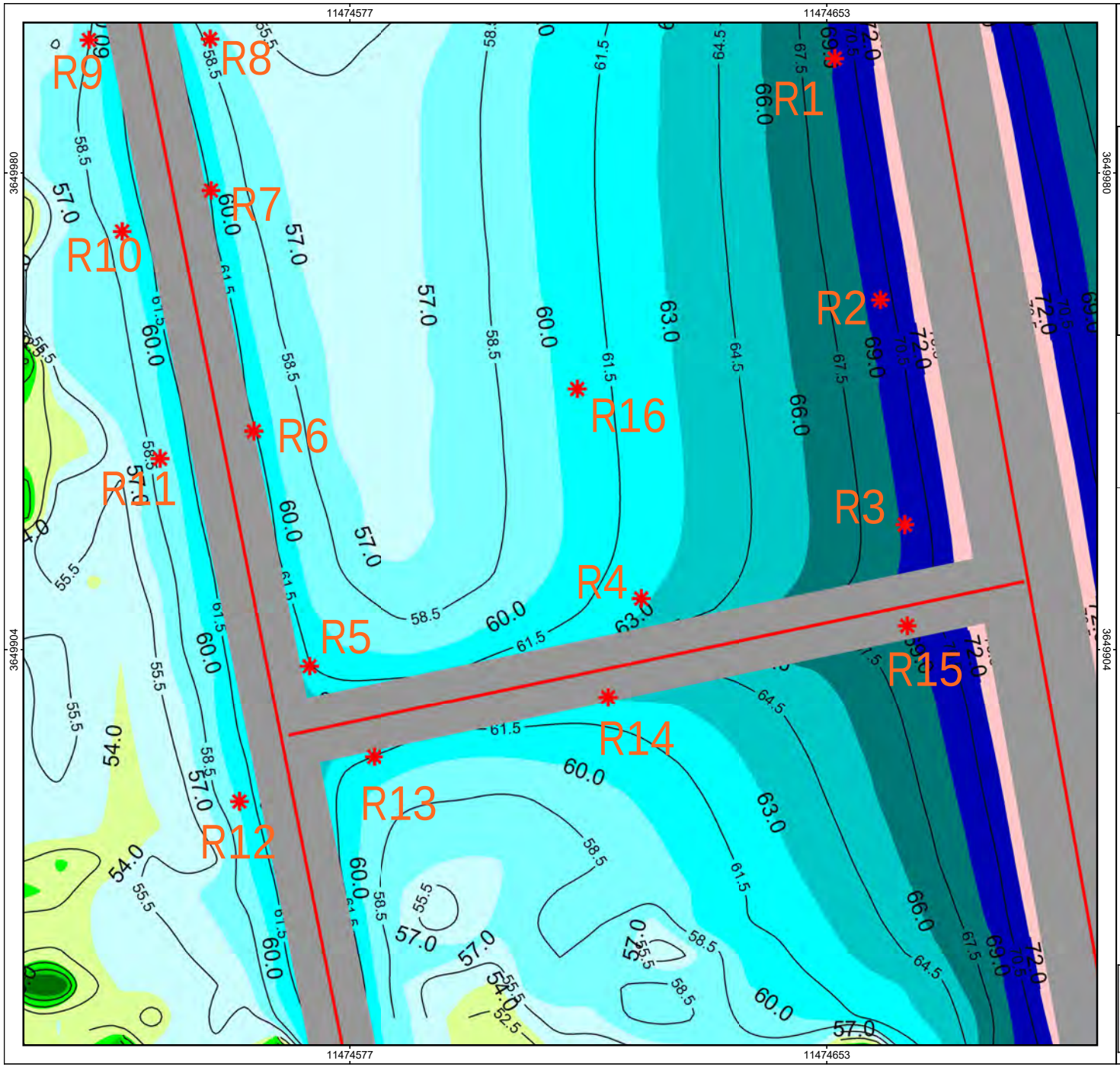

Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

2

Existing without project
Result number 8
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Ldn
in dB(A)

	< 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	60 - 63
	63 - 66
	66 - 69
	69 - 72
	72 - 75
	75 - 78
	78 - 81
	81 - 84
	>= 84

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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ABC Acoustics, Inc.
Project No:

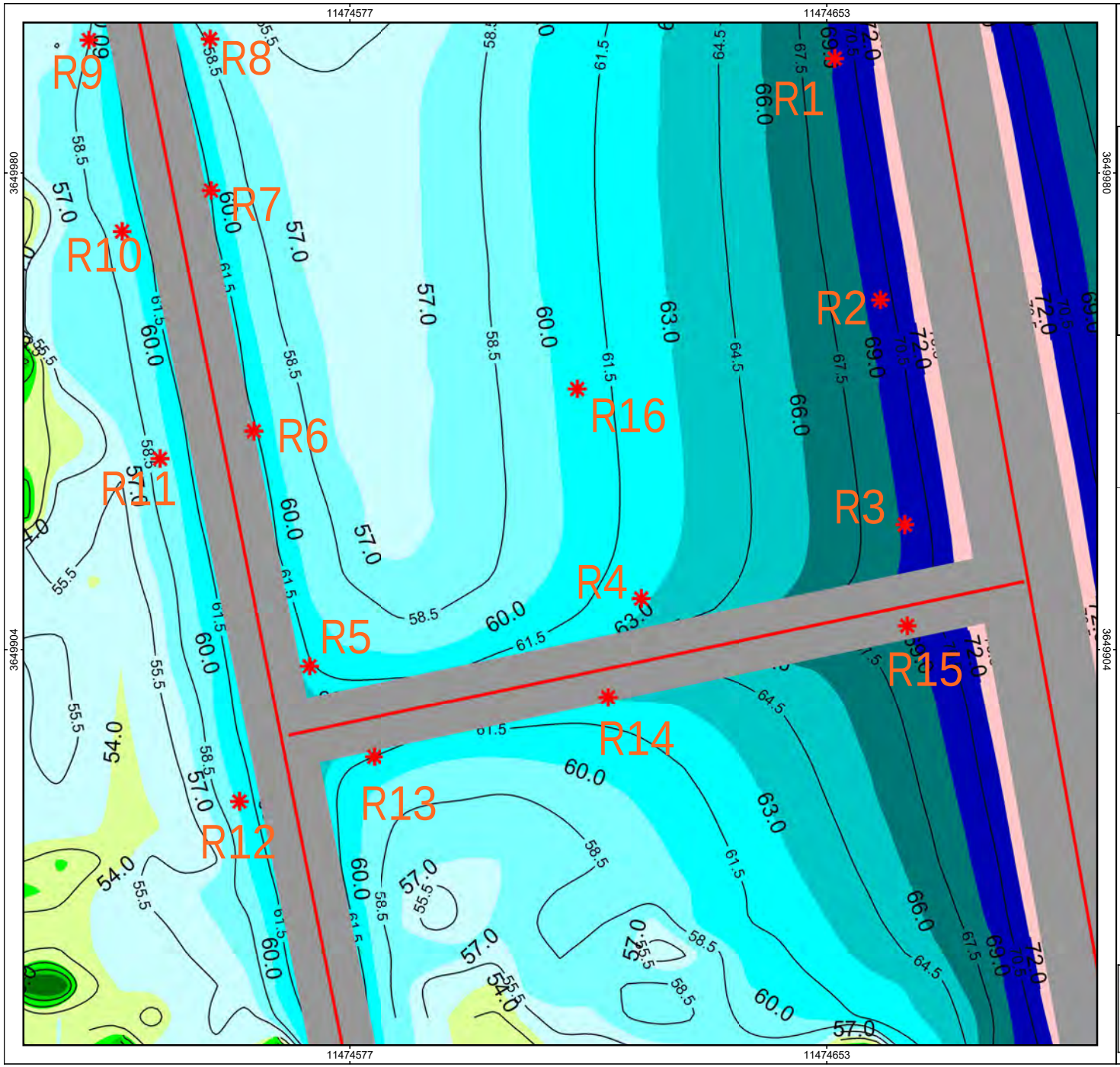
101 COAST MIXED USE
Source level road - Existing Rec

Road	ADT Veh/24h	Gradient %
Dahlia Drive	2405	1.4
Highway 101	18127	-0.5
Sierra Avenue	3966	-0.6

ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
Existing Rec

Receiver	Fl	X m	Y m	Z m	Ldn dB(A)	Leq,d dB(A)	Leq,n dB(A)
R1	G	11474653.9	3649998.1	23.00	69.2	67.6	61.0
	F2			25.80	69.4	67.8	61.2
R2	G	11474661.2	3649959.6	23.00	69.8	68.1	61.6
	F2			25.80	70.0	68.4	61.8
R3	G	11474665.1	3649923.6	23.00	69.2	67.6	61.0
	F2			25.80	69.4	67.9	61.2
R4	G	11474623.0	3649911.8	23.00	61.3	60.0	52.8
	F2			25.80	62.9	61.5	54.5
R5	G	11474570.0	3649901.0	22.40	61.5	60.8	52.4
	F2			25.20	62.3	61.4	53.4
R6	G	11474561.2	3649938.6	22.43	61.6	61.0	52.5
	F2			25.23	61.9	61.0	53.0
R7	G	11474554.3	3649977.1	23.00	61.0	60.4	52.0
	F2			25.80	61.5	60.6	52.6
R8	G	11474554.2	3650001.2	23.00	57.5	56.8	48.5
	F2			25.80	59.2	58.2	50.4
R9	G	11474534.8	3650001.0	23.02	58.0	57.3	49.0
	F2			25.82	58.9	58.0	50.0
R10	G	11474540.2	3649970.5	23.00	59.0	58.3	50.0
	F2			25.80	60.0	59.2	51.2
R11	G	11474546.2	3649934.2	23.00	58.7	58.0	49.8
	F2			25.80	60.0	59.0	51.2
R12	G	11474558.9	3649879.3	23.00	59.8	59.0	50.8
	F2			25.80	60.7	59.8	51.8
R13	G	11474580.4	3649886.5	22.29	60.8	60.1	51.8
	F2			25.09	61.7	60.8	52.8
R14	G	11474617.7	3649896.0	22.21	62.3	61.4	53.4
	F2			25.01	63.1	61.9	54.5
R15	G	11474665.5	3649907.4	22.91	69.4	68.0	61.0
	F2			25.71	69.1	67.7	60.8
R16	G	11474612.8	3649945.3	23.00	58.4	56.8	50.2
	F2			25.80	61.4	59.9	53.2



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

3

Existing without project (Near future)
Result number 9
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Ldn
in dB(A)

	< 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	60 - 63
	63 - 66
	66 - 69
	69 - 72
	72 - 75
	75 - 78
	78 - 81
	81 - 84
	>= 84

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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ABC Acoustics, Inc.
Project No: 2484

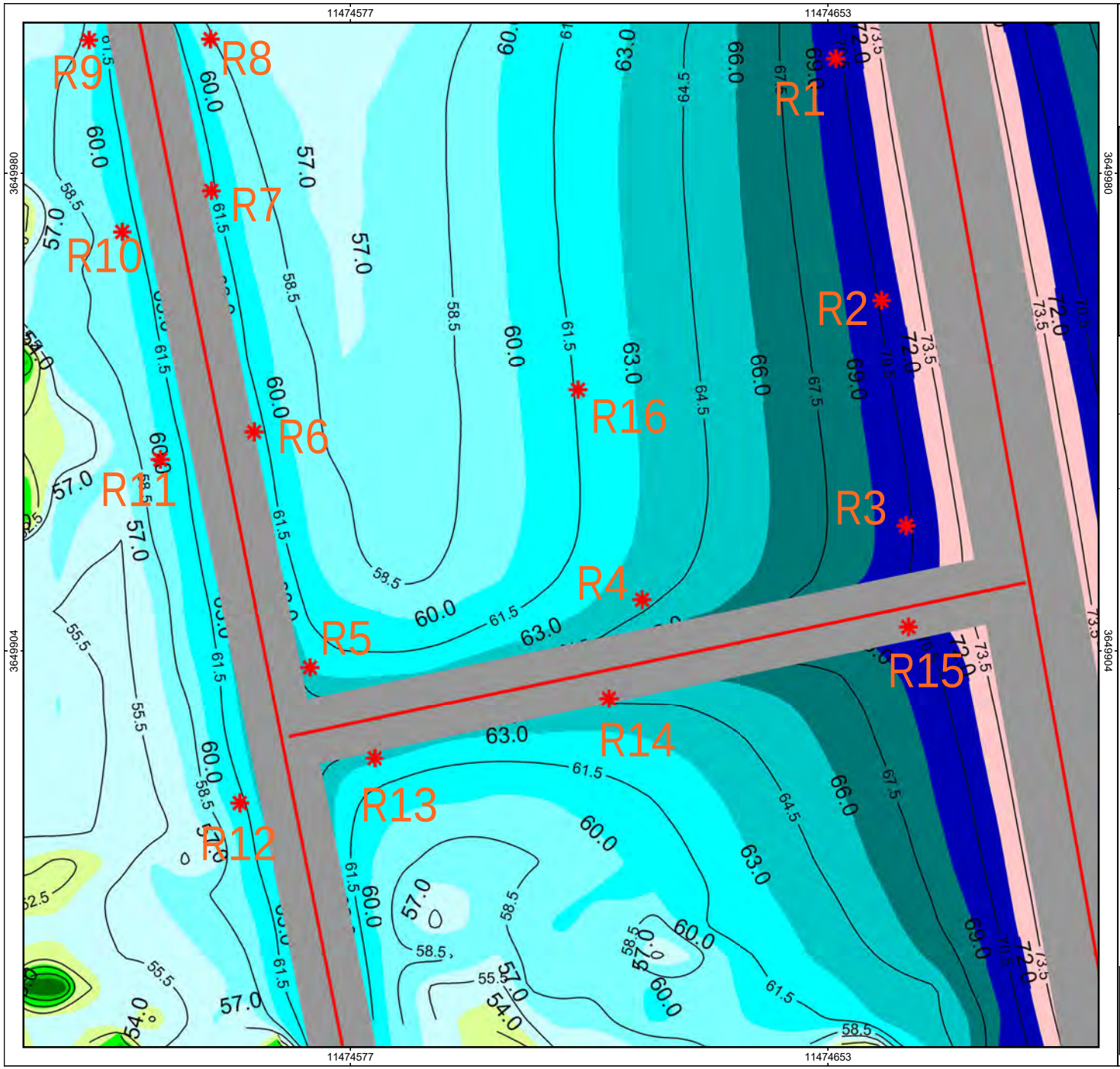
101 COAST MIXED USE
Source level road
Existing Near Future

Road	ADT Veh/24h	Gradient %
Dahlia Drive	2405	1.4
Highway 101	18127	-0.5
Sierra Avenue	4070	-0.6

ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
Existing Near Future

Receiver	Fl	X	Y	Z	Ldn	Leq,d	Leq,n
		m	m	m	dB(A)	dB(A)	dB(A)
R1	G	11474653.9	3649998.12	23.00	69.2	67.6	61.0
	F2			25.80	69.4	67.8	61.2
R2	G	11474661.2	3649959.64	23.00	69.8	68.1	61.6
	F2			25.80	70.0	68.4	61.8
R3	G	11474665.1	3649923.66	23.00	69.2	67.6	61.0
	F2			25.80	69.4	67.9	61.2
R4	G	11474623.0	3649911.87	23.00	61.3	60.0	52.8
	F2			25.80	62.9	61.5	54.5
R5	G	11474570.0	3649901.03	22.40	61.5	60.9	52.5
	F2			25.20	62.3	61.5	53.4
R6	G	11474561.2	3649938.62	22.43	61.7	61.1	52.6
	F2			25.23	62.0	61.1	53.1
R7	G	11474554.3	3649977.10	23.00	61.1	60.5	52.1
	F2			25.80	61.6	60.7	52.7
R8	G	11474554.2	3650001.25	23.00	57.6	56.9	48.6
	F2			25.80	59.2	58.3	50.5
R9	G	11474534.8	3650001.07	23.02	58.1	57.4	49.1
	F2			25.82	59.0	58.1	50.1
R10	G	11474540.2	3649970.56	23.00	59.1	58.4	50.1
	F2			25.80	60.1	59.2	51.3
R11	G	11474546.2	3649934.22	23.00	58.8	58.1	49.9
	F2			25.80	60.0	59.1	51.2
R12	G	11474558.9	3649879.37	23.00	59.9	59.1	50.9
	F2			25.80	60.7	59.9	51.9
R13	G	11474580.4	3649886.51	22.29	60.9	60.1	51.9
	F2			25.09	61.7	60.8	52.9
R14	G	11474617.7	3649896.06	22.21	62.3	61.4	53.4
	F2			25.01	63.1	61.9	54.5
R15	G	11474665.5	3649907.48	22.91	69.4	68.0	61.0
	F2			25.71	69.1	67.7	60.8
R16	G	11474612.8	3649945.36	23.00	58.4	56.9	50.2
	F2			25.80	61.4	59.9	53.2



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

4

Existing without project (future 2035)
Result number 10
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Ldn
in dB(A)

	< 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	60 - 63
	63 - 66
	66 - 69
	69 - 72
	72 - 75
	75 - 78
	78 - 81
	81 - 84
	>= 84

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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ABC Acoustics, Inc.
Project No: R2484

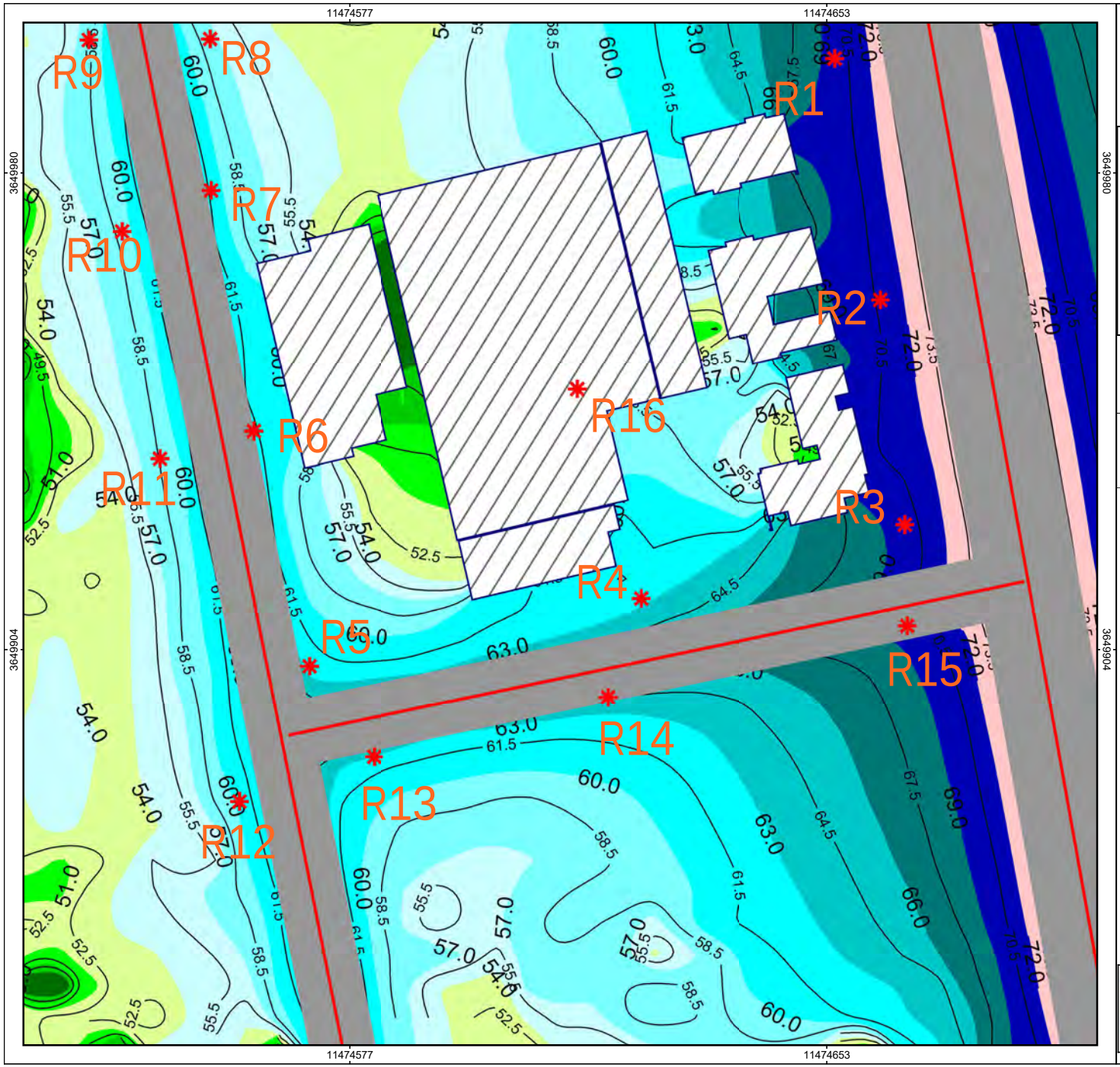
101 COAST MIXED USE
Source level road
Existing in 2035

Road	ADT Veh/24h	Gradient %
Dahlia Drive	4400	1.4
Highway 101	22500	-0.5
Sierra Avenue	4700	-0.6

ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
Existing in 2035

Receiver	Fl	X	Y	Z	Ldn	Leq,d	Leq,n
		m	m	m	dB(A)	dB(A)	dB(A)
R1	G	11474653.9	3649998.1	23.00	70.1	68.5	62.0
	F2			25.80	70.4	68.8	62.2
R2	G	11474661.2	3649959.6	23.00	70.7	69.1	62.5
	F2			25.80	70.9	69.3	62.7
R3	G	11474665.1	3649923.6	23.00	70.2	68.6	62.0
	F2			25.80	70.4	68.9	62.2
R4	G	11474623.0	3649911.8	23.00	62.8	61.7	54.3
	F2			25.80	64.2	63.0	55.8
R5	G	11474570.0	3649901.0	22.40	62.7	62.0	53.6
	F2			25.20	63.4	62.6	54.5
R6	G	11474561.2	3649938.6	22.43	62.4	61.8	53.3
	F2			25.23	62.7	61.9	53.9
R7	G	11474554.3	3649977.1	23.00	61.8	61.1	52.7
	F2			25.80	62.3	61.4	53.4
R8	G	11474554.2	3650001.2	23.00	58.3	57.5	49.3
	F2			25.80	60.0	59.0	51.3
R9	G	11474534.8	3650001.0	23.02	58.8	58.0	49.7
	F2			25.82	59.7	58.8	50.8
R10	G	11474540.2	3649970.5	23.00	59.8	59.1	50.8
	F2			25.80	60.9	60.0	52.0
R11	G	11474546.2	3649934.2	23.00	59.6	58.8	50.6
	F2			25.80	60.8	59.9	52.0
R12	G	11474558.9	3649879.3	23.00	60.8	60.1	51.9
	F2			25.80	61.7	60.8	52.8
R13	G	11474580.4	3649886.5	22.29	62.8	62.1	53.7
	F2			25.09	63.3	62.4	54.4
R14	G	11474617.7	3649896.0	22.21	64.4	63.5	55.5
	F2			25.01	64.8	63.7	56.1
R15	G	11474665.5	3649907.4	22.91	70.6	69.3	62.2
	F2			25.71	70.3	69.0	62.0
R16	G	11474612.8	3649945.3	23.00	59.4	57.8	51.1
	F2			25.80	62.4	60.9	54.2



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

5

ATT Solana Beach Existing
Result number 11
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Ldn
in dB(A)

	< 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	60 - 63
	63 - 66
	66 - 69
	69 - 72
	72 - 75
	75 - 78
	78 - 81
	81 - 84
	>= 84

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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ABC Acoustics, Inc.
Project No: R2484

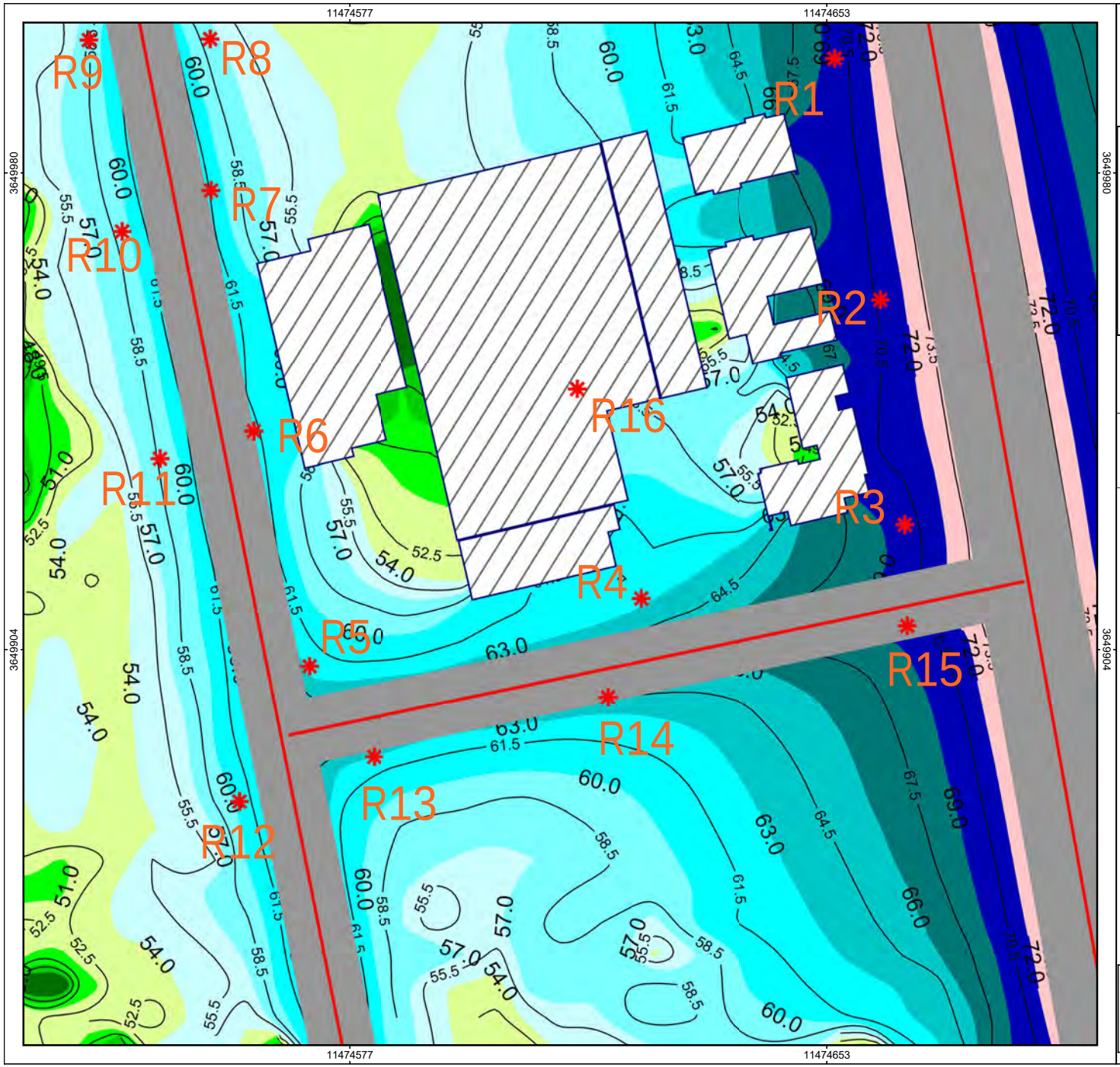
101 COAST MIXED USE
Source level road
ATT Solana Beach Existing

Road	ADT Veh/24h	Gradient %
Dahlia Drive	4295	1.4
Highway 101	18719	-0.5
Sierra Avenue	4074	-0.6

ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
ATT Solana Beach Existing

Receiver	Fl	X	Y	Z	Ldn	Leq,d	Leq,n
		m	m	m	dB(A)	dB(A)	dB(A)
R1	G	11474653.9	3649998.1	23.00	69.7	68.1	61.5
	F2			25.80	69.9	68.3	61.7
R2	G	11474661.2	3649959.6	23.00	70.7	69.1	62.5
	F2			25.80	70.9	69.3	62.7
R3	G	11474665.1	3649923.6	23.00	69.8	68.2	61.6
	F2			25.80	70.0	68.5	61.8
R4	G	11474623.0	3649911.8	23.00	61.6	60.6	52.9
	F2			25.80	62.9	61.7	54.2
R5	G	11474570.0	3649901.0	22.40	62.2	61.5	53.1
	F2			25.20	62.5	61.7	53.5
R6	G	11474561.2	3649938.6	22.43	61.7	61.1	52.5
	F2			25.23	61.5	60.9	52.3
R7	G	11474554.3	3649977.1	23.00	61.0	60.4	51.9
	F2			25.80	60.9	60.2	51.8
R8	G	11474554.2	3650001.2	23.00	57.2	56.6	48.2
	F2			25.80	58.1	57.3	49.2
R9	G	11474534.8	3650001.0	23.02	57.8	57.2	48.8
	F2			25.82	58.1	57.4	49.1
R10	G	11474540.2	3649970.5	23.00	58.8	58.2	49.7
	F2			25.80	59.2	58.5	50.1
R11	G	11474546.2	3649934.2	23.00	58.4	57.8	49.3
	F2			25.80	58.7	58.1	49.6
R12	G	11474558.9	3649879.3	23.00	60.2	59.5	51.2
	F2			25.80	60.8	60.0	51.8
R13	G	11474580.4	3649886.5	22.29	62.4	61.7	53.4
	F2			25.09	62.8	62.0	53.8
R14	G	11474617.7	3649896.0	22.21	64.0	63.2	55.0
	F2			25.01	63.9	63.0	55.2
R15	G	11474665.5	3649907.4	22.91	70.0	68.7	61.6
	F2			25.71	69.8	68.4	61.4



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

6

ATT Solan Beach Near Future
Result number 12
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Ldn
in dB(A)

	< 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	60 - 63
	63 - 66
	66 - 69
	69 - 72
	72 - 75
	75 - 78
	78 - 81
	81 - 84
	>= 84

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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ABC Acoustics, Inc.
Project No: R2484

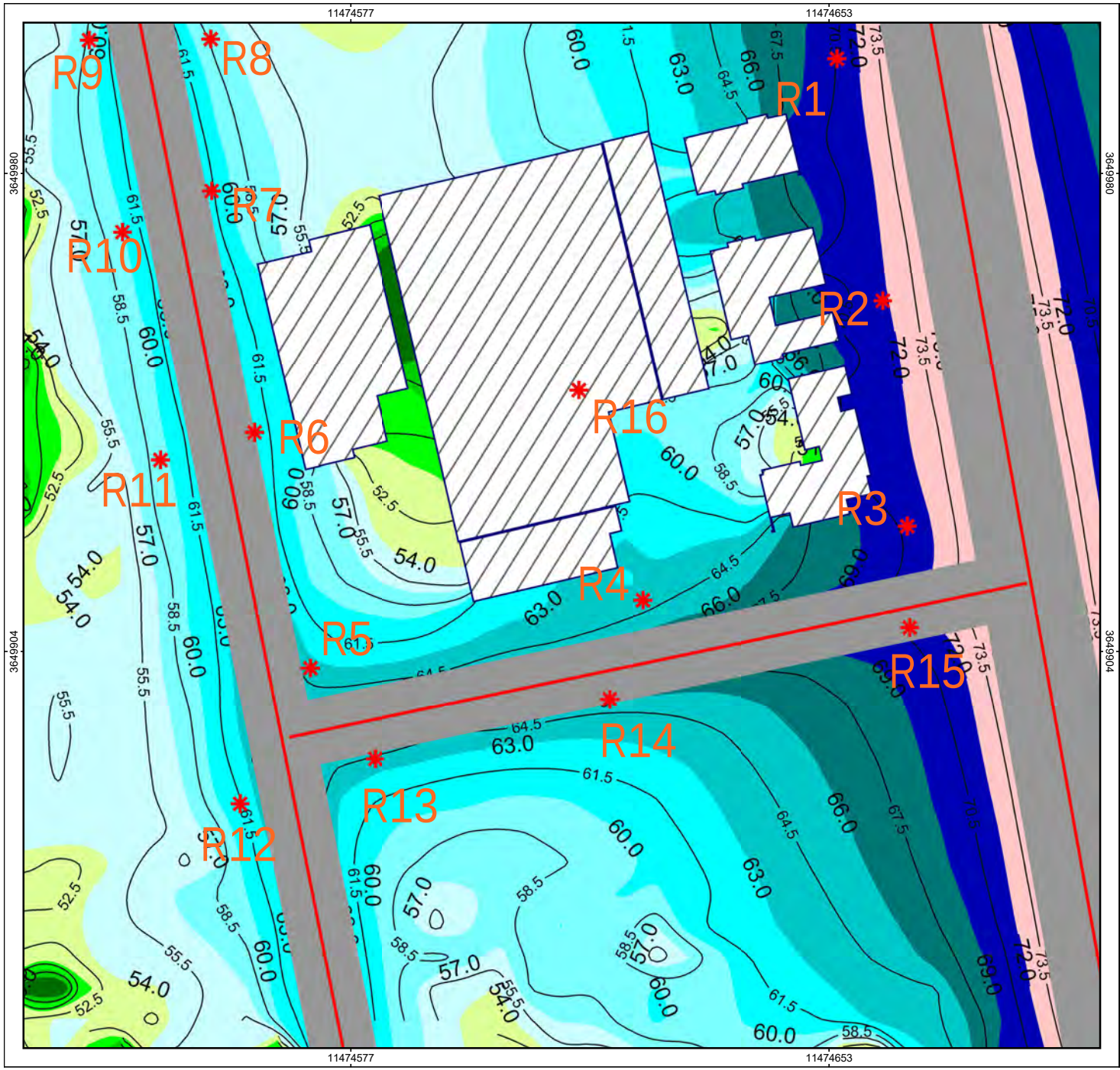
101 COAST MIXED USE
Source level road
ATT Solana Beach Near Future

Road	ADT Veh/24h	Gradient %
Dahlia Drive	2405	1.4
Highway 101	18127	-0.5
Sierra Avenue	4070	-0.6

ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
ATT Solana Beach Near Future

Receiver	Fl	X	Y	Z	Ldn	Leq,d	Leq,n
		m	m	m	dB(A)	dB(A)	dB(A)
R1	G	11474653.9	3649998.1	23.00	69.2	67.6	61.0
	F2			25.80	69.4	67.8	61.2
R2	G	11474661.2	3649959.6	23.00	69.8	68.1	61.6
	F2			25.80	70.0	68.4	61.8
R3	G	11474665.1	3649923.6	23.00	69.2	67.6	61.0
	F2			25.80	69.4	67.9	61.2
R4	G	11474623.0	3649911.8	23.00	61.3	60.0	52.8
	F2			25.80	62.9	61.5	54.5
R5	G	11474570.0	3649901.0	22.40	61.5	60.9	52.5
	F2			25.20	62.3	61.5	53.4
R6	G	11474561.2	3649938.6	22.43	61.7	61.1	52.6
	F2			25.23	62.0	61.1	53.1
R7	G	11474554.3	3649977.1	23.00	61.1	60.5	52.1
	F2			25.80	61.6	60.7	52.7
R8	G	11474554.2	3650001.2	23.00	57.6	56.9	48.6
	F2			25.80	59.2	58.3	50.5
R9	G	11474534.8	3650001.0	23.02	58.1	57.4	49.1
	F2			25.82	59.0	58.1	50.1
R10	G	11474540.2	3649970.5	23.00	59.1	58.4	50.1
	F2			25.80	60.1	59.2	51.3
R11	G	11474546.2	3649934.2	23.00	58.8	58.1	49.9
	F2			25.80	60.0	59.1	51.2
R12	G	11474558.9	3649879.3	23.00	59.9	59.1	50.9
	F2			25.80	60.7	59.9	51.9
R13	G	11474580.4	3649886.5	22.29	60.9	60.1	51.9
	F2			25.09	61.7	60.8	52.9
R14	G	11474617.7	3649896.0	22.21	62.3	61.4	53.4
	F2			25.01	63.1	61.9	54.5
R15	G	11474665.5	3649907.4	22.91	69.4	68.0	61.0
	F2			25.71	69.1	67.7	60.8
R16	G	11474612.8	3649945.3	23.00	58.4	56.9	50.2
	F2			25.80	61.4	59.9	53.2



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

7

ATT Solana Beach in 2035
Result number 13
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Ldn
in dB(A)

	< 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	60 - 63
	63 - 66
	66 - 69
	69 - 72
	72 - 75
	75 - 78
	78 - 81
	81 - 84
	>= 84

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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ABC Acoustics, Inc.
Project No: R2484

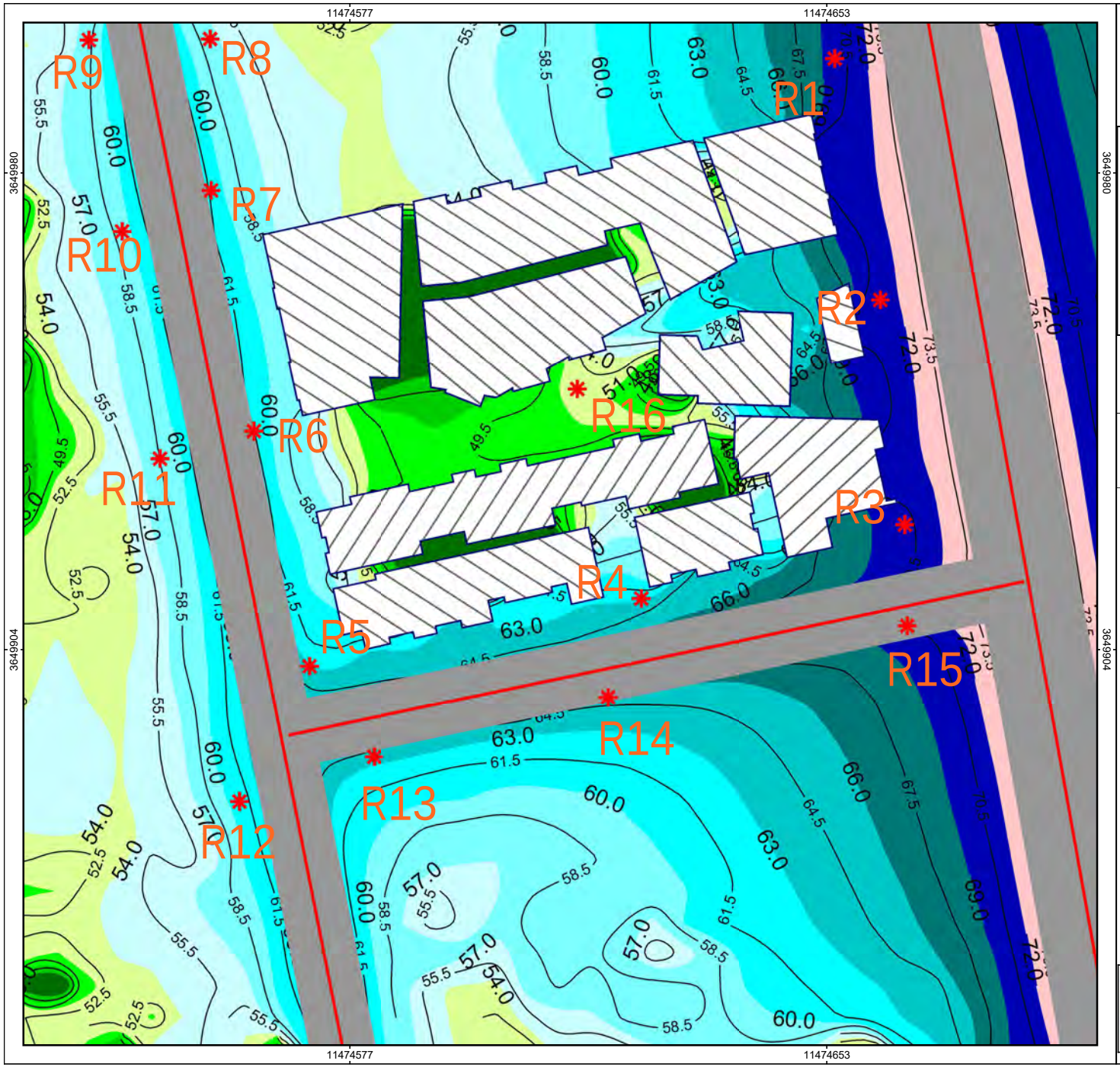
101 COAST MIXED USE
Source level road
ATT Solana Beach in 2035

Road	ADT Veh/24h	Gradient %
Dahlia Drive	6290	1.4
Highway 101	23092	-0.5
Sierra Avenue	4808	-0.6

ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
ATT Solana Beach in 2035

Receiver	Fl	X	Y	Z	Ldn	Leq,d	Leq,n
		m	m	m	dB(A)	dB(A)	dB(A)
R1	G	11474653.9	3649998.1	23.00	70.6	69.0	62.4
	F2			25.80	70.8	69.2	62.6
R2	G	11474661.2	3649959.6	23.00	71.6	70.0	63.4
	F2			25.80	71.8	70.3	63.6
R3	G	11474665.1	3649923.6	23.00	70.7	69.2	62.5
	F2			25.80	71.0	69.5	62.7
R4	G	11474623.0	3649911.8	23.00	62.9	62.0	54.2
	F2			25.80	64.1	63.0	55.5
R5	G	11474570.0	3649901.0	22.40	63.2	62.6	54.1
	F2			25.20	63.5	62.8	54.5
R6	G	11474561.2	3649938.6	22.43	62.5	61.9	53.3
	F2			25.23	62.2	61.6	53.0
R7	G	11474554.3	3649977.1	23.00	61.7	61.1	52.6
	F2			25.80	61.6	60.9	52.6
R8	G	11474554.2	3650001.2	23.00	58.0	57.3	48.9
	F2			25.80	58.9	58.0	49.9
R9	G	11474534.8	3650001.0	23.02	58.6	57.9	49.5
	F2			25.82	58.9	58.2	49.8
R10	G	11474540.2	3649970.5	23.00	59.6	58.9	50.5
	F2			25.80	59.9	59.2	50.9
R11	G	11474546.2	3649934.2	23.00	59.2	58.5	50.0
	F2			25.80	59.5	58.8	50.3
R12	G	11474558.9	3649879.3	23.00	61.2	60.4	52.1
	F2			25.80	61.7	61.0	52.8
R13	G	11474580.4	3649886.5	22.29	63.8	63.2	54.8
	F2			25.09	64.1	63.3	55.1
R14	G	11474617.7	3649896.0	22.21	65.5	64.7	56.5
	F2			25.01	65.3	64.4	56.5
R15	G	11474665.5	3649907.4	22.91	71.2	69.9	62.7
	F2			25.71	70.8	69.5	62.4



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

8

Zephyr Existing
Result number 16
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Ldn
in dB(A)

	< 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	60 - 63
	63 - 66
	66 - 69
	69 - 72
	72 - 75
	75 - 78
	78 - 81
	81 - 84
	>= 84

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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ABC Acoustics, Inc.
Project No: R2484

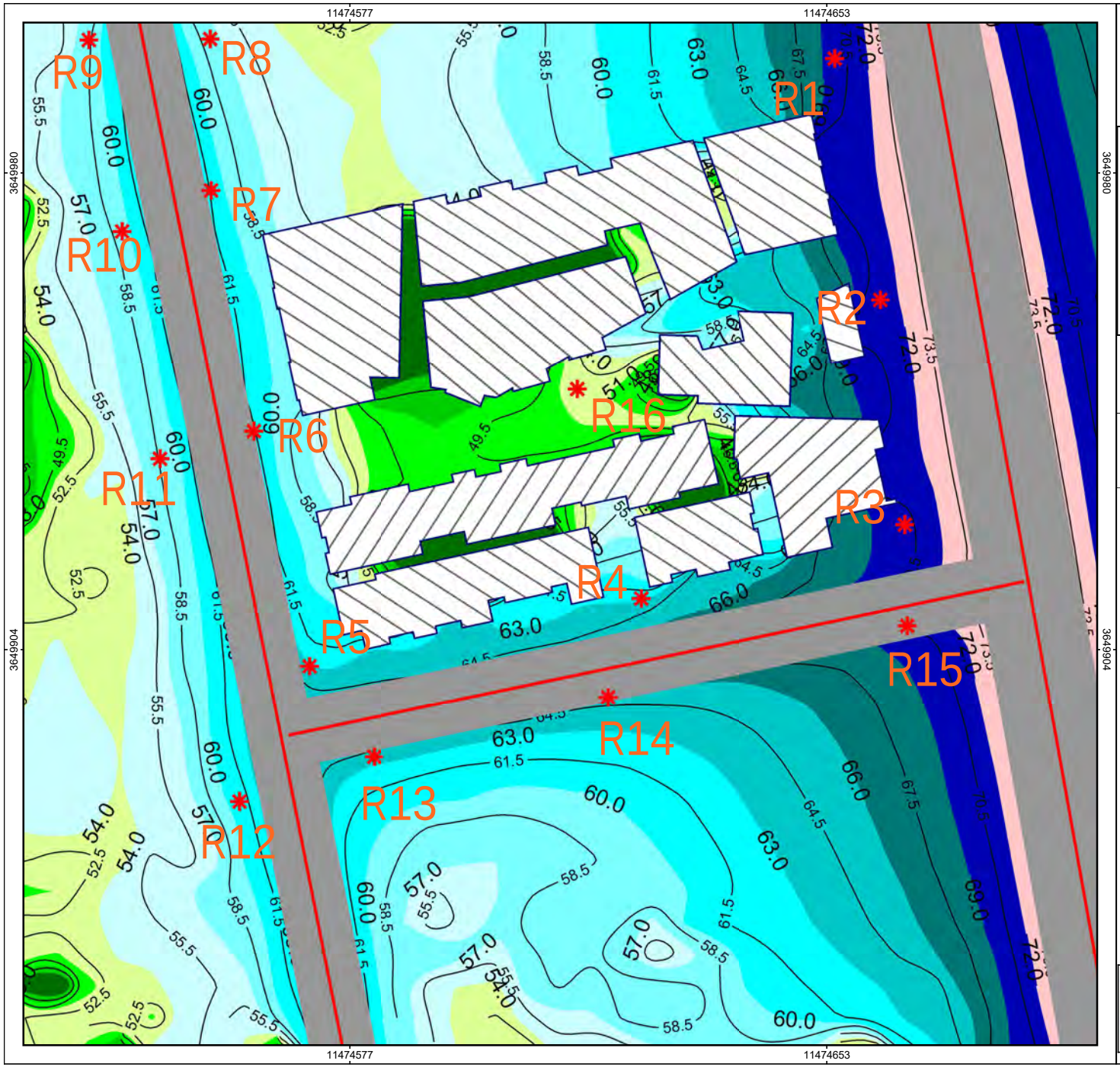
101 COAST MIXED USE
Source level road
Zephyr Existing

Road	ADT Veh/24h	Gradient %
Dahlia Drive	5786	1.4
Highway 101	19157	-0.5
Sierra Avenue	4074	-0.6

ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
Zephyr Existing

Receiver	Fl	Y	X	Z	Ldn	Leq,d	Leq,n
		m	m	m	dB(A)	dB(A)	dB(A)
R1	G	3649998.1	11474653.9	23.00	69.7	68.1	61.5
	F2			25.80	69.9	68.3	61.7
R2	G	3649959.6	11474661.2	23.00	71.3	69.7	63.1
	F2			25.80	71.5	69.9	63.3
R3	G	3649923.6	11474665.1	23.00	69.9	68.4	61.7
	F2			25.80	70.2	68.6	61.9
R4	G	3649911.8	11474623.0	23.00	62.9	61.9	54.2
	F2			25.80	63.7	62.7	55.1
R5	G	3649901.0	11474570.0	22.40	62.6	62.0	53.5
	F2			25.20	63.0	62.3	54.0
R6	G	3649938.6	11474561.2	22.43	61.6	61.0	52.5
	F2			25.23	61.1	60.5	52.0
R7	G	3649977.1	11474554.3	23.00	61.0	60.4	51.9
	F2			25.80	61.0	60.3	52.0
R8	G	3650001.2	11474554.2	23.00	57.2	56.6	48.2
	F2			25.80	58.1	57.3	49.2
R9	G	3650001.0	11474534.8	23.02	57.9	57.2	48.8
	F2			25.82	58.2	57.5	49.1
R10	G	3649970.5	11474540.2	23.00	58.9	58.2	49.8
	F2			25.80	59.3	58.6	50.3
R11	G	3649934.2	11474546.2	23.00	58.4	57.8	49.3
	F2			25.80	58.5	57.9	49.4
R12	G	3649879.3	11474558.9	23.00	60.5	59.8	51.5
	F2			25.80	61.2	60.4	52.2
R13	G	3649886.5	11474580.4	22.29	63.5	62.8	54.4
	F2			25.09	63.5	62.8	54.5
R14	G	3649896.0	11474617.7	22.21	65.2	64.4	56.2
	F2			25.01	65.0	64.1	56.2
R15	G	3649907.4	11474665.5	22.91	70.5	69.3	62.1
	F2			25.71	70.2	68.9	61.8
R16	G	3649945.3	11474612.8	23.00	49.8	48.2	41.5
	F2			25.80	52.6	51.1	44.4



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

9

Zephyr Near Future
Result number 14
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Ldn
in dB(A)

	< 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	60 - 63
	63 - 66
	66 - 69
	69 - 72
	72 - 75
	75 - 78
	78 - 81
	81 - 84
	>= 84

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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ABC Acoustics, Inc.
Project No: R2484

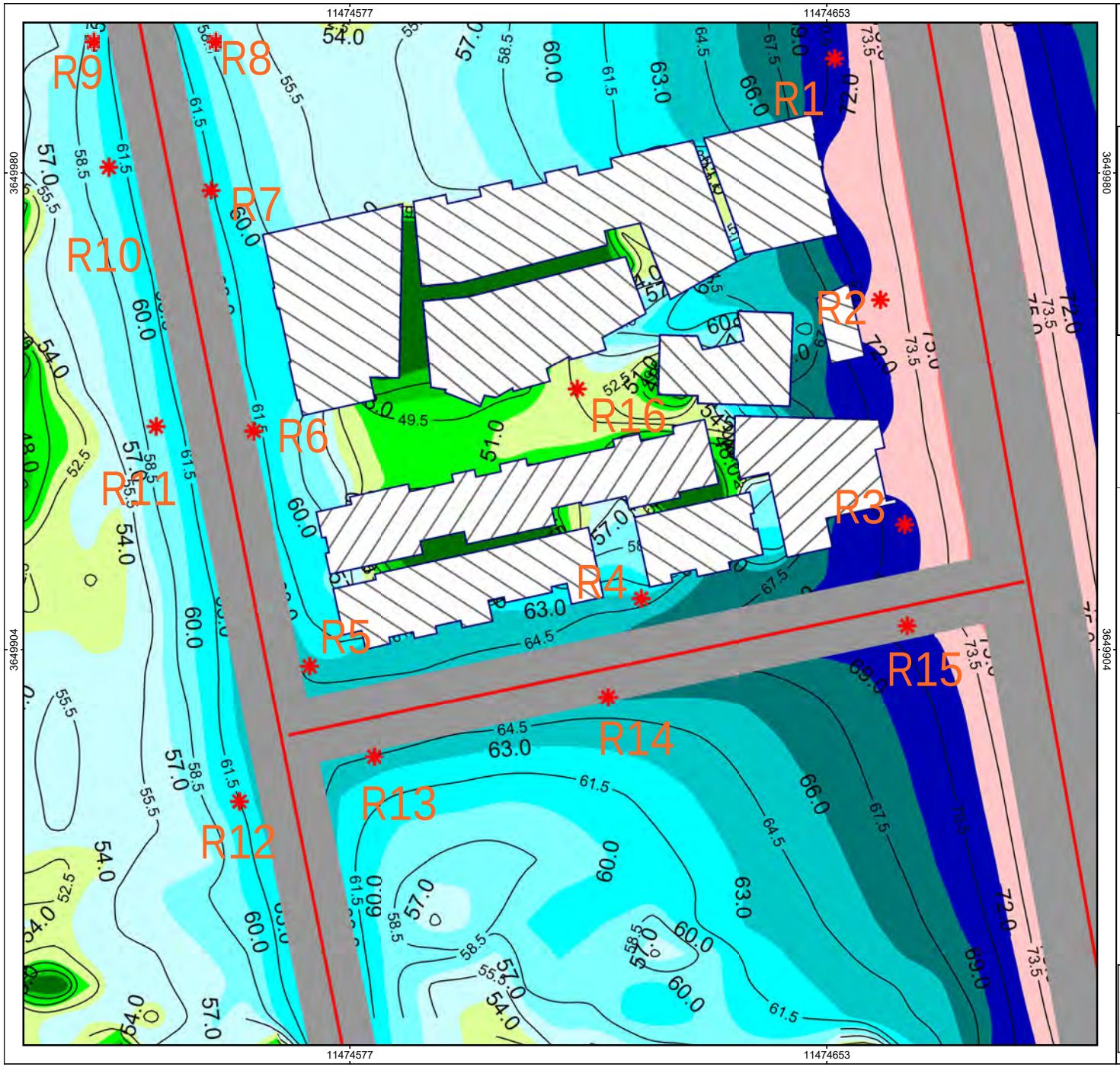
101 COAST MIXED USE
Source level road
Zephyr Near Future

Road	ADT Veh/24h	Gradient %
Dahlia Drive	5786	1.4
Highway 101	19157	-0.5
Sierra Avenue	4177	-0.6

ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
Zephyr Near Future

Receiver	Fl	X	Y	Z	Ldn	Leq,d	Leq,n
		m	m	m	dB(A)	dB(A)	dB(A)
R1	G	11474653.9	3649998.1	23.00	69.7	68.1	61.5
	F2			25.80	69.9	68.3	61.7
R2	G	11474661.2	3649959.6	23.00	71.3	69.7	63.1
	F2			25.80	71.5	69.9	63.3
R3	G	11474665.1	3649923.6	23.00	69.9	68.4	61.7
	F2			25.80	70.2	68.6	61.9
R4	G	11474623.0	3649911.8	23.00	62.9	61.9	54.2
	F2			25.80	63.7	62.7	55.1
R5	G	11474570.0	3649901.0	22.40	62.7	62.0	53.6
	F2			25.20	63.1	62.4	54.1
R6	G	11474561.2	3649938.6	22.43	61.7	61.1	52.6
	F2			25.23	61.2	60.6	52.1
R7	G	11474554.3	3649977.1	23.00	61.1	60.5	52.0
	F2			25.80	61.1	60.4	52.1
R8	G	11474554.2	3650001.2	23.00	57.3	56.7	48.3
	F2			25.80	58.2	57.4	49.3
R9	G	11474534.8	3650001.0	23.02	58.0	57.3	48.9
	F2			25.82	58.3	57.6	49.2
R10	G	11474540.2	3649970.5	23.00	59.0	58.3	49.9
	F2			25.80	59.4	58.7	50.4
R11	G	11474546.2	3649934.2	23.00	58.5	57.9	49.4
	F2			25.80	58.6	58.0	49.5
R12	G	11474558.9	3649879.3	23.00	60.6	59.9	51.6
	F2			25.80	61.2	60.5	52.3
R13	G	11474580.4	3649886.5	22.29	63.5	62.8	54.4
	F2			25.09	63.5	62.8	54.6
R14	G	11474617.7	3649896.0	22.21	65.2	64.4	56.2
	F2			25.01	65.1	64.2	56.2
R15	G	11474665.5	3649907.4	22.91	70.5	69.3	62.1
	F2			25.71	70.2	68.9	61.8
R16	G	11474612.8	3649945.3	23.00	49.8	48.3	41.5
	F2			25.80	52.6	51.1	44.4



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

10

Zephyr in 2035
Result number 15
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created:
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Ldn
in dB(A)

	< 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	60 - 63
	63 - 66
	66 - 69
	69 - 72
	72 - 75
	75 - 78
	78 - 81
	81 - 84
	>= 84

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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ABC Acoustics, Inc.
Project No: R2484

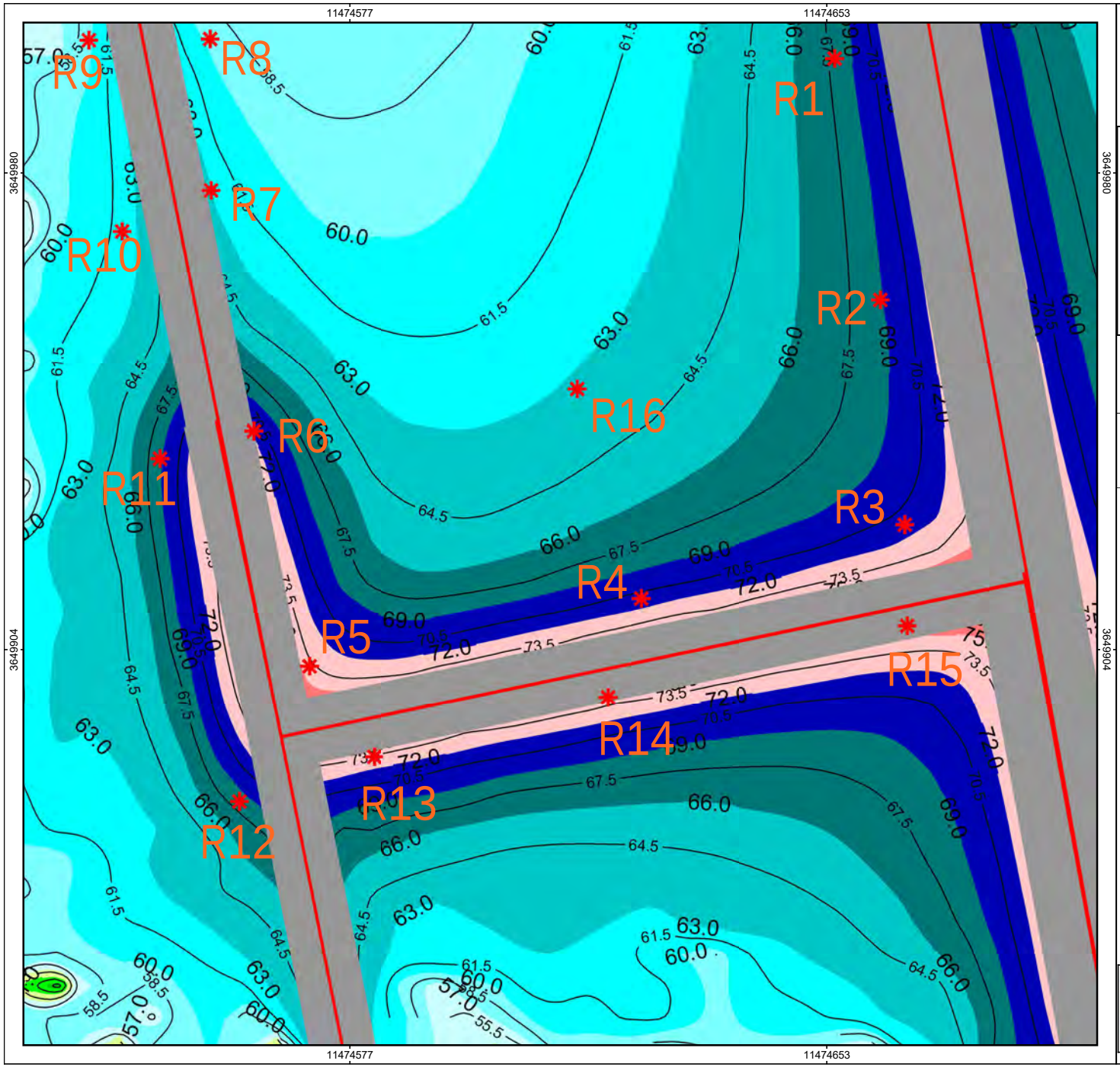
101 COAST MIXED USE
Source level road
Zephyr in 2035

Road	ADT Veh/24h	Gradient %
Dahlia Drive	6481	1.4
Highway 101	25830	-0.5
Sierra Avenue	4808	-0.6

ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
Zephyr in 2035

Receiver	Fl	X	Y	Z	Ldn	Leq,d	Leq,n
		m	m	m	dB(A)	dB(A)	dB(A)
R1	G	11474653.9	3649998.1	23.00	71.0	69.4	62.8
	F2			25.80	71.2	69.6	63.0
R2	G	11474661.2	3649959.6	23.00	72.6	70.9	64.4
	F2			25.80	72.8	71.2	64.6
R3	G	11474665.1	3649923.6	23.00	71.2	69.6	62.9
	F2			25.80	71.4	69.9	63.1
R4	G	11474623.0	3649911.8	23.00	63.7	62.7	55.0
	F2			25.80	64.6	63.5	56.0
R5	G	11474570.0	3649901.0	22.40	63.3	62.6	54.2
	F2			25.20	63.8	63.0	54.7
R6	G	11474561.2	3649938.6	22.43	62.3	61.8	53.2
	F2			25.23	61.8	61.2	52.7
R7	G	11474554.3	3649977.1	23.00	61.8	61.1	52.6
	F2			25.80	61.8	61.1	52.8
R8	G	11474554.2	3650001.2	23.00	58.0	57.3	48.9
	F2			25.80	59.0	58.2	50.1
R9	G	11474534.8	3650001.0	23.02	58.6	58.0	49.5
	F2			25.82	59.0	58.3	50.0
R10	G	11474540.2	3649970.5	23.00	59.6	59.0	50.6
	F2			25.80	60.1	59.4	51.1
R11	G	11474546.2	3649934.2	23.00	59.1	58.5	50.0
	F2			25.80	59.3	58.7	50.1
R12	G	11474558.9	3649879.3	23.00	61.3	60.6	52.3
	F2			25.80	62.0	61.2	53.0
R13	G	11474580.4	3649886.5	22.29	64.1	63.4	55.0
	F2			25.09	64.2	63.4	55.3
R14	G	11474617.7	3649896.0	22.21	65.8	65.0	56.9
	F2			25.01	65.8	64.9	57.1
R15	G	11474665.5	3649907.4	22.91	71.6	70.3	63.2
	F2			25.71	71.3	70.0	62.9
R16	G	11474612.8	3649945.3	23.00	51.0	49.5	42.7
	F2			25.80	53.9	52.3	45.7



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

11

Costruction Traffic
Result number 29
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Leq,d
in dB(A)

	< 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	60 - 63
	63 - 66
	66 - 69
	69 - 72
	72 - 75
	75 - 78
	78 - 81
	81 - 84
	>= 84

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

C:\Users\salar\Desktop\101 Coast Mixed-Use 1-last\Sheet2.sgs

ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Source level road
Costruction Traffic Rec

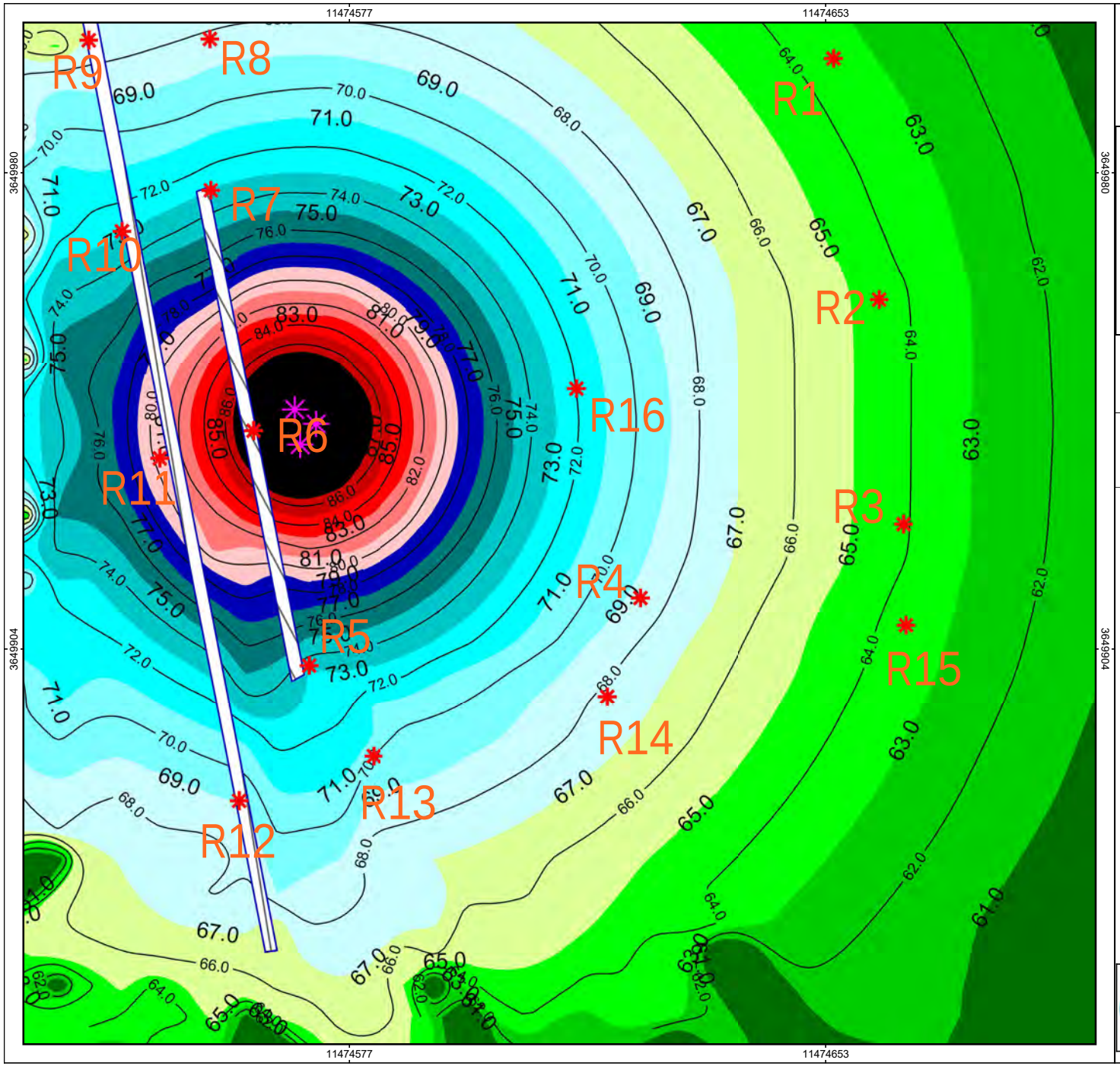
Road	ADT Veh/24h	Gradient %	
Dahlia Drive	2405	1.4	
Highway 101	18127	-0.5	
Sierra Avenue	3966	-0.6	
Dahlia Drive	136	1.4	
Highway 101	136	-1.1	Construction daily traffic
Sierra Avenue	136	-2.4	

ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
Costruction Traffic Rec

Table: A-

Receiver	Fl	X m	Y m	Z m	Leq,d dB(A)	
R1	G	11474653.9	3649998.1	23.00	67.8	
R2	G	11474661.2	3649959.6	23.00	68.7	
R3	G	11474665.1	3649923.6	23.00	71.1	
R4	G	11474623.0	3649911.8	23.00	70.5	
R5	G	11474570.0	3649901.0	22.40	73.6	
R6	G	11474561.2	3649938.6	22.43	72.0	
R7	G	11474554.3	3649977.1	23.00	62.9	
R8	G	11474554.2	3650001.2	23.00	59.2	
R9	G	11474534.8	3650001.0	23.02	58.9	
R10	G	11474540.2	3649970.5	23.00	61.8	
R11	G	11474546.2	3649934.2	23.00	68.1	
R12	G	11474558.9	3649879.3	23.00	67.9	
R13	G	11474580.4	3649886.5	22.29	73.4	
R14	G	11474618.1	3649895.1	22.34	74.0	
R15	G	11474666.5	3649905.2	22.96	74.6	
R16	G	11474612.8	3649945.3	23.00	62.4	



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

12

Costruction operation without barrier
Result number 33
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Leq,d
in dB(A)

	< 61
	61 - 63
	63 - 65
	65 - 67
	67 - 69
	69 - 71
	71 - 73
	73 - 75
	75 - 77
	77 - 79
	79 - 81
	81 - 83
	83 - 85
	85 - 87
	>= 87

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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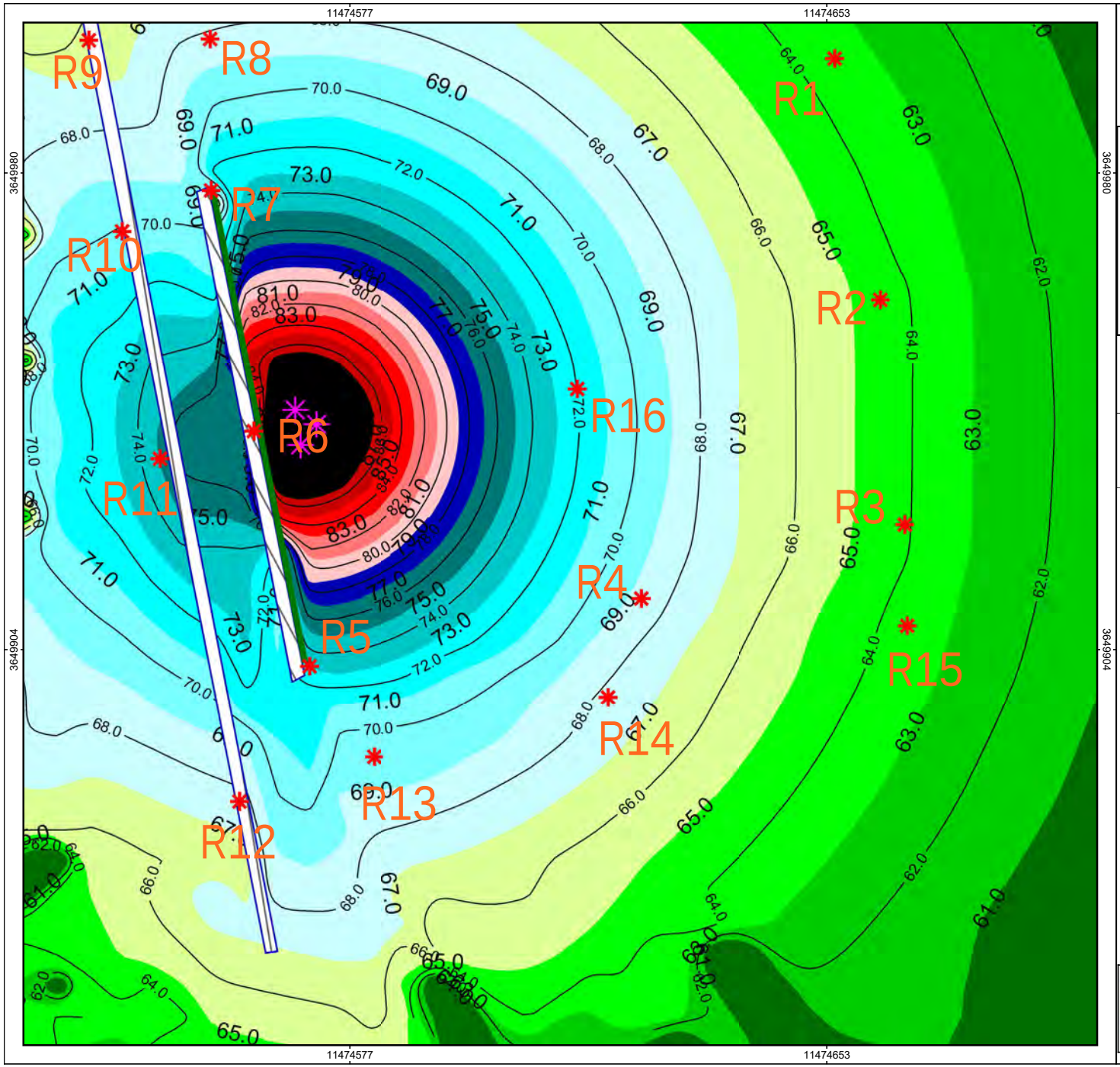
ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
Costruction operation without barrier

Receiver	Fl	X m	Y m	Z m	Leq,d dB(A)	
R1	G	11474653.9	3649998.1	23.00	63.4	
R2	G	11474661.2	3649959.6	23.00	64.2	
R3	G	11474665.1	3649923.6	23.00	63.9	
R4	G	11474623.0	3649911.8	23.00	68.5	
R5	G	11474570.0	3649901.0	22.40	74.0	
R6	G	11474561.2	3649938.6	22.43	89.7	
R7	G	11474554.3	3649977.1	23.00	72.7	
R8	G	11474554.2	3650001.2	23.00	68.1	
R9	G	11474534.8	3650001.0	23.02	67.2	
R10	G	11474540.2	3649970.5	23.00	72.6	
R11	G	11474546.2	3649934.2	23.00	80.2	
R12	G	11474558.9	3649879.3	23.00	68.9	
R13	G	11474580.4	3649886.5	22.29	70.7	
R14	G	11474618.1	3649895.1	22.34	67.5	
R15	G	11474666.5	3649905.2	22.96	63.4	
R16	G	11474612.8	3649945.3	23.00	71.7	



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

13

Costruction operation with barrier
Result number 34
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Leq,d
in dB(A)

	< 61
	61 - 63
	63 - 65
	65 - 67
	67 - 69
	69 - 71
	71 - 73
	73 - 75
	75 - 77
	77 - 79
	79 - 81
	81 - 83
	83 - 85
	85 - 87
	>= 87

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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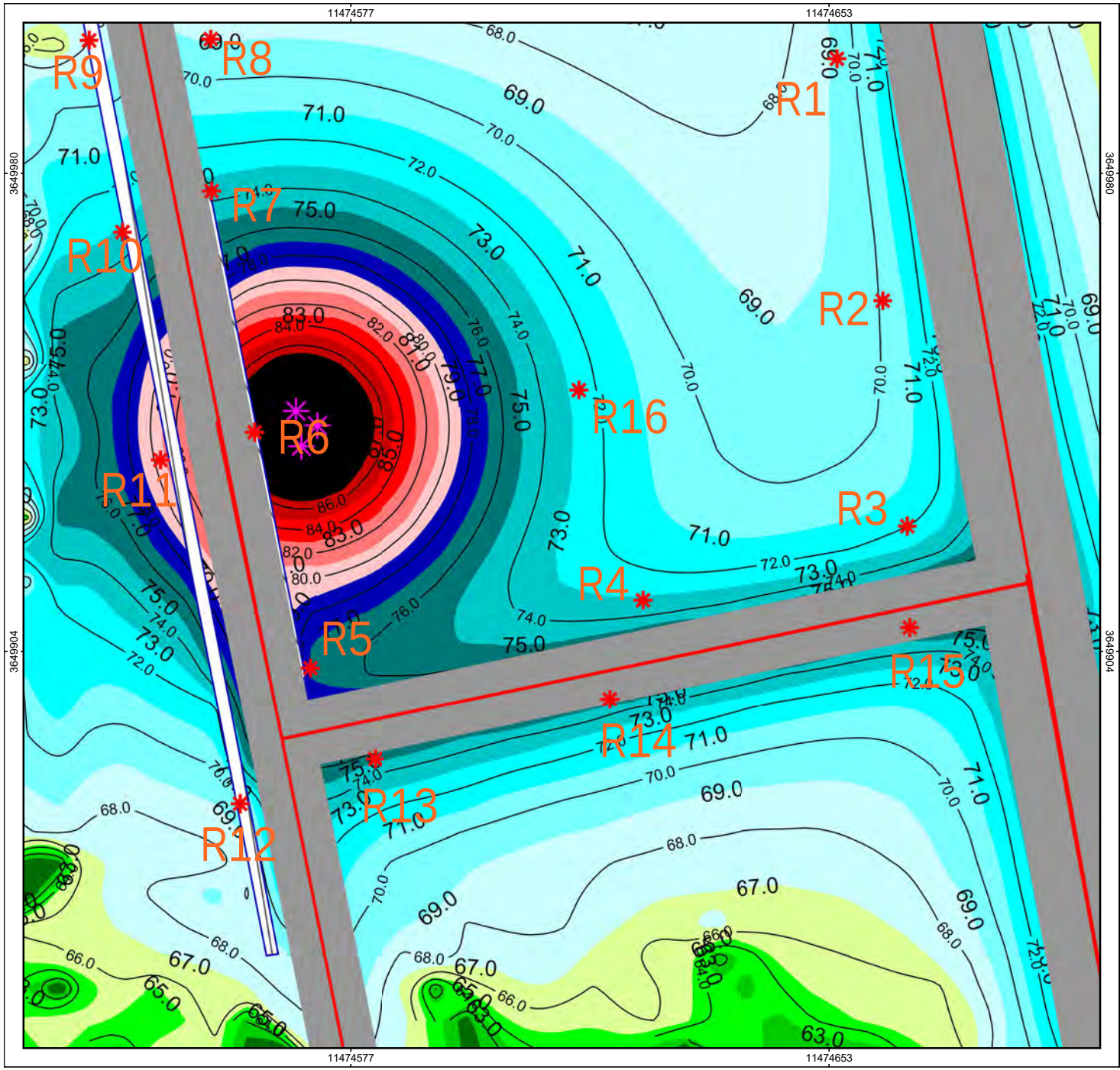
ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
Costruction operation with barrier

Receiver	Fl	X m	Y m	Z m	Leq,d dB(A)	
R1	G	11474653.9	3649998.1	23.00	63.4	
R2	G	11474661.2	3649959.6	23.00	64.2	
R3	G	11474665.1	3649923.6	23.00	63.9	
R4	G	11474623.0	3649911.8	23.00	68.5	
R5	G	11474570.0	3649901.0	22.40	72.9	
R6	G	11474561.2	3649938.6	22.43	75.4	
R7	G	11474554.3	3649977.1	23.00	64.0	
R8	G	11474554.2	3650001.2	23.00	68.1	
R9	G	11474534.8	3650001.0	23.02	65.9	
R10	G	11474540.2	3649970.5	23.00	69.8	
R11	G	11474546.2	3649934.2	23.00	74.5	
R12	G	11474558.9	3649879.3	23.00	67.5	
R13	G	11474580.4	3649886.5	22.29	69.4	
R14	G	11474618.1	3649895.1	22.34	67.5	
R15	G	11474666.5	3649905.2	22.96	63.4	
R16	G	11474612.8	3649945.3	23.00	71.7	



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

14

Construction operation with traffic and no barrier
Result number 31
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Leq,d
in dB(A)

	< 61
	61 - 63
	63 - 65
	65 - 67
	67 - 69
	69 - 71
	71 - 73
	73 - 75
	75 - 77
	77 - 79
	79 - 81
	81 - 83
	83 - 85
	85 - 87
	>= 87

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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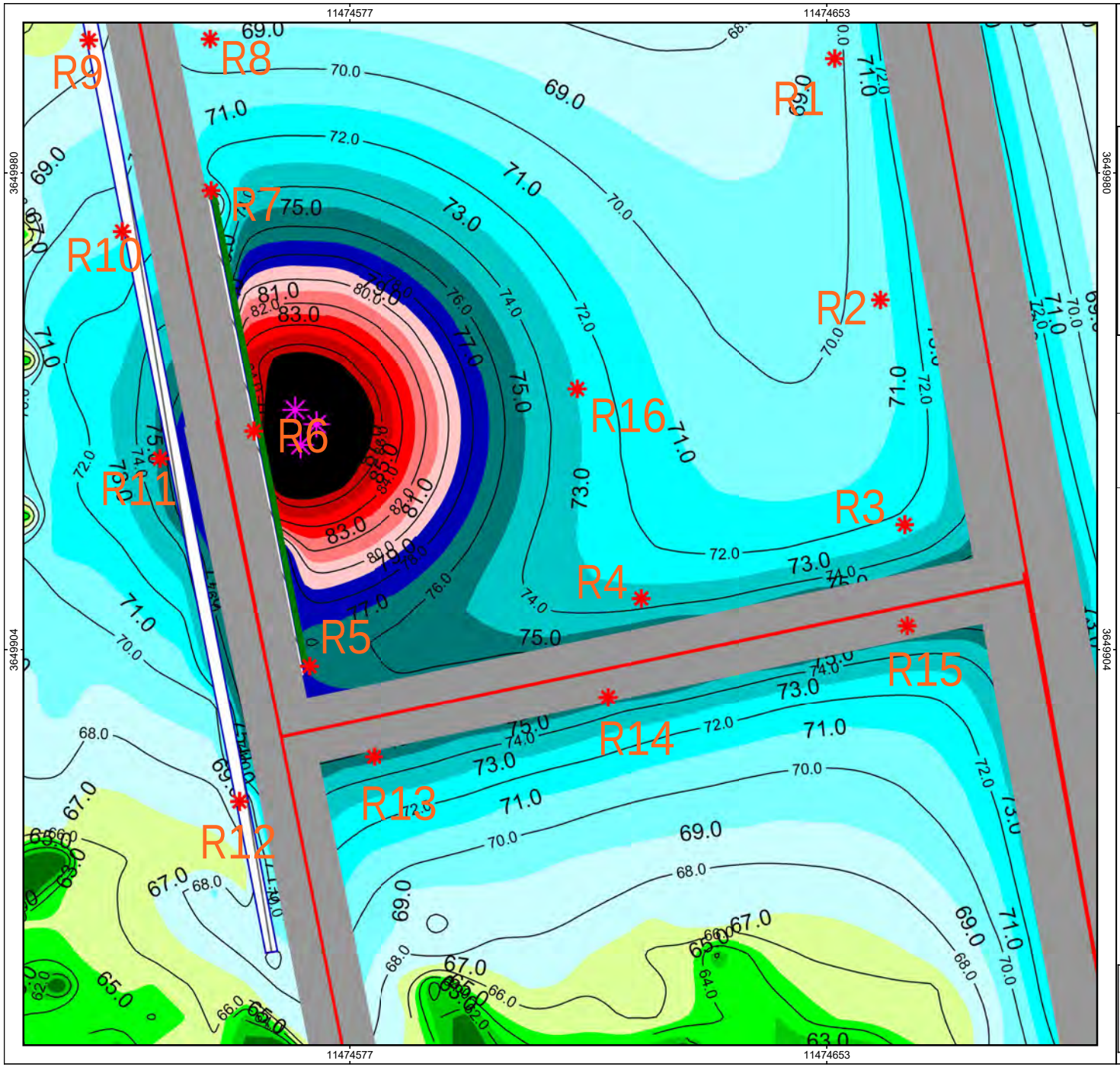
ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
Construction operation with traffic and no barrier

Receiver	Fl	X m	Y m	Z m	Leq,d dB(A)	
R1	G	11474653.9	3649998.1	23.00	69.2	
R2	G	11474661.2	3649959.6	23.00	70.1	
R3	G	11474665.1	3649923.6	23.00	71.9	
R4	G	11474623.0	3649911.8	23.00	72.7	
R5	G	11474570.0	3649901.0	22.40	77.1	
R6	G	11474561.2	3649938.6	22.43	89.8	
R7	G	11474554.3	3649977.1	23.00	73.3	
R8	G	11474554.2	3650001.2	23.00	68.8	
R9	G	11474534.8	3650001.0	23.02	67.8	
R10	G	11474540.2	3649970.5	23.00	72.7	
R11	G	11474546.2	3649934.2	23.00	80.2	
R12	G	11474558.9	3649879.3	23.00	69.4	
R13	G	11474580.4	3649886.5	22.29	75.5	
R14	G	11474618.1	3649895.1	22.34	74.9	
R15	G	11474666.5	3649905.2	22.96	74.9	
R16	G	11474612.8	3649945.3	23.00	72.3	



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484

Map

15

Construction operation with traffic and barrier
Result number 32
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/12/2018
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Leq,d
in dB(A)

	< 61
	61 - 63
	63 - 65
	65 - 67
	67 - 69
	69 - 71
	71 - 73
	73 - 75
	75 - 77
	77 - 79
	79 - 81
	81 - 83
	83 - 85
	85 - 87
	>= 87

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:612
0 5 10 20 30 40 m

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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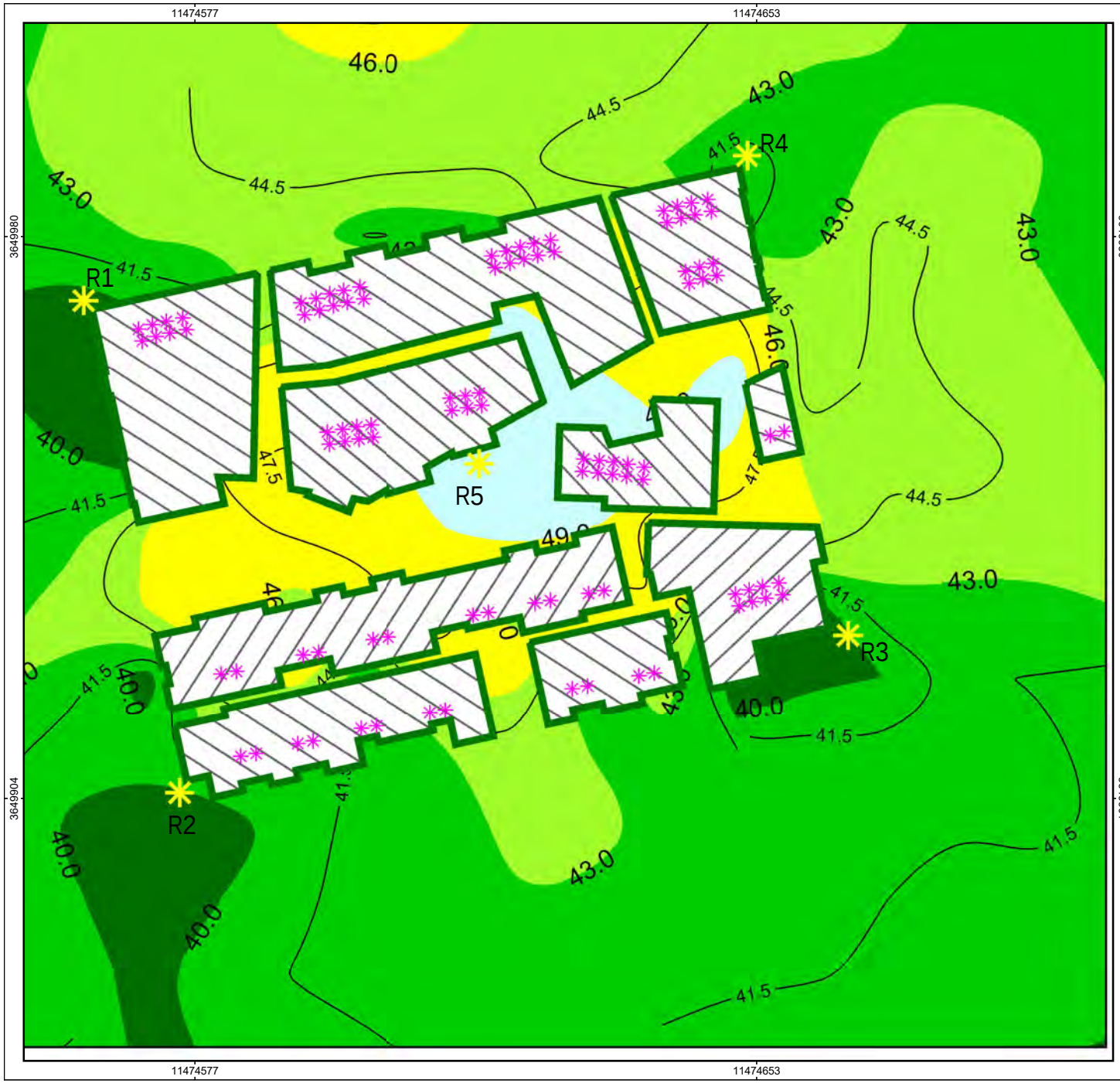
ABC Acoustics, Inc.
Project No: R2484

101 COAST MIXED USE
Assessed receiver levels
Construction operation with traffic and barrier

Receiver	Fl	X m	Y m	Z m	Leq,d dB(A)	
R1	G	11474653.9	3649998.1	23.00	69.2	
R2	G	11474661.2	3649959.6	23.00	70.1	
R3	G	11474665.1	3649923.6	23.00	71.9	
R4	G	11474623.0	3649911.8	23.00	72.7	
R5	G	11474570.0	3649901.0	22.40	76.3	
R6	G	11474561.2	3649938.6	22.43	77.0	
R7	G	11474554.3	3649977.1	23.00	66.7	
R8	G	11474554.2	3650001.2	23.00	68.6	
R9	G	11474534.8	3650001.0	23.02	66.7	
R10	G	11474540.2	3649970.5	23.00	70.0	
R11	G	11474546.2	3649934.2	23.00	74.5	
R12	G	11474558.9	3649879.3	23.00	68.3	
R13	G	11474580.4	3649886.5	22.29	75.1	
R14	G	11474618.1	3649895.1	22.34	74.9	
R15	G	11474666.5	3649905.2	22.96	74.9	
R16	G	11474612.8	3649945.3	23.00	72.2	



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484R4

Map

16

Mechanical Noise
Result number 4
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/28/2017
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Leq,d
in dB(A)

	< 40
	40 - 43
	43 - 46
	46 - 49
	49 - 52
	52 - 55
	55 - 58
	58 - 61
	61 - 64
	64 - 67
	67 - 70
	70 - 73
	73 - 76
	76 - 79
	>= 79

Signs and symbols
- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:527
0 5 10 20 30

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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ABC Acoustics, Inc.
Project No: 2484R4

101 COAST MIXED USE
Assessed receiver levels
Mechanical Noise

*Name	*Floor	*X m	*Y m	Ldn dB(A)	Leq,d dB(A)	Leq,e dB(A)	Leq,n dB(A)
R1	G	11474561.5	3649971.2	45.5	38.8	38.8	38.8
	F2			47.9	41.3	41.3	41.3
R2	G	11474574.5	3649904.4	43.4	36.7	36.7	36.7
	F2			45.9	39.2	39.2	39.2
R3	G	11474665.1	3649925.7	44.5	37.9	37.9	37.9
	F2			47.0	40.4	40.4	40.4
R4	G	11474651.4	3649990.8	47.0	40.4	40.4	40.4
	F2			49.4	42.7	42.7	42.7
R5	G	11474615.0	3649949.0	57.3	50.6	50.6	50.6
	F2			59.2	52.6	52.6	52.6

Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484R4

Map

17

50 Per Mechanical
Result number 6
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 4/28/2017
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Leq,n
in dB(A)

	< 40
	40 - 43
	43 - 46
	46 - 49
	49 - 52
	52 - 55
	55 - 58
	58 - 61
	61 - 64
	64 - 67
	67 - 70
	70 - 73
	73 - 76
	76 - 79
	>= 79

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:527
0 5 10 20 30

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

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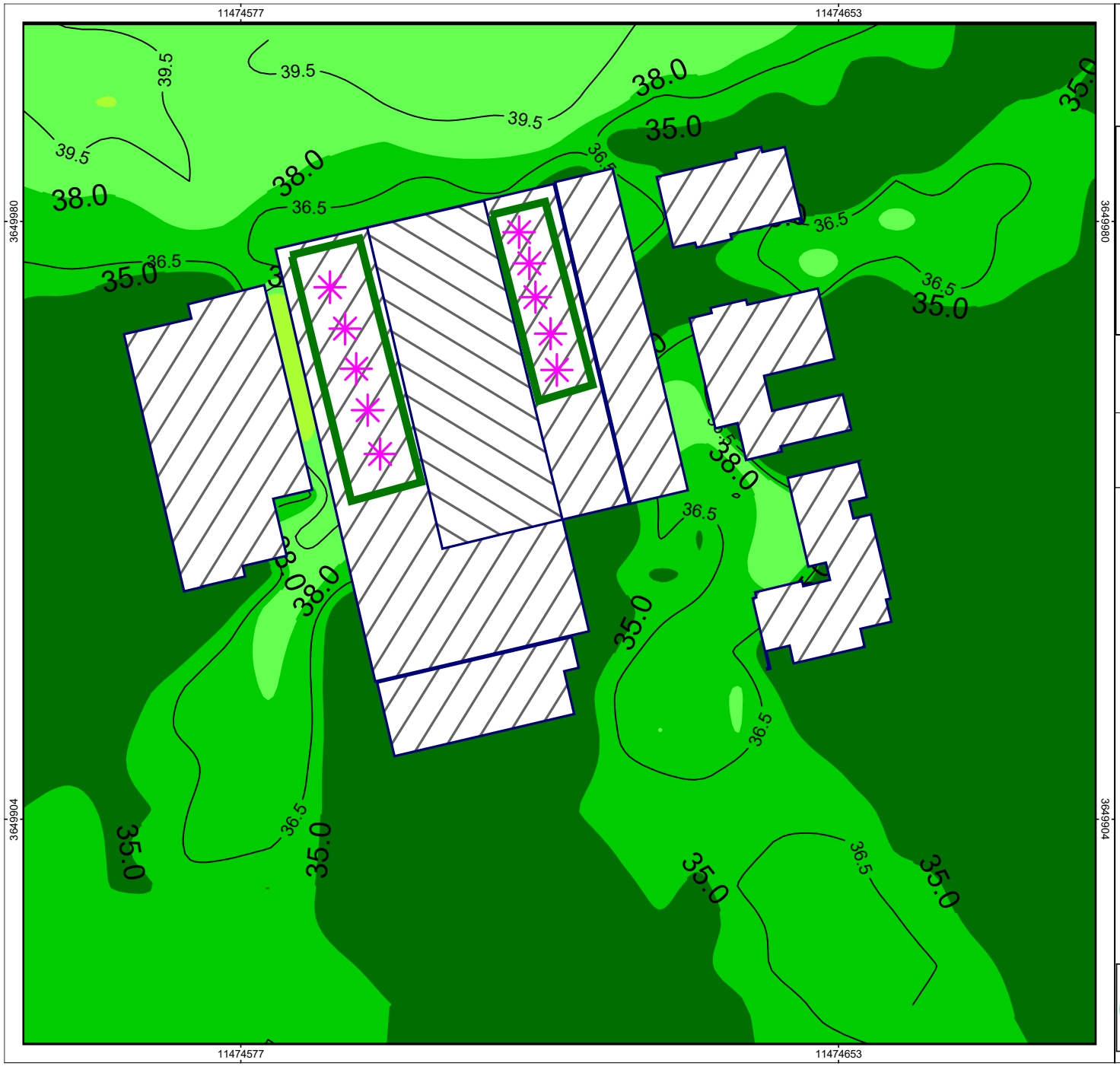
ABC Acoustics, Inc.
Project No: 2484R4

101 COAST MIXED USE
Assessed receiver levels
50 Per Mechanical

Receiver	Fl	X m	Y m	Ldn dB(A)	Leq,d dB(A)	Leq,e dB(A)
R1	G F2	11474561.5	3649971.2	42.0 44.5	35.3 37.9	35.3 37.9
R2	G F2	11474574.5	3649904.4	41.6 44.1	34.9 37.4	34.9 37.4
R3	G F2	11474665.1	3649925.7	41.8 44.2	35.1 37.6	35.1 37.6
R4	G F2	11474651.4	3649990.8	45.0 47.4	38.3 40.7	38.3 40.7
R5	G F2	11474615.0	3649949.0	53.9 55.7	47.2 49.0	47.2 49.0



Client: Zephyr Partners
Project: 101 COAST MIXED USE
Project-No. 2484R4

Map

18

Project Mechanical
Result number 18
Calculation in 1.5 m above ground

Project engineer: Sal Atter
Created: 7/10/2017
Processed with SoundPLAN 7.3, Update 3/19/2015

Levels Leq,d
in dB(A)

	< 35
	35 - 38
	38 - 41
	41 - 44
	44 - 47
	47 - 50
	50 - 53
	53 - 56
	56 - 59
	59 - 62
	62 - 65
	65 - 68
	68 - 71
	71 - 74
	>= 74

Signs and symbols

- Road axis
- Emission line
- Wall
- inside tunnels
- Signal
- Railway axis
- Surface
- Wall
- inside tunnels
- Main building
- Auxiliary building
- School
- Wall
- Sloped wall areas
- Point receiver
- Noise calculation area

N

Length scale 1:488
0 4.5 9 18 27 36

ABC Acoustics, Inc.
NOISE CONTROL EXPERTS

F:\sp\101 Coast Mixed-Use\101Coast.sgs

ABC Acoustics, Inc.
Project No: 2484R4

101 COAST MIXED USE
Assessed receiver levels
AAT Mechanical Rec

*Name	*Floor	*X m	*Y m	*Z m	Ldn dB(A)	Leq,d dB(A)	Leq,n dB(A)	
R1	G	11474561.5	3649971.2	24.50	42.7	36.3	36.3	
	F2			27.00	46.3	39.9	39.9	
R2	G	11474574.5	3649904.4	24.50	43.8	37.4	37.4	
	F2			27.00	46.2	39.8	39.8	
R3	G	11474665.1	3649925.7	24.50	32.3	25.9	25.9	
	F2			27.00	36.6	30.2	30.2	
R4	G	11474651.4	3649990.8	24.50	32.3	25.9	25.9	
	F2			27.00	36.4	30.0	30.0	

25HCE4
Comfort™ 14 Heat Pump with Puron® Refrigerant 1–1/2 to 5 Nominal Tons

Carrier
turn to the experts

Product Data

Puron

Comfort SERIES

Carrier heat pumps with Puron® refrigerant provide a collection of features unmatched by any other family of equipment. The 25HCE4 has been designed utilizing Carrier's Puron refrigerant. The environmentally sound refrigerant allows consumers to make a responsible decision in the protection of the earth's ozone layer.

NOTE: Ratings contained in this document are subject to change at any time. Always refer to the AHRI directory (www.ahridirectory.org) for the most up-to-date ratings information.

INDUSTRY LEADING FEATURES / BENEFITS

Efficiency

- 14 SEER / 11.5 - 11.7 EER / 8.2 HSPF
- Microtube Technology™ refrigeration system
- Indoor air quality accessories available

Sound

- Sound level as low as 69 dBA
- Sound levels as low as 68 dBA with accessory sound blanket

Comfort

- System supports CôR™, Edge® or standard thermostat controls

Reliability

- Puron® refrigerant - environmentally sound, won't deplete the ozone layer and low lifetime service cost.
- Scroll compressor
- Internal pressure relief valve
- Internal thermal overload
- High pressure switch
- Loss of charge switch
- Filter drier
- Balanced refrigeration system for maximum reliability

Durability

WeatherArmor™ protection package:

- Solid, durable sheet metal construction
- Dense wire coil guard
- Baked-on powder paint

Applications

- Long-line - up to 250 feet (76.20 m) total equivalent length, up to 200 feet (60.96 m) condenser above evaporator, or up to 80 ft. (24.38 m) evaporator above condenser (See Longline Guide for more information.)
- Low ambient (down to -20°F/-28.9°C) with accessory kit

MODEL NUMBER NOMENCLATURE

1	2	3	4	5	6	7	8	9	10	11	12	13
N	N	A	A	A/N	N	N	N	A/N	A/N	A/N	N	N
2	5	H	C	E	4	3	6	A	0	0	3	0
Product Series		Product Family	Tier	Major Series	SEER	Cooling Capacity		Grille Variations	Open	Open	Voltage	Minor Series
25 = HP		H = RES HP	C=Comfort	E = Puron	4=14 SEER			A=Dense Grille	0=Not Defined	0=Not Defined	3=208/230–1	0, 1, 2...

Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program For verification of certification for individual products, go to www.ahridirectory.org.

STANDARD FEATURES

Feature	18	24	30	36	42	48	60
Puron Refrigerant	X	X	X	X	X	X	X
Scroll Compressor	X	X	X	X	X	X	X
Field Installed Filter Drier	X	X	X	X	X	X	X
Front Seating Service Valves	X	X	X	X	X	X	X
Internal Pressure Relief Valve	X	X	X	X	X	X	X
Internal Thermal Overload	X	X	X	X	X	X	X
Long Line capability	X	X	X	X	X	X	X
Low Ambient capability with Kit	X	X	X	X	X	X	X
Suction Line Accumulator	X	X	X	X	X	X	X
High Pressure Switch	X	X	X	X	X	X	X
Loss of Charge Switch	X	X	X	X	X	X	X

X = Standard

PHYSICAL DATA

UNIT SIZE SERIES	18–30	24–30	30–30	36–31	42–30	48–30	60–30
Compressor Type	Scroll						
REFRIGERANT	Puron® (R–410A)						
Control	TXV (Puron Hard Shutoff)						
Outdoor Heating Piston #	42	46	49	57	61	65	73
Charge lb (kg)	5.3 (2.4)	5.6 (2.5)	6.4 (2.9)	7.67 (3.48)	8.25 (3.74)	8.68 (3.94)	10.6 (4.81)
COND FAN	Forwrard Swept or Propeller Type, Direct Drive						
Air Discharge	Vertical						
Motor HP	1/12	1/10	1/4	1/5	1/4	1/4	1/4
Motor RPM	1100	1100	1100	1100	1100	1100	800
VALVE CONNECT. (In. ID)							
Vapor	5/8	5/8	3/4	3/4	7/8	7/8	7/8
Liquid	3/8						
REFRIGERANT TUBES* (In. OD)							
Rated Vapor	5/8	5/8	3/4	3/4	7/8	7/8	1–1/8
Max Liquid Line	3/8						

*Units are rated with 25 ft (7.6 m) of lineset length. See *Vapor Line Sizing and Cooling Capacity Loss* table when using other sizes and lengths of lineset.

Note: See unit Installation Instruction for proper installation.

VAPOR LINE SIZING AND COOLING CAPACITY LOSS

Acceptable vapor line diameters provide adequate oil return to the compressor while avoiding excessive capacity loss. The suction line diameters shown in the chart below are acceptable for HP systems with Puron refrigerant:

Vapor Line Sizing and Cooling Capacity Losses - Puron® Refrigerant 1- Stage Heat Pump Applications

Unit Nominal Size (Btuh)	Acceptable Vapor Line Diameters (In. OD)	Cooling Capacity Loss (%) Total Equivalent Line Length (ft)										
		Standard Application				Long Line Application Requries Accessories						
		25 (7.62)	50 (15.2)	80 (24.4)	80+ (24.4+)	100 (30.48)	125 (38.10)	150 (45.72)	175 (53.34)	200 (60.96)	225 (68.58)	250 (76.20)
18000 1–Stage HP	1/2	1	2	3	3	4	6	7	8	9	10	12
	5/8	0	0	1	1	1	1	2	2	3	3	3
24000 1–Stage HP	5/8	0	1	1	1	2	3	3	4	4	5	6
	3/4	0	0	0	0	0	1	1	1	1	1	2
30000 1–Stage HP	5/8	1	2	3	3	3	4	5	6	7	8	9
	3/4	0	0	1	1	1	1	2	2	2	3	3
	7/8	0	0	0	0	0	1	1	1	1	1	1
36000 1–Stage HP	5/8	1	2	4	4	5	6	7	9	10	11	13
	3/4	0	0	1	1	1	2	2	3	3	4	4
	7/8	0	0	0	0	0	1	1	1	1	2	2
42000 1–Stage HP	3/4	0	1	2	2	2	3	4	4	5	6	6
	7/8	0	0	1	1	1	1	2	2	2	3	3
48000 1–Stage HP	3/4	0	1	2	2	3	4	5	5	6	7	8
	7/8	0	0	1	1	1	2	2	2	3	3	4
60000 1–Stage Puron HP	3/4	1	2	4	4	5	6	7	9	10	11	12
	7/8	0	1	2	2	2	3	4	4	5	5	6
	1 1/8	0	0	0	0	1	1	1	1	1	1	2

Standard Length = 80 ft. (24.4 m) or less total equivalent length

Applications in this area are long line. Accessories are required as shown recommended on Long Line Application Guidelines

Applications in this area may have height restrictions that limit allowable total equivalent length, when outdoor unit is below indoor unit See Long Line Application Guidelines

REFRIGERANT PIPING LENGTH LIMITATIONS

Maximum Line Lengths:

The maximum allowable total equivalent length for heat pumps varies depending on the vertical separation. See the tables below for allowable lengths depending on whether the outdoor unit is on the same level, above or below the outdoor unit.

Maximum Line Lengths for Heat Pump Applications

	MAXIMUM ACTUAL LENGTH ft (m)	MAXIMUM EQUIVALENT LENGTH† ft (m)	MAXIMUM VERTICAL SEPARATION ft (m)
Units on equal level	200 (61)	250 (76.2)	N/A
Outdoor unit ABOVE indoor unit	200 (61)	250 (76.2)	200 (61)
Outdoor unit BELOW indoor unit	See Table *'Maximum Total Equivalent Length: Outdoor Unit BELOW Indoor Unit'*		

† Total equivalent length accounts for losses due to elbows or fitting. See the Long Line Guideline for details.

Maximum Total Equivalent Length† - Outdoor Unit BELOW Indoor Unit

Size	Liquid Line Diameter w/ TXV	HP with Puron® Refrigerant – Maximum Total Equivalent Length† Vertical Separation ft (m) Outdoor unit BELOW indoor unit;						
		0 – 20 (0 – 6.1)	21 – 30 (6.4 – 9.1)	31 – 40 (9.4 – 12.2)	41 – 50 (12.5 – 15.2)	51 – 60 (15.5 – 18.3)	61 – 70 (18.6 – 21.3)	71 – 80 (21.6 – 24.4)
18000 HP with Puron	3/8	250*	250*	250*	250*	250*	250*	250*
24000 HP with Puron	3/8	250*	250*	250*	250*	250*	250*	250*
30000 HP with Puron	3/8	250*	250*	250*	250*	250*	250*	250*
36000 HP with Puron	3/8	250*	250*	250*	250*	250*	250*	250*
42000 HP with Puron	3/8	250*	250*	250*	250*	250*	250*	150
48000 HP with Puron	3/8	250*	250*	250*	250*	230	160	– –
60000 HP with Puron	3/8	250*	225*	190	150	110	– –	– –

*** Maximum actual length not to exceed 200 ft (61 m)**

† Total equivalent length accounts for losses due to elbows or fitting. See the Long Line Guideline for details.

– – = outside acceptable range

LONG LINE APPLICATIONS

An application is considered Long Line when the refrigerant level in the system requires the use of accessories to maintain acceptable refrigerant management for systems reliability. Defining a system as long line depends on the liquid line diameter, actual length of the tubing, and vertical separation between the indoor and outdoor units.

For Heat Pump systems, the chart below shows when an application is considered Long Line. Beyond these lengths, long line accessories are required:

HP WITH PURON® REFRIGERANT LONG LINE DESCRIPTION ft (m)
Beyond these lengths, long line accessories are required

Liquid Line Size	Units On Same Level	Outdoor Below Indoor	Outdoor Above Indoor
3/8	80 (24.4)	20 (6.1) vertical or 80 (24.4) total	80 (24.4)

Note: See Long Line Guideline for details

ACCESSORIES

ORDER NUMBER	DESCRIPTION	18–30	24–30	30–30	36–30	42–30	48–30	60–30
HC32GE234	BALL BEARING FAN MOTOR	X						
HC34GE240	BALL BEARING FAN MOTOR		X					
HC38GE219	BALL BEARING FAN MOTOR				X			
HC40GE226	BALL BEARING FAN MOTOR			X		X	X	
HC40GE228	BALL BEARING FAN MOTOR							X
KAACH1601AAA	CRKC HTR KIT					X	X	
KAACH1701AAA	CRKC HTR KIT	X	X	X	X			
KAACS0201PTC	KIT PTC	X	X	X	X	X	X	X
KAAFT0101AAA	FRZ THERM KIT	X	X	X	X	X	X	X
KAATD0101TDR	TIME DELAY KIT	X	X	X	X	X	X	X
KHAIR0201AAA	ISLN RELAY KIT	X	X	X	X	X	X	X
KHALS0401LLS	SOL VALVE KIT	X	X	X	X	X	X	X
KHAOT0201SEC	OUTDR THERM KIT	X	X	X	X	X	X	X
KHAOT0301FST	OUTDR THERM KIT	X	X	X	X	X	X	X
KHASS0606MPK	SNOW STAND KIT	X	X	X	X	X	X	X
KSACY0101AAA	CYCLE PROTR KIT	X	X	X	X	X	X	X
KSAHS1701AAA	HARD START KIT	X	X	X	X	X	X	X
KSALA0301410	LOW AMBIENT KIT	X	X	X	X	X	X	X
KSALA0601AAA	MOTORMASTER KIT	X	X	X	X	X	X	X
KSASF0101AAA	SPRT FEET KIT			X	X	X	X	X
KSASF0201AAA	SPRT FEET KIT	X	X					
KSASH0601COP	SOUND BLKT KIT	X	X	X	X	X		
KSASH2101COP	SOUND BLKT KIT						X	X
KSATX0201PUR	TXV KIT (for copper coils)	X	X	X				
KSATX0301PUR	TXV KIT (for copper coils)				X	X		
KSATX0501PUR	TXV KIT (for copper coils)						X	X
KSBTX0201PUR	TXV KIT (for aluminum coils)	X	X	X				
KSBTX0301PUR	TXV KIT (for aluminum coils)				X	X		
KSBTX0401PUR	TXV KIT (for aluminum coils)						X	X

x = Accessory

ACCESSORY THERMOSTATS

Part Number	Description	Capabilities			Heat Stages	Cooling Stages
		Gas	Electric	Heat Pump		
TP–WEM01	CôR™, Wi–Fi Programmable Relative Humidity Thermostat	X	X	X	4	2
TP–PRH01–A	edge™ Programmable Relative Humidity Thermostat	X	X	X	3	2
TP–PHP01	edge™ Programmable Thermostat (HP or AC)		X	X	3	2
TP–NRH01	edge™ Non–Programmable Relative Humidity Thermostat	X	X	X	3	2
TP–NHP01	edge™ Non–Programmable Thermostat (HP or AC)		X	X	3	2
TC–WHS01	Wi–Fi® Programmable	X	X	X	3	2
TC–PHP01	Programmable Thermostat (HP or AC)		X	X	3	2
TC–NHP01	Non–Programmable Thermostat (HP or AC)		X	X	3	2
TB–PHP01	Programmable Thermostat (HP or AC)		X	X	2	1
TB–NHP01	Non–Programmable Thermostat (HP or AC)		X	X	2	1

Thermostat Accessories		
Part Number	**Description**	**Used With**
TP–EXP	EXP® Card for Programmable Thermostats	TP–Pxx
TSTATXXCNV10	Thermostat Conversion Kit (4 to 5 wire) 10 pack	All Carrier branded thermostats
TX–LBP01	Large Decorative Backplate	TP–Pxx, TP–Nxx, TC–Pxx
TX–MBP01	Medium Decorative Backplate	TC–Nxx, TB–Pxx
TX–SBP01	Small Decorative Backplate	TB–Nxx

ACCESSORY USAGE GUIDELINE

Accessory	REQUIRED FOR LOW–AMBIENT COOLING APPLICATIONS (Below 55°F / 12.8°C)	REQUIRED FOR LONG LINE APPLICATIONS*	REQUIRED FOR SEA COAST APPLICATIONS (Within 2 miles / 3.22 km)
Accumulator	Standard	Standard	Standard
Ball Bearing Fan Motor	Yes†	No	No
Compressor Start Assist Capacitor and Relay	Yes	Yes	No
Crankcase Heater	Yes	Yes	No
Evaporator Freeze Thermostat	Yes	No	No
Hard Shutoff TXV	Yes	Yes	No
Isolation Relay	Yes	No	No
Liquid Line Solenoid Valve	No	See Long–Line Application Guideline	No
Motor Master® Control or Low Ambient Switch	Yes	No	No
Support Feet	Recommended	No	Recommended

* For tubing line sets between 80 and 200 ft. (24.38 and 60.96 m) and/or 20 ft. (6.09 m) vertical differential, refer to Residential Split–System Longline Application Guideline.

† Additional requirement for Low–Ambient Controller (full modulation feature) MotorMaster® Control.

Accessory Description and Usage (Listed Alphabetically)

1. Ball-Bearing Fan Motor

A fan motor with ball bearings which permits speed reduction while maintaining bearing lubrication.

Usage Guideline:

Required on all units when using MotorMaster®

2. Compressor Start Assist - Capacitor and Relay

Start capacitor and relay gives a hard boost to compressor motor at each start up.

Usage Guideline:

Required for reciprocating compressors in the following applications:

Long line

Low ambient cooling

Hard shut off expansion valve on indoor coil

Liquid line solenoid on indoor coil

Required for single-phase scroll compressors in the following applications:

Long line

Low ambient cooling

Suggested for all compressors in areas with a history of low voltage problems.

3. Compressor Start Assist — PTC Type

Solid state electrical device which gives a soft boost to the compressor at each start-up.

Usage Guideline:

Suggested in installations with marginal power supply.

4. Crankcase Heater

An electric resistance heater which mounts to the base of the compressor to keep the lubricant warm during off cycles. Improves compressor lubrication on restart and minimizes the chance of liquid slugging.

Usage Guideline:

Required in low ambient cooling applications.

Required in long line applications.

Suggested in all commercial applications.

5. Evaporator Freeze Thermostat

An SPST temperature-actuated switch that stops unit operation when evaporator reaches freeze-up conditions.

Usage Guideline:

Required when low ambient kit has been added.

6. Isolation Relay

An SPDT relay which switches the low-ambient controller out of the outdoor fan motor circuit when the heat pump switches to heating mode.

Usage Guideline:

Required in all heat pumps where low ambient kit has been added.

7. Liquid-Line Solenoid Valve (LLS)

An electrically operated shutoff valve which stops and starts refrigerant liquid flow in response to compressor operation. It is to be installed at the outdoor unit to control refrigerant off cycle migration in the heating mode.

Usage Guideline:

An LLS is required in all long line heat pump applications to control refrigerant off cycle migration in the heating mode. See Long Line Guideline.

8. Low-Ambient Pressure Switch Kit

A long life pressure switch which is mounted to outdoor unit service valve. It is designed to cycle the outdoor fan motor in order to maintain head pressure within normal operating limits. The control will maintain working head pressure at low-ambient temperatures down to 0°F (-18°C) when properly installed.

Usage Guideline:

A Low-Ambient Pressure Switch or MotorMaster® Low-Ambient Controller must be used when cooling operation is used at outdoor temperatures below 55°F (12.8°C).

9. MotorMaster® Low-Ambient Controller

A fan-speed control device activated by a temperature sensor, designed to control condenser fan motor speed in response to the saturated, condensing temperature during operation in cooling mode only. For outdoor temperatures down to -20°F (-28.9°C), it maintains condensing temperature at 100°F ±10°F (37.8°C ± 6.5°C).

Usage Guideline:

A MotorMaster® Low Ambient Controller or Low-Ambient Pressure Switch must be used when cooling operation is used at outdoor temperatures below 55°F (12.8°C).

Suggested for all commercial applications.

10. Outdoor Air Temperature Sensor

Designed for use with Carrier Thermostats listed in this publication. This device enables the thermostat to display the outdoor temperature. This device also is required to enable special thermostat features such as auxiliary heat lock out.

Usage Guideline:

Suggested for all Carrier thermostats listed in this publication.

11. Outdoor Thermostat

An SPDT temperature-actuated switch which turns on supplemental electric heaters when outdoor air temperature drops below a user-selected set point.

Usage Guideline:

Electric supplemental heat applications in non-variable speed indoor units when electric heat staging is desired.

12. Secondary Outdoor Thermostat

An SPDT temperature-actuated switch which turns on third-stage of supplemental electric heaters when outdoor air temperature drops below the second-stage set point.

Usage Guideline:

Outdoor thermostat applications where electric heater is capable of 3-stage operation.

13. Snow Stand Rack

Coated wire rack which supports unit 18 in. (457.2 mm) above mounting pad to allow for drainage from unit base.

Usage Guideline:

Suggested in the following applications:

Heat pump installations in heavy snowfall areas.

Heat pump installations in snow drift locations.

Heat pump installations in areas of prolonged subfreezing temperatures.

All commercial installations.

14. Sound Hood

Wraparound sound reducing cover for the compressor. Reduces the sound level by about 2 dBA.

Usage Guideline:

Suggested when unit is installed closer than 15 ft. (4.577 m) to quiet areas, bedrooms, etc.

Suggested when unit is installed between two houses less than 10 ft. (3.05 m) apart.

15. Thermostatic Expansion Valve (TXV) Bi-Flow

A modulating flow-control valve which meters refrigerant liquid flow rate into the evaporator in response to the superheat of the refrigerant gas leaving the evaporator.

Usage Guideline:

Accessory required to meet AHRI rating and system reliability, where indoor not equipped.

Required in all heat pump applications designed with Puron refrigerant.

16. Time-Delay Relay

An SPST delay relay which briefly continues operation of indoor blower motor to provide additional cooling after the compressor cycles off.

Note: Most indoor unit controls include this feature. For those that do not, use the guideline below.

Usage Guideline:

Accessory required to meet AHRI rating, where indoor not equipped.

ELECTRICAL DATA

UNIT SIZE	V/PH	OPER VOLTS*		COMPR		FAN	MCA	MAX FUSE** or CKT BRK AMPS
		MAX	MIN	LRA	RLA	FLA		
18	208/230/1	253	197	48.0	9.0	0.50	11.8	20
24				62.9	10.9	0.60	14.2	25
30				72.5	13.5	1.40	18.3	30
36				75.0	15.1	1.10	20.0	30
42				105.5	15.5	1.40	24.0	40
48				108.0	19.0	1.40	25.2	40
60				144.2	24.4	1.52	32.0	50

* Permissible limits of the voltage range at which the unit will operate satisfactorily
** Time–Delay fuse.
FLA – Full Load Amps
LRA – Locked Rotor Amps
MCA – Minimum Circuit Amps
RLA – Rated Load Amps
NOTE: Control circuit is 24–V on all units and requires external power source. Copper wire must be used from service disconnect to unit.
All motors/compressors contain internal overload protection.
Complies with 2007 requirements of ASHRAE Standards 90.1

A-WEIGHTED SOUND POWER

UNIT SIZE	STANDARD RATING (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA, without tone adjustment)						
		125	250	500	1000	2000	4000	8000
18	69	45	48	56	62	55	53	47
24	76	46	56	59	63	63	60	55
30	77	52	62	67	68	65	62	55
36	77	51	62	66	69	64	61	53
42	76	49	61	63	65	62	60	52
48	79	53	66	69	71	67	64	57
60	73	50	63	62	63	60	58	52

NOTE: Tested in accordance with AHRI Standard 270–08 (not listed in AHRI).

A-WEIGHTED SOUND POWER WITH SOUND HOOD

UNIT SIZE	STANDARD RATING	TYPICAL OCTAVE BAND SPECTRUM (dBA, without tone adjustment)						
		125	250	500	1000	2000	4000	8000
18	68	47	48	56	61	55	52	46
24	74	47	57	59	62	61	58	51
30	77	52	62	67	67	65	62	54
36	76	52	62	66	67	64	60	52
42	74	50	61	63	64	61	58	49
48	79	54	66	69	70	67	64	56
60	73	51	64	62	63	59	56	49

NOTE: Tested in accordance with AHRI Standard 270–08 (not listed in AHRI).

CHARGING SUBCOOLING (TXV-TYPE EXPANSION DEVICE)

UNIT SIZE–SERIES	REQUIRED SUBCOOLING °F (°C)
18	11 (6.1)
24	11 (6.1)
30	10 (5.6)
36	10 (5.6)
42	10 (5.6)
48	14 (7.8)
60	15 (8.3)

HP ONLY REPLACEMENT WITH PISTON INDOORS

When the 25HCE4 is used as a replacement component in a system with a piston fan coil, use the indoor piston size specified below:

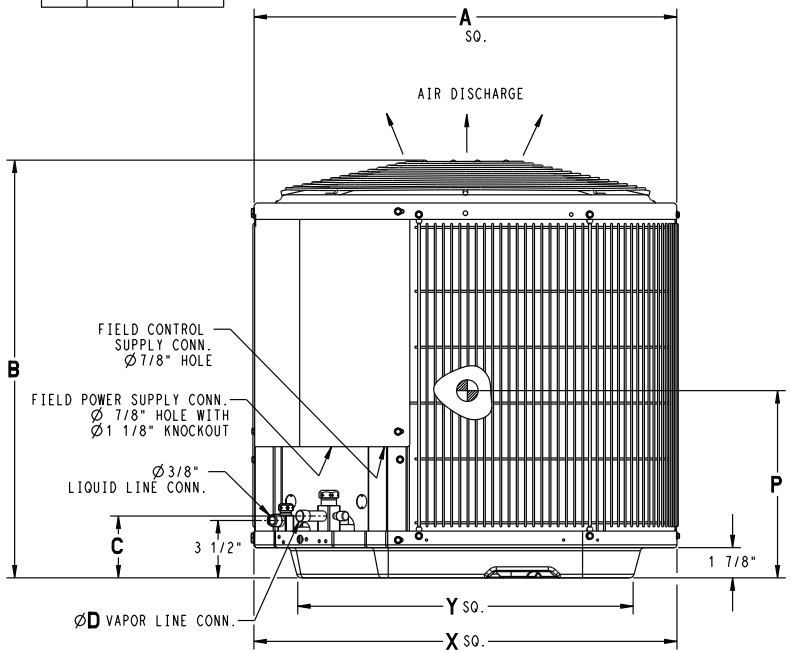
UNIT SIZE	PISTON SIZE		
	FB4CNF	FFM	FPMA
18	0.052	0.050	0.050
24	0.057	0.057	0.056
30	0.067	0.070	0.067
36	0.070	0.072	0.069
42	0.078		
48	0.084		
60			

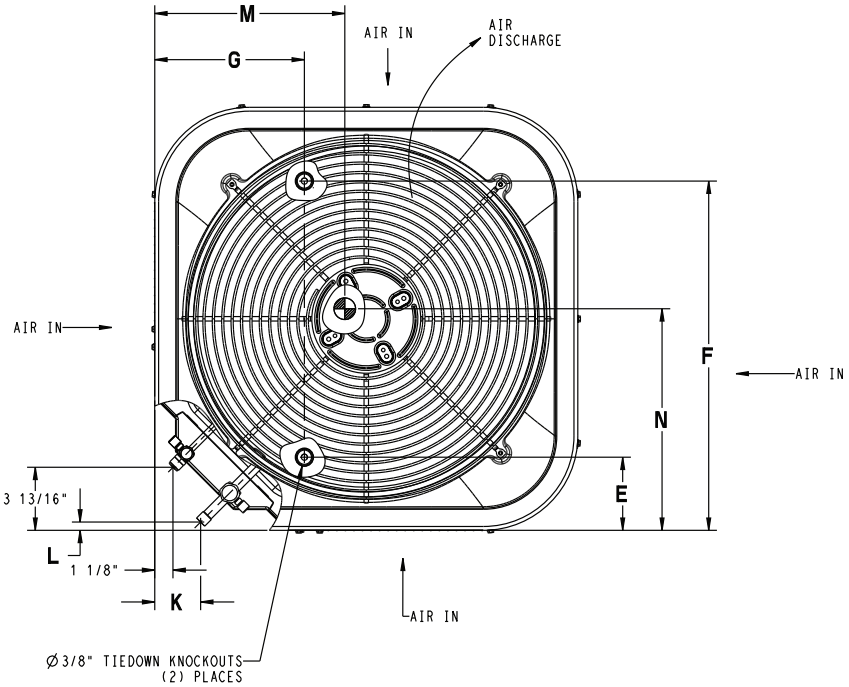
= N/A

DIMENSIONS - ENGLISH

UNIT	SERIES	ELECTRICAL CHARACTERISTICS				A	B	C	D	E	F	G	K	L	M	N	P	OPERATING WEIGHT (lbs)	SHIPPING WEIGHT (lbs)	SHIPPING DIMENSIONS (L x W x H)
25HCE418	0	X	O	O	O	23 1/8"	35 1/4"	3 3/4"	5/8"	4 7/16"	18 1/16"	7 13/16"	2 13/16"	1/2"	11"	15 3/4"	12"	136	166	25 1/4" X 25 1/4" X 40"
25HCE424	0	X	O	O	O	25 3/4"	35 1/4"	3 3/4"	5/8"	4 7/16"	21 1/4"	9 1/8"	2 13/16"	1/2"	12"	13 1/4"	13 1/2"	144	175	27 7/8" X 27 7/8" X 40"
25HCE430	0	X	O	O	O	31 3/16"	31 13/16"	3 3/4"	3/4"	6 9/16"	24 11/16"	9 1/8"	2 15/16"	5/8"	15"	11"	16"	158	180	33 3/8" X 33 3/8" X 36 5/8"
25HCE436	1	X	O	O	O	31 3/16"	28 7/16"	3 3/4"	3/4"	6 9/16"	24 11/16"	9 1/8"	2 15/16"	5/8"	15 3/4"	14"	10 3/4"	170	201	33 3/8" X 33 3/8" X 33 1/4"
25HCE442	0	X	O	O	O	31 3/16"	39 1/8"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	2 15/16"	5/8"	15 1/2"	13 1/2"	14"	201	235	33 3/8" X 33 3/8" X 43 1/2"
25HCE448	0	X	O	O	O	31 3/16"	28 7/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	2 15/16"	5/8"	16 1/2"	11 1/2"	15"	197	232	33 3/8" X 33 3/8" X 33 1/4"
25HCE460	0	X	O	O	O	31 3/16"	31 13/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	2 15/16"	5/8"	14 3/4"	15 3/4"	16 1/4"	212	248	33 3/8" X 33 3/8" X 36 5/8"
		208-230-1-60	230-1-60	208/230-3-60	460-3-60															

X = YES
O = NO





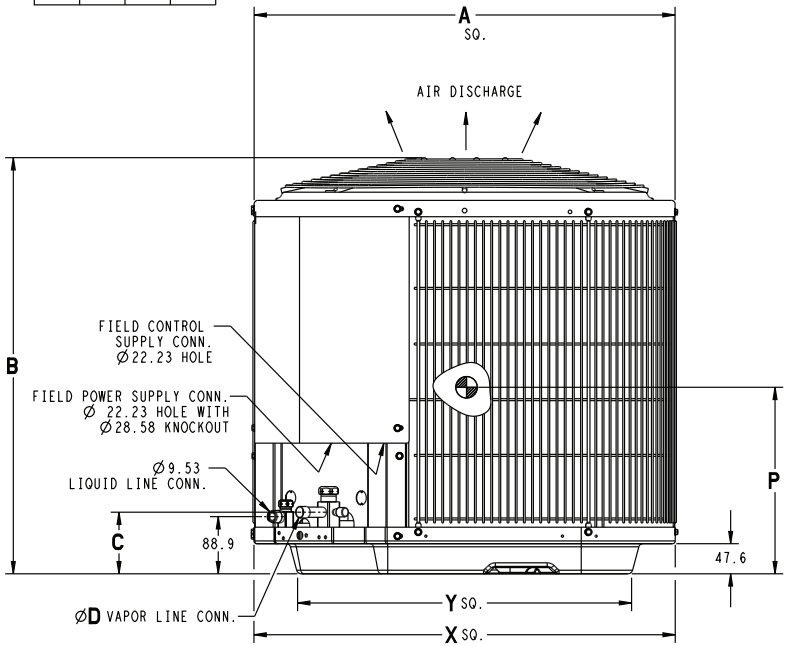
UNIT SIZE	"X" MIN GROUND MOUNTING PAD APPLICATION DIMENSIONS	"Y" MIN ROOF-TOP MOUNTING PAD APPLICATION DIMENSIONS
18	23 1/8"	17 3/4"
24	25 3/4"	20 7/16"
30,37,42,48,60	31 3/16"	23"
-	35"	26 3/4"

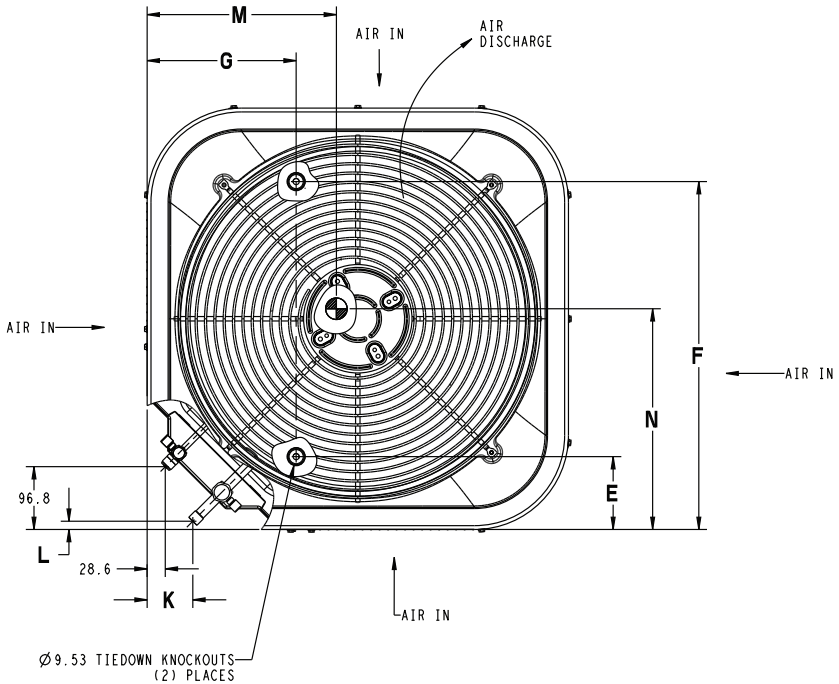
When installing, allow sufficient space for airflow clearance, wiring, refrigerant piping, and service. Allow 24 in. (609.6 mm) clearance to service end of unit and 48 in. (1219.2 mm) (above unit. For proper airflow, a 6–in. (152.4 mm) clearance on 1 side of unit and 12–in. (304.8 mm) on all remaining sides must be maintained. Maintain a distance of 24 in. (609.6 mm) between units or 18 in. (457.2 mm) if no overhang within 12 ft. (3.66 m) Position so water, snow, or ice from roof or eaves cannot fall directly on unit.
NOTE: 18" (457.2 mm) clearance option described above is approved for outdoor units with wire grille coil guard only. Units with louver panels require 24" (609.6 mm) between units.
On rooftop applications, locate unit at least 6 in. (152.4 mm) above roof surface.

DIMENSIONS - SI

UNIT	SERIES	ELECTRICAL CHARACTERISTICS				A	B	C	D	E	F	G	K	L	M	N	P	OPERATING WEIGHT (Kgs)	SHIPPING WEIGHT (Kgs)	SHIPPING DIMENSIONS (L x W x H)
25HCE418	0	X	O	O	O	587.4	895.4	95.2	15.9	112.7	458.8	198.4	71.4	12.7	279.4	400.1	304.8	61.7	75.3	641.5 X 641.5 X 1016.9
25HCE424	0	X	O	O	O	654.0	895.4	95.2	15.9	112.7	539.8	231.8	71.4	12.7	304.8	336.6	342.9	65.3	79.4	708.0 X 708.0 X 1016.9
25HCE430	0	X	O	O	O	792.2	808.0	95.2	19.0	166.7	627.1	231.8	74.6	15.9	381.0	279.4	406.4	71.7	81.6	846.6 X 846.6 X 930.6
25HCE436	1	X	O	O	O	792.2	722.3	95.2	19.0	166.7	627.1	231.8	74.6	15.9	400.1	355.6	273.1	77.1	91.2	846.6 X 846.6 X 844.2
25HCE442	0	X	O	O	O	792.2	993.8	98.4	22.2	166.7	627.1	231.8	74.6	15.9	393.7	342.9	355.6	91.2	106.6	846.6 X 846.6 X 1103.3
25HCE448	0	X	O	O	O	792.2	722.3	98.4	22.2	166.7	627.1	231.8	74.6	15.9	419.1	292.1	381.0	89.4	105.2	846.6 X 846.6 X 844.2
25HCE460	0	X	O	O	O	792.2	808.0	98.4	22.2	166.7	627.1	231.8	74.6	15.9	374.7	400.1	412.8	96.2	112.5	846.6 X 846.6 X 930.6
		208-230-1-60	230-1-60	208/230-3-60	460-3-60															

X = YES
O = NO





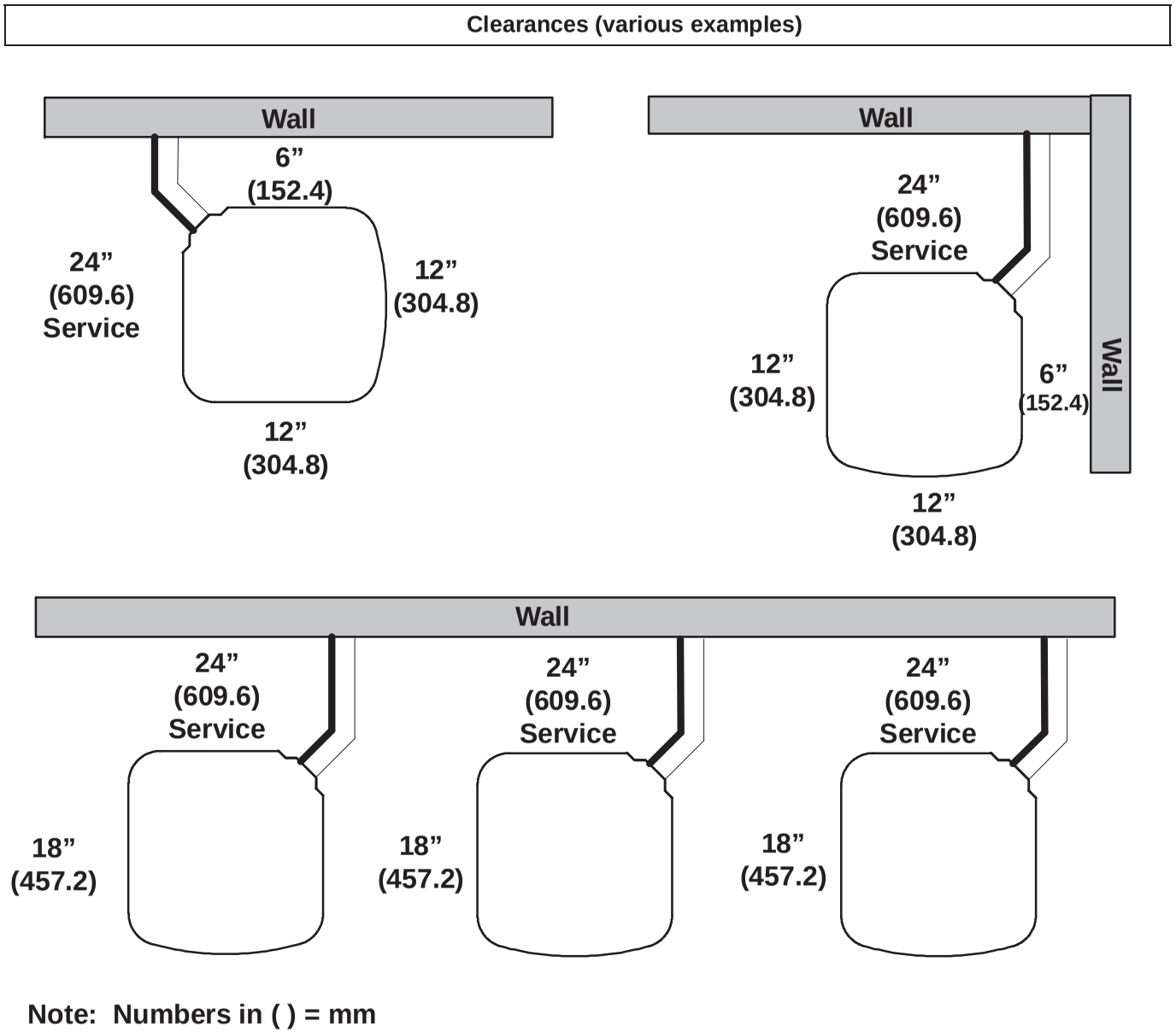
UNIT SIZE	"X" MIN GROUND MOUNTING PAD APPLICATION DIMENSIONS	"Y" MIN ROOF-TOP MOUNTING PAD APPLICATION DIMENSIONS
18	587.4	451.3
24	654.0	518.5
30,37,42,48,60	792.2	583.2
-	889.0	679.7

When installing, allow sufficient space for airflow clearance, wiring, refrigerant piping, and service. Allow 24 in. (609.6 mm) clearance to service end of unit and 48 in. (1219.2 mm) (above unit. For proper airflow, a 6–in. (152.4 mm) clearance on 1 side of unit and 12–in. (304.8 mm) on all remaining sides must be maintained. Maintain a distance of 24 in. (609.6 mm) between units or 18 in. (457.2 mm) if no overhang within 12 ft. (3.66 m) Position so water, snow, or ice from roof or eaves cannot fall directly on unit.

NOTE: 18" (457.2 mm) clearance option described above is approved for outdoor units with wire grille coil guard only. Units with louver panels require 24" (609.6 mm) between units.

On rooftop applications, locate unit at least 6 in. (152.4 mm) above roof surface.

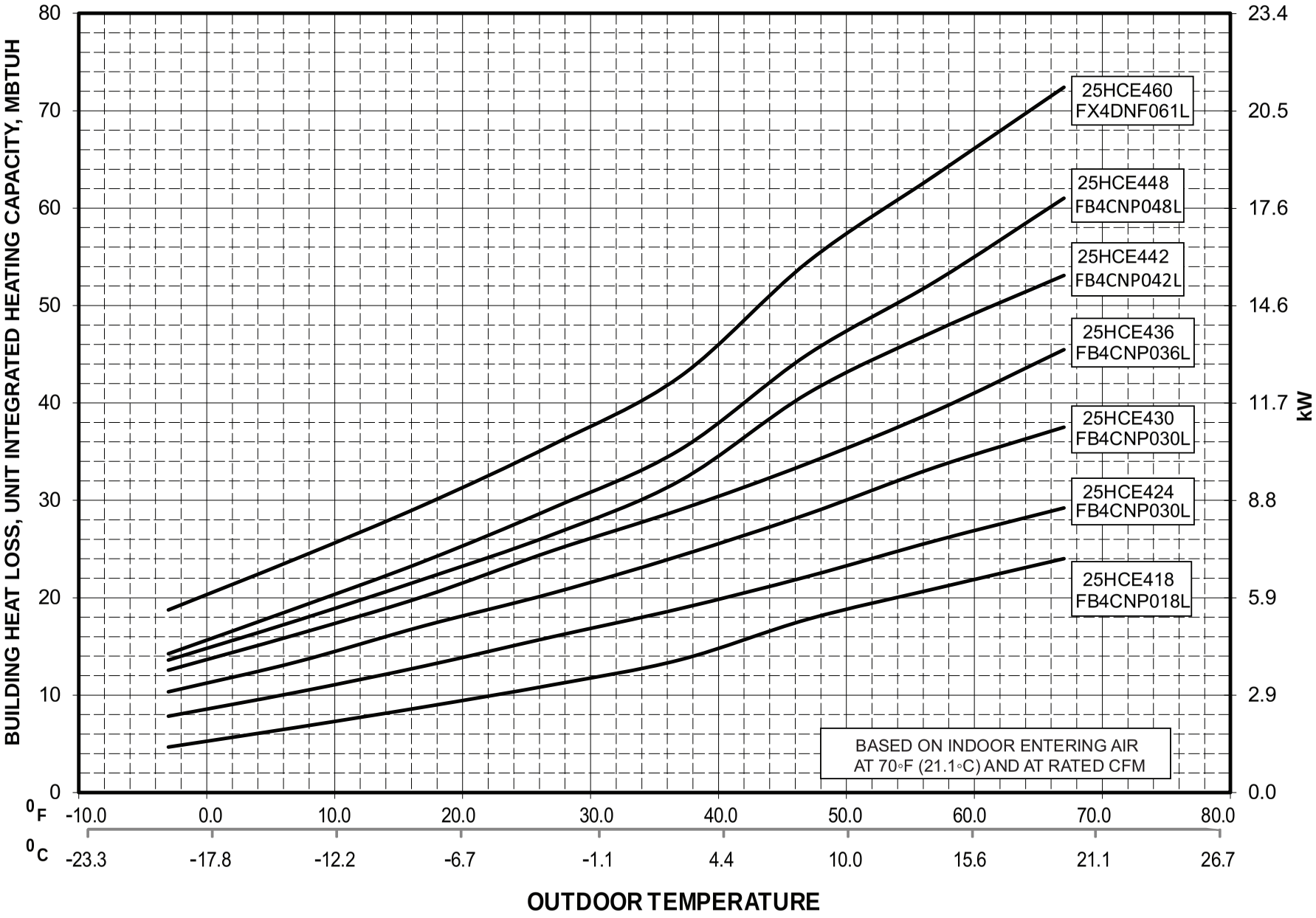
CLEARANCES



Note: Numbers in ( ) = mm

IMPORTANT: When installing multiple units in an alcove, roof well, or partially enclosed area, ensure there is adequate ventilation to prevent re-circulation of discharge air.

BALANCE POINT WORKSHEET



TESTED AHRI COMBINATION RATINGS

NOTE: Ratings contained in this document are subject to change at any time.

For AHRI ratings certificates, please refer to the AHRI directory www.ahridirectory.org

Additional ratings and system combinations can be accessed via the Carrier database at: www.MyCarrierRatings.com

For performance data at specific application &/or design conditions with various indoor unit combinations, the equipment performance calculator can be accessed at : http://rpmob.wrightsoft.com/

Model Number	Indoor Coil Model Number	Cooling Capacity	EER	SEER	High Temp		HSPF	Low Temp	
					E Capacity	E COP		H Capacity	H COP
25HCE418A30**	FB4CNP018L	17,800	11.7	14	17,600	3.72	8.2	10,400	2.40
25HCE424A30**	FB4CNP030L	22,200	11.5	14	22,200	3.84	8.2	13,200	2.54
25HCE430A30**	FB4CNP030L	28,600	11.7	14	28,600	3.62	8.2	17,100	2.44
25HCE436A31**	FB4CNP036L	33,000	11.7	14	33,800	3.62	8.2	21,000	2.40
25HCE442A30**	FB4CNP042L	40,000	11.5	14	41,000	3.62	8.2	25,200	2.50
25HCE448A30**	FB4CNP048L	46,000	11.7	14	45,500	3.64	8.2	27,800	2.56
25HCE460A30**	FX4DN(B,F)061L	57,000	11.7	14	54,500	3.70	8.2	33,000	2.56

* AHRI = Air Conditioning, Heating & Refrigeration Institute

* Ratings are net values reflecting the effects of circulating fan heat. Supplemental electric heat is not included. Ratings are based on:

Cooling Standard: 80°F (27°C) db 67°F (19°C) wb indoor entering air temperature and 95°F (35°C) db air entering outdoor unit.

High−Temp Heating Standard: 70°F (21°C) db indoor entering air temperature and 47°F (8°C) db 43°F (6°C) wb air entering outdoor unit.

Low−Temp Heating Standard: 70°F (21°C) db indoor entering air temperature and 17°F (−8°C) db 15°F (−9°C) wb air entering outdoor unit.

COP — Coefficient of Performance

EER — Energy Efficiency Ratio

HSPF — Heating Seasonal Performance Factor

SEER — Seasonal Energy Efficiency Ratio

DETAILED COOLING CAPACITIES#

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB °F (°C)	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
25HCE418 Outdoor Section With FB4CNP018L Indoor Section																			
525	72 (22.2)	21.43	10.44	1.20	20.38	10.06	1.36	19.27	9.66	1.54	18.10	9.26	1.74	16.86	8.83	1.97	15.56	8.39	2.22
	67 (19.4)	19.44	12.77	1.19	18.48	12.39	1.36	17.47	11.99	1.53	16.40	11.58	1.73	15.26	11.15	1.96	14.06	10.69	2.21
	63 (17.2)††	17.99	12.27	1.19	17.10	11.90	1.35	16.16	11.50	1.53	15.16	11.08	1.73	14.10	10.65	1.95	12.98	10.19	2.20
	62 (16.7)	17.64	15.03	1.19	16.78	14.64	1.35	15.88	14.22	1.53	14.93	13.76	1.73	14.00	14.00	1.95	13.10	13.10	2.20
	57 (13.9)	16.97	16.97	1.19	16.30	16.30	1.35	15.58	15.58	1.52	14.81	14.81	1.73	13.98	13.98	1.95	13.08	13.08	2.20
600	72 (22.2)	21.88	10.96	1.21	20.77	10.58	1.38	19.62	10.18	1.56	18.40	9.76	1.76	17.12	9.33	1.98	15.77	8.88	2.23
	67 (19.4)	19.86	13.61	1.20	18.86	13.22	1.37	17.80	12.82	1.55	16.69	12.39	1.75	15.51	11.95	1.97	14.27	11.48	2.22
	63 (17.2)††	18.40	13.06	1.20	17.47	12.67	1.36	16.49	12.27	1.54	15.44	11.84	1.74	14.34	11.39	1.97	13.19	10.92	2.21
	62 (16.7)	18.08	16.13	1.20	17.20	15.71	1.36	16.27	16.27	1.54	15.43	15.43	1.74	14.54	14.54	1.97	13.59	13.59	2.22
	57 (13.9)	17.73	17.73	1.20	17.01	17.01	1.36	16.24	16.24	1.54	15.41	15.41	1.74	14.52	14.52	1.97	13.57	13.57	2.22
675	72 (22.2)	22.22	11.46	1.22	21.08	11.07	1.39	19.88	10.66	1.57	18.63	10.24	1.77	17.31	9.80	2.00	15.92	9.35	2.25
	67 (19.4)	20.19	14.41	1.22	19.15	14.01	1.38	18.06	13.60	1.56	16.91	13.16	1.76	15.70	12.71	1.99	14.44	12.22	2.23
	63 (17.2)††	18.71	13.81	1.21	17.75	13.41	1.38	16.74	12.99	1.56	15.66	12.55	1.75	14.53	12.09	1.98	13.35	11.59	2.23
	62 (16.7)	18.48	17.11	1.21	17.63	17.63	1.38	16.80	16.80	1.56	15.93	15.93	1.76	14.99	14.99	1.98	13.99	13.99	2.23
	57 (13.9)	18.36	18.36	1.21	17.60	17.60	1.38	16.78	16.78	1.56	15.91	15.91	1.75	14.97	14.97	1.98	13.97	13.97	2.23

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB °F (°C)	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
25HCE424 Outdoor Section With FB4CNP030L Indoor Section																			
700	72 (22.2)	26.47	13.51	1.53	25.28	13.08	1.71	24.03	12.62	1.91	22.72	12.15	2.14	21.30	11.65	2.41	19.77	11.11	2.72
	67 (19.4)	24.06	16.68	1.53	22.96	16.24	1.71	21.82	15.78	1.91	20.62	15.31	2.15	19.33	14.80	2.42	17.93	14.25	2.72
	63 (17.2)††	22.32	16.04	1.53	21.30	15.60	1.72	20.23	15.14	1.92	19.11	14.66	2.16	17.91	14.15	2.42	16.62	13.60	2.73
	62 (16.7)	21.92	19.75	1.53	20.94	19.28	1.72	19.93	18.78	1.92	18.88	18.78	2.16	17.88	17.88	2.42	16.83	16.83	2.73
	57 (13.9)	21.31	21.31	1.54	20.52	20.52	1.72	19.70	19.70	1.92	18.81	18.81	2.16	17.86	17.86	2.42	16.81	16.81	2.73
800	72 (22.2)	26.97	14.20	1.55	25.73	13.76	1.72	24.44	13.30	1.92	23.07	12.82	2.16	21.60	12.31	2.43	20.01	11.76	2.74
	67 (19.4)	24.53	17.79	1.55	23.38	17.34	1.73	22.20	16.87	1.93	20.95	16.38	2.16	19.61	15.86	2.43	18.18	15.29	2.74
	63 (17.2)††	22.77	17.07	1.55	21.70	16.62	1.73	20.60	16.15	1.94	19.43	15.65	2.17	18.19	15.13	2.44	16.86	14.56	2.75
	62 (16.7)	22.45	21.17	1.55	21.45	21.27	1.73	20.50	20.50	1.94	19.55	19.55	2.17	18.53	18.53	2.44	17.41	17.41	2.74
	57 (13.9)	22.20	22.20	1.55	21.35	21.35	1.73	20.47	20.47	1.94	19.53	19.53	2.17	18.51	18.51	2.44	17.39	17.39	2.74
900	72 (22.2)	27.35	14.86	1.56	26.08	14.41	1.74	24.73	13.94	1.94	23.33	13.46	2.17	21.82	12.94	2.44	20.18	12.38	2.75
	67 (19.4)	24.89	18.85	1.57	23.71	18.38	1.75	22.49	17.91	1.95	21.20	17.40	2.18	19.84	16.86	2.45	18.37	16.26	2.76
	63 (17.2)††	23.12	18.05	1.57	22.02	17.59	1.75	20.88	17.10	1.96	19.68	16.59	2.19	18.41	16.05	2.46	17.05	15.45	2.77
	62 (16.7)	22.97	22.97	1.57	22.08	22.08	1.75	21.14	21.14	1.95	20.14	20.14	2.19	19.07	19.07	2.45	17.88	17.88	2.76
	57 (13.9)	22.94	22.94	1.57	22.05	22.05	1.75	21.11	21.11	1.95	20.12	20.12	2.19	19.04	19.04	2.45	17.86	17.86	2.76

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB °F (°C)	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
25HCE430 Outdoor Section With FB4CNP030L Indoor Section																			
875	72 (22.2)	33.97	17.32	1.97	32.47	16.75	2.17	30.87	16.16	2.40	29.15	15.54	2.67	27.30	14.87	2.98	25.29	14.15	3.33
	67 (19.4)	30.80	21.30	1.97	29.42	20.72	2.17	27.96	20.13	2.40	26.39	19.50	2.67	24.69	18.82	2.98	22.86	18.10	3.32
	63 (17.2)††	28.51	20.46	1.97	27.22	19.89	2.17	25.86	19.29	2.41	24.39	18.66	2.67	22.82	17.98	2.97	21.12	17.25	3.32
	62 (16.7)	27.99	25.15	1.97	26.74	24.55	2.17	25.44	23.90	2.41	24.07	23.17	2.67	22.67	22.67	2.97	21.30	21.30	3.32
	57 (13.9)	27.05	27.05	1.97	26.06	26.06	2.18	25.01	25.01	2.41	23.88	23.88	2.67	22.64	22.64	2.97	21.27	21.27	3.32
1050	72 (22.2)	34.85	18.48	2.00	33.25	17.90	2.21	31.57	17.30	2.44	29.76	16.66	2.71	27.81	15.97	3.02	25.71	15.24	3.37
	67 (19.4)	31.61	23.17	2.01	30.15	22.59	2.21	28.60	21.97	2.44	26.95	21.32	2.71	25.18	20.61	3.02	23.27	19.84	3.36
	63 (17.2)††	29.28	22.21	2.01	27.91	21.62	2.21	26.47	21.00	2.45	24.94	20.34	2.71	23.29	19.63	3.01	21.52	18.86	3.36
	62 (16.7)	28.88	27.53	2.01	27.62	27.37	2.21	26.36	26.36	2.45	25.12	25.12	2.71	23.77	23.77	3.01	22.28	22.28	3.36
	57 (13.9)	28.55	28.55	2.01	27.48	27.48	2.21	26.33	26.33	2.45	25.09	25.09	2.71	23.74	23.74	3.01	22.26	22.26	3.36
1125	72 (22.2)	35.15	18.97	2.02	33.53	18.39	2.23	31.81	17.78	2.46	29.96	17.13	2.73	27.99	16.44	3.03	25.85	15.70	3.38
	67 (19.4)	31.89	23.96	2.02	30.39	23.37	2.23	28.82	22.74	2.46	27.14	22.07	2.73	25.34	21.35	3.03	23.41	20.56	3.38
	63 (17.2)††	29.55	22.94	2.03	28.15	22.34	2.23	26.69	21.71	2.46	25.12	21.03	2.73	23.45	20.30	3.03	21.66	19.51	3.38
	62 (16.7)	29.18	29.18	2.03	28.02	28.02	2.23	26.83	26.83	2.46	25.55	25.55	2.73	24.15	24.15	3.03	22.63	22.63	3.38
	57 (13.9)	29.10	29.10	2.03	27.98	27.98	2.23	26.80	26.80	2.46	25.52	25.52	2.73	24.13	24.13	3.03	22.60	22.60	3.38

See notes on page 16

DETAILED COOLING CAPACITIES# CONTINUED

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB °F (°C)	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
25HCE436 Outdoor Section With FB4CNP036L Indoor Section																			
1050	72 (22.2)	39.42	20.36	2.23	37.61	19.67	2.50	35.70	18.96	2.79	33.63	18.20	3.10	31.37	17.37	3.46	28.97	16.51	3.85
	67 (19.4)	35.87	25.19	2.24	34.23	24.50	2.50	32.48	23.78	2.78	30.59	23.01	3.09	28.52	22.17	3.44	26.33	21.29	3.84
	63 (17.2)††	33.28	24.23	2.25	31.76	23.54	2.50	30.14	22.82	2.77	28.38	22.05	3.08	26.45	21.21	3.43	24.41	20.32	3.84
	62 (16.7)	32.68	29.85	2.25	31.22	29.12	2.50	29.67	28.32	2.77	28.03	27.40	3.08	26.31	26.31	3.43	24.65	24.65	3.84
	57 (13.9)	31.63	31.63	2.26	30.46	30.46	2.50	29.20	29.20	2.77	27.82	27.82	3.08	26.28	26.28	3.43	24.62	24.62	3.84
1200	72 (22.2)	40.13	21.34	2.27	38.25	20.63	2.54	36.25	19.90	2.83	34.10	19.12	3.14	31.76	18.28	3.50	29.28	17.40	3.90
	67 (19.4)	36.53	26.77	2.28	34.82	26.07	2.54	33.00	25.34	2.82	31.03	24.54	3.13	28.88	23.67	3.49	26.62	22.75	3.89
	63 (17.2)††	33.92	25.70	2.29	32.33	25.00	2.54	30.64	24.26	2.82	28.81	23.47	3.13	26.81	22.59	3.48	24.71	21.66	3.88
	62 (16.7)	33.39	31.85	2.29	31.89	31.02	2.54	30.31	30.31	2.82	28.80	28.80	3.12	27.16	27.16	3.48	25.40	25.40	3.88
	57 (13.9)	32.83	32.83	2.29	31.58	31.58	2.54	30.24	30.24	2.82	28.77	28.77	3.12	27.13	27.13	3.48	25.37	25.37	3.88
1350	72 (22.2)	40.68	22.25	2.31	38.72	21.53	2.58	36.66	20.80	2.87	34.45	20.01	3.19	32.03	19.15	3.54	29.50	18.26	3.94
	67 (19.4)	37.04	28.29	2.32	35.25	27.57	2.58	33.37	26.81	2.86	31.35	25.98	3.17	29.14	25.07	3.53	26.85	24.10	3.93
	63 (17.2)††	34.40	27.11	2.33	32.75	26.38	2.58	31.00	25.62	2.86	29.12	24.79	3.17	27.07	23.87	3.52	24.93	22.89	3.92
	62 (16.7)	33.95	33.95	2.33	32.55	32.55	2.58	31.13	31.13	2.86	29.57	29.57	3.17	27.85	27.85	3.52	26.00	26.00	3.93
	57 (13.9)	33.84	33.84	2.33	32.51	32.51	2.58	31.10	31.10	2.86	29.54	29.54	3.17	27.82	27.82	3.52	25.98	25.98	3.93

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB °F (°C)	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
25HCE442 Outdoor Section With FB4CNP042L Indoor Section																			
1225	72 (22.2)	48.18	24.31	2.78	46.14	23.54	3.12	43.91	22.72	3.47	41.39	21.79	3.89	38.48	20.75	4.38	35.14	19.57	4.98
	67 (19.4)	43.90	29.85	2.81	42.03	29.07	3.13	40.00	28.24	3.48	37.70	27.31	3.88	35.04	26.26	4.38	31.98	25.05	5.00
	63 (17.2)††	40.78	28.76	2.83	39.02	27.98	3.14	37.15	27.15	3.48	35.01	26.22	3.88	32.54	25.16	4.38	29.68	23.95	5.01
	62 (16.7)	40.02	35.22	2.83	38.32	34.41	3.14	36.51	33.54	3.48	34.48	32.52	3.88	32.15	32.15	4.38	29.82	29.82	5.01
	57 (13.9)	38.47	38.47	2.84	37.12	37.12	3.14	35.68	35.68	3.48	34.03	34.03	3.88	32.08	32.08	4.38	29.78	29.78	5.01
1400	72 (22.2)	49.11	25.48	2.81	46.98	24.70	3.15	44.64	23.85	3.51	42.03	22.91	3.92	39.00	21.85	4.41	35.57	20.66	5.02
	67 (19.4)	44.77	31.73	2.84	42.82	30.94	3.17	40.70	30.10	3.51	38.30	29.14	3.92	35.55	28.06	4.42	32.39	26.81	5.03
	63 (17.2)††	41.63	30.52	2.86	39.80	29.72	3.17	37.83	28.87	3.52	35.61	27.92	3.92	33.04	26.83	4.42	30.10	25.58	5.04
	62 (16.7)	40.95	37.70	2.86	39.20	36.82	3.18	37.36	35.82	3.52	35.36	35.36	3.92	33.27	33.27	4.42	30.82	30.82	5.04
	57 (13.9)	40.07	40.07	2.87	38.63	38.63	3.18	37.09	37.09	3.52	35.31	35.31	3.92	33.23	33.23	4.42	30.78	30.78	5.04
1575	72 (22.2)	49.81	26.57	2.84	47.60	25.78	3.18	45.20	24.93	3.54	42.49	23.97	3.96	39.38	22.90	4.44	35.86	21.70	5.05
	67 (19.4)	45.44	33.53	2.87	43.41	32.72	3.20	41.22	31.85	3.55	38.75	30.88	3.96	35.92	29.75	4.45	32.71	28.46	5.06
	63 (17.2)††	42.28	32.19	2.89	40.38	31.38	3.21	38.36	30.51	3.55	36.06	29.53	3.96	33.43	28.40	4.45	30.42	27.09	5.08
	62 (16.7)	41.76	39.89	2.89	39.97	39.97	3.21	38.30	38.30	3.55	36.41	36.41	3.96	34.21	34.21	4.45	31.64	31.64	5.07
	57 (13.9)	41.40	41.40	2.90	39.89	39.89	3.21	38.25	38.25	3.55	36.36	36.36	3.96	34.17	34.17	4.45	31.60	31.60	5.07

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB °F (°C)	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
25HCE448 Outdoor Section With FB4CNP048L Indoor Section																			
1400	72 (22.2)	55.75	28.05	3.23	53.27	27.12	3.59	50.55	26.11	3.96	47.46	24.99	4.37	44.01	23.75	4.83	40.13	22.38	5.35
	67 (19.4)	50.68	34.45	3.22	48.45	33.53	3.57	46.00	32.52	3.93	43.23	31.42	4.34	40.10	30.17	4.80	36.59	28.79	5.33
	63 (17.2)††	46.99	33.15	3.22	44.92	32.23	3.55	42.67	31.23	3.91	40.12	30.14	4.31	37.25	28.91	4.78	34.00	27.52	5.32
	62 (16.7)	46.10	40.65	3.21	44.11	39.69	3.55	41.94	38.63	3.91	39.54	37.40	4.31	36.87	36.87	4.77	34.21	34.21	5.32
	57 (13.9)	44.33	44.33	3.21	42.76	42.76	3.54	41.05	41.05	3.90	39.07	39.07	4.30	36.80	36.80	4.77	34.17	34.17	5.32
1600	72 (22.2)	56.80	29.37	3.28	54.22	28.42	3.64	51.35	27.39	4.01	48.15	26.25	4.42	44.55	24.98	4.88	40.56	23.60	5.40
	67 (19.4)	51.68	36.59	3.28	49.35	35.66	3.62	46.77	34.62	3.99	43.87	33.48	4.39	40.64	32.20	4.85	37.01	30.76	5.38
	63 (17.2)††	47.95	35.15	3.27	45.79	34.21	3.61	43.42	33.18	3.96	40.77	32.06	4.37	37.78	30.79	4.83	34.43	29.35	5.37
	62 (16.7)	47.16	43.44	3.27	45.10	42.39	3.60	42.90	41.17	3.96	40.54	40.54	4.37	38.10	38.10	4.83	35.30	35.30	5.38
	57 (13.9)	46.14	46.14	3.26	44.46	44.46	3.60	42.61	42.61	3.96	40.49	40.49	4.37	38.06	38.06	4.83	35.26	35.26	5.37
1800	72 (22.2)	57.65	30.65	3.33	54.95	29.68	3.69	52.00	28.64	4.06	48.67	27.48	4.47	44.97	26.19	4.93	40.86	24.79	5.45
	67 (19.4)	52.48	38.69	3.33	50.04	37.72	3.67	47.37	36.65	4.04	44.38	35.48	4.45	41.04	34.15	4.91	37.34	32.64	5.44
	63 (17.2)††	48.72	37.10	3.32	46.47	36.13	3.66	44.02	35.07	4.02	41.28	33.91	4.42	38.20	32.58	4.88	34.78	31.07	5.42
	62 (16.7)	48.09	45.92	3.32	45.99	45.99	3.66	43.96	43.96	4.02	41.71	41.71	4.43	39.13	39.13	4.89	36.17	36.17	5.43
	57 (13.9)	47.65	47.65	3.32	45.88	45.88	3.66	43.91	43.91	4.02	41.66	41.66	4.43	39.09	39.09	4.89	36.13	36.13	5.43

See notes on page 16

DETAILED COOLING CAPACITIES# CONTINUED

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB °F (°C)	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
25HCE460 Outdoor Section With FX4DN(B,F)061L Indoor Section																			
1750	72 (22.2)	64.47	36.36	3.53	61.69	35.21	3.88	58.75	34.01	4.30	55.61	32.74	4.78	52.18	31.36	5.34	48.43	29.90	5.99
	67 (19.4)	58.76	44.97	3.50	56.25	43.82	3.86	53.58	42.62	4.27	50.71	41.34	4.76	47.58	39.96	5.32	44.10	38.44	5.96
	63 (17.2)††	54.60	43.31	3.48	52.27	42.16	3.84	49.79	40.96	4.25	47.13	39.68	4.74	44.21	38.28	5.29	40.98	36.76	5.94
	62 (16.7)	53.59	53.34	3.48	51.34	52.14	3.84	48.98	50.87	4.25	46.43	49.42	4.73	43.81	43.81	5.29	41.19	41.19	5.94
	57 (13.9)	51.87	51.87	3.47	50.08	50.08	3.83	48.17	48.17	4.25	46.08	46.08	4.73	43.74	43.74	5.29	41.14	41.14	5.94
2000	72 (22.2)	65.61	38.13	3.59	62.71	36.95	3.95	59.66	35.74	4.37	56.39	34.44	4.85	52.83	33.04	5.41	48.97	31.55	6.06
	67 (19.4)	59.86	47.88	3.57	57.21	46.69	3.92	54.43	45.47	4.34	51.45	44.16	4.82	48.19	42.72	5.38	44.64	41.17	6.03
	63 (17.2)††	55.66	46.01	3.55	53.22	44.83	3.91	50.64	43.61	4.32	47.87	42.29	4.80	44.85	40.86	5.36	41.52	39.29	6.01
	62 (16.7)	54.79	57.14	3.55	52.47	55.78	3.90	50.08	50.08	4.32	47.80	47.80	4.80	45.32	45.32	5.36	42.54	42.54	6.02
	57 (13.9)	53.97	53.97	3.54	52.05	52.05	3.90	49.99	49.99	4.32	47.74	47.74	4.80	45.26	45.26	5.36	42.49	42.49	6.02
2250	72 (22.2)	66.47	39.80	3.66	63.48	38.61	4.02	60.32	37.37	4.43	56.96	36.06	4.91	53.30	34.64	5.47	49.33	33.13	6.12
	67 (19.4)	60.67	50.65	3.63	57.94	49.44	3.99	55.07	48.18	4.40	51.99	46.83	4.89	48.67	45.37	5.45	45.03	43.74	6.09
	63 (17.2)††	56.46	48.58	3.61	53.93	47.38	3.97	51.26	46.11	4.38	48.41	44.76	4.87	45.32	43.28	5.43	41.91	41.63	6.07
	62 (16.7)	55.83	55.83	3.61	53.75	53.75	3.97	51.56	51.56	4.39	49.17	49.17	4.87	46.57	46.57	5.44	43.63	43.63	6.09
	57 (13.9)	55.71	55.71	3.61	53.68	53.68	3.97	51.49	51.49	4.39	49.12	49.12	4.87	46.49	46.49	5.43	43.58	43.58	6.09

† Total and sensible capacities are net capacities. Blower motor heat has been subtracted.
‡ Sensible capacities shown are based on 80°F (27°C) entering air at the indoor coil. For sensible capacities at other than 80°F (27°C), deduct 835 Btuh (245 kW) per 1000 CFM (480 L/S) of indoor coil air for each degree below 80°F (27°C), or add 835 Btuh (245 kW) per 1000 CFM (480 L/S) of indoor coil air per degree above 80°F (27°C).
# Detailed cooling capacities are based on indoor and outdoor unit at the same elevation per AHRI standard 210/240–2008. If additional tubing length and/or indoor unit is located above outdoor unit, a slight variation in capacity may occur.
** Sys. kw is total of indoor and outdoor unit kilowatts.
†† At TVA rating indoor condition (75°F edb/63°F ewb). All other indoor air temperatures are at 80°F edb.
NOTE: When the required data falls between the published data, interpolation may be performed. Extrapolation is not an acceptable practice.
EWB — Entering Wet Bulb

HEAT PUMP HEATING PERFORMANCE

INDOOR AIR		OUTDOOR COIL ENTERING AIR TEMPERATURES ° F (° C)																							
		-3 (19.4)			7 (-13.9)			17 (-8.3)			27 (-2.i8)			37 (2.8)			47 (8.3)			57 (13.9)			67 (19.4)		
EDB ° F (° C)	CFM	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW
		Total	Integ		Total	Integ		Total	Integ		Total	Integ		Total	Integ		Total	Integ		Total	Integ		Total	Integ	
25HCE418 Outdoor Section With FB4CNP018L Indoor Section																									
65	525	5.26	4.84	1.03	7.45	6.84	1.09	9.80	8.94	1.14	12.54	11.14	1.21	15.07	13.71	1.27	17.87	17.87	1.35	21.00	21.00	1.44	24.19	24.19	1.53
	600	5.36	4.93	1.04	7.57	6.95	1.09	9.96	9.08	1.13	12.70	11.28	1.19	15.26	13.89	1.24	18.13	18.13	1.31	21.35	21.35	1.40	24.32	24.32	1.47
	675	5.44	5.01	1.04	7.66	7.04	1.09	10.09	9.20	1.13	12.83	11.40	1.18	15.43	14.04	1.23	18.33	18.33	1.29	21.54	21.54	1.37	24.32	24.32	1.43
70	525	4.98	4.58	1.08	7.15	6.57	1.14	9.49	8.65	1.20	12.28	10.90	1.27	14.78	13.45	1.33	17.54	17.54	1.41	20.61	20.61	1.51	23.84	23.84	1.61
	600	5.08	4.67	1.08	7.27	6.68	1.14	9.64	8.79	1.19	12.45	11.05	1.25	14.98	13.63	1.31	17.80	17.80	1.38	20.95	20.95	1.47	24.01	24.01	1.55
	675	5.16	4.75	1.09	7.38	6.78	1.14	9.77	8.91	1.18	12.58	11.17	1.24	15.14	13.78	1.29	18.01	18.01	1.36	21.21	21.21	1.44	24.05	24.05	1.50
75	525	4.65	4.28	1.13	6.83	6.27	1.19	9.15	8.35	1.25	11.98	10.64	1.33	14.49	13.19	1.40	17.21	17.21	1.48	20.22	20.22	1.58	23.47	23.47	1.69
	600	4.74	4.36	1.13	6.95	6.39	1.19	9.31	8.49	1.24	12.16	10.80	1.31	14.69	13.37	1.37	17.46	17.46	1.45	20.55	20.55	1.54	23.68	23.68	1.62
	675	4.84	4.45	1.14	7.05	6.48	1.19	9.44	8.61	1.24	12.30	10.93	1.30	14.86	13.52	1.36	17.67	17.67	1.42	20.82	20.82	1.51	23.75	23.75	1.58
25HCE424 Outdoor Section With FB4CNP030L Indoor Section																									
65	700	8.09	7.45	1.53	10.51	9.65	1.59	13.25	12.08	1.65	16.10	14.30	1.71	18.99	17.28	1.79	22.27	22.27	1.88	26.02	26.02	1.98	29.55	29.55	2.06
	800	8.23	7.57	1.54	10.66	9.80	1.58	13.63	12.43	1.64	16.28	14.46	1.70	19.22	17.49	1.76	22.55	22.55	1.84	26.19	26.19	1.92	29.49	29.49	2.00
	900	8.35	7.69	1.54	10.81	9.93	1.59	13.78	12.56	1.64	16.44	14.60	1.69	19.41	17.67	1.74	22.78	22.78	1.82	26.20	26.20	1.89	29.26	29.26	1.95
70	700	7.69	7.08	1.60	10.12	9.30	1.66	12.77	11.64	1.72	15.81	14.04	1.80	18.67	16.99	1.87	21.95	21.95	1.96	25.62	25.62	2.08	29.23	29.23	2.16
	800	7.84	7.21	1.60	10.29	9.45	1.65	12.99	11.84	1.71	15.99	14.20	1.78	18.89	17.19	1.84	22.20	22.20	1.93	25.88	25.88	2.02	29.23	29.23	2.10
	900	7.96	7.32	1.61	10.43	9.59	1.66	13.21	12.05	1.71	16.16	14.35	1.77	19.08	17.37	1.83	22.42	22.42	1.91	25.96	25.96	1.98	29.10	29.10	2.05
75	700	7.30	6.71	1.67	9.74	8.95	1.73	12.37	11.28	1.80	15.54	13.80	1.88	18.37	16.72	1.96	21.60	21.60	2.06	25.21	25.21	2.18	28.90	28.90	2.26
	800	7.44	6.84	1.67	9.90	9.10	1.73	12.57	11.46	1.79	15.73	13.97	1.86	18.58	16.91	1.93	21.86	21.86	2.02	25.53	25.53	2.12	28.93	28.93	2.20
	900	7.55	6.95	1.68	10.03	9.22	1.73	12.73	11.61	1.79	15.88	14.10	1.85	18.76	17.07	1.92	22.08	22.08	2.00	25.68	25.68	2.08	28.88	28.88	2.15
25HCE430 Outdoor Section With FB4CNP030L Indoor Section																									
65	875	10.54	9.70	1.80	13.55	12.45	1.87	17.16	15.64	1.95	20.49	18.19	2.04	24.30	22.12	2.14	28.57	28.57	2.26	33.42	33.42	2.40	37.91	37.91	2.51
	1050	10.81	9.95	1.81	13.87	12.75	1.88	17.44	15.90	1.95	20.83	18.50	2.02	24.73	22.50	2.11	29.10	29.10	2.22	33.84	33.84	2.34	37.90	37.90	2.43
	1125	10.91	10.04	1.82	13.99	12.85	1.88	17.54	15.99	1.95	20.96	18.61	2.02	24.88	22.64	2.11	29.28	29.28	2.22	33.88	33.88	2.32	37.80	37.80	2.41
70	875	10.08	9.27	1.87	13.10	12.04	1.95	16.82	15.34	2.04	20.13	17.88	2.13	23.89	21.74	2.23	28.09	28.09	2.35	32.88	32.88	2.50	37.48	37.48	2.62
	1050	10.34	9.51	1.89	13.40	12.31	1.95	17.12	15.61	2.03	20.47	18.18	2.11	24.31	22.12	2.20	28.60	28.60	2.31	33.42	33.42	2.44	37.51	37.51	2.53
	1125	10.44	9.60	1.90	13.51	12.42	1.96	17.23	15.71	2.04	20.59	18.29	2.11	24.46	22.26	2.20	28.79	28.79	2.31	33.53	33.53	2.42	0.00	0.00	0.00
75	875	9.61	8.84	1.95	12.64	11.62	2.02	16.08	14.66	2.11	19.78	17.57	2.22	23.48	21.37	2.32	27.62	27.62	2.45	32.34	32.34	2.60	37.01	37.01	2.73
	1050	9.86	9.07	1.96	12.94	11.89	2.03	16.76	15.28	2.12	20.11	17.86	2.20	23.89	21.74	2.30	28.11	28.11	2.41	32.93	32.93	2.54	37.11	37.11	2.64
	1125	9.95	9.16	1.97	13.05	11.99	2.04	16.87	15.39	2.12	20.23	17.97	2.20	24.04	21.88	2.29	28.30	28.30	2.40	33.08	33.08	2.52	37.07	37.07	2.62
25HCE436 Outdoor Section With FB4CNP036L Indoor Section																									
65	1050	12.92	11.89	2.18	16.50	15.16	2.26	20.40	18.60	2.34	24.90	22.12	2.45	29.12	26.50	2.55	33.86	33.86	2.66	39.25	39.25	2.81	45.49	45.49	3.02
	1200	13.19	12.13	2.20	16.81	15.44	2.27	20.77	18.94	2.35	25.23	22.40	2.44	29.49	26.84	2.53	34.32	34.32	2.63	39.87	39.87	2.76	46.23	46.23	2.94
	1350	13.43	12.35	2.23	17.08	15.69	2.29	21.13	19.27	2.36	25.51	22.66	2.44	29.82	27.14	2.52	34.70	34.70	2.61	40.38	40.38	2.74	46.70	46.70	2.88
70	1050	12.30	11.32	2.26	15.91	14.62	2.34	19.81	18.06	2.43	24.51	21.77	2.55	28.67	26.09	2.65	33.35	33.35	2.77	38.60	38.60	2.93	44.71	44.71	3.15
	1200	12.56	11.56	2.28	16.22	14.90	2.36	20.15	18.38	2.44	24.82	22.05	2.54	29.04	26.43	2.63	33.80	33.80	2.74	39.20	39.20	2.88	45.47	45.47	3.07
	1350	12.80	11.77	2.31	16.48	15.15	2.38	20.47	18.66	2.45	25.10	22.29	2.55	29.36	26.72	2.63	34.19	34.19	2.72	39.70	39.70	2.85	46.01	46.01	3.02
75	1050	11.66	10.73	2.35	15.30	14.06	2.43	19.20	17.50	2.53	24.07	21.37	2.66	28.23	25.69	2.77	32.83	32.83	2.89	37.95	37.95	3.06	43.92	43.92	3.29
	1200	11.92	10.97	2.37	15.60	14.34	2.45	19.54	17.82	2.53	24.41	21.68	2.65	28.60	26.02	2.75	33.28	33.28	2.85	38.54	38.54	3.00	44.68	44.68	3.22
	1350	12.15	11.18	2.40	15.87	14.58	2.47	19.85	18.10	2.55	24.69	21.93	2.65	28.91	26.31	2.74	33.66	33.66	2.84	39.03	39.03	2.98	45.28	45.28	3.16

See notes on page 18

HEAT PUMP HEATING PERFORMANCE CONTINUED

INDOOR AIR		OUTDOOR COIL ENTERING AIR TEMPERATURES ° F (° C)																							
		-3 (19.4)			7 (-13.9)			17 (-8.3)			27 (-2.i8)			37 (2.8)			47 (8.3)			57 (13.9)			67 (19.4)		
EDB ° F (° C)	CFM	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW	Capacity MBtuh		Total Sys-tem KW
		Total	Integ		Total	Integ		Total	Integ		Total	Integ		Total	Integ		Total	Integ		Total	Integ		Total	Integ	
25HCE442 Outdoor Section With FB4CNP042L Indoor Section																									
65	1225	15.59	14.35	2.48	19.93	18.31	2.59	24.83	22.64	2.71	30.26	26.88	2.87	35.66	32.45	3.01	41.58	41.58	3.18	48.02	48.02	3.34	53.69	53.69	3.47
	1400	15.91	14.64	2.50	20.28	18.64	2.59	25.75	23.48	2.72	30.60	27.17	2.84	36.05	32.81	2.98	42.10	42.10	3.14	48.21	48.21	3.26	53.51	53.51	3.37
	1575	16.19	14.89	2.51	20.58	18.91	2.60	26.05	23.75	2.72	30.91	27.46	2.84	36.39	33.12	2.96	42.45	42.45	3.10	48.18	48.18	3.20	53.24	53.24	3.31
70	1225	14.78	13.60	2.58	19.20	17.64	2.69	24.06	21.93	2.82	29.80	26.47	2.98	35.19	32.02	3.14	41.00	41.00	3.32	47.42	47.42	3.48	53.09	53.09	3.62
	1400	15.07	13.87	2.59	19.52	17.94	2.69	24.44	22.28	2.81	30.13	26.76	2.96	35.55	32.35	3.10	41.49	41.49	3.27	47.70	47.70	3.40	52.99	52.99	3.52
	1575	15.33	14.10	2.61	19.82	18.21	2.71	24.79	22.60	2.82	30.42	27.02	2.95	35.89	32.66	3.09	41.91	41.91	3.24	47.75	47.75	3.35	52.74	52.74	3.45
75	1225	14.00	12.88	2.68	18.50	17.00	2.79	23.38	21.32	2.93	29.35	26.07	3.11	34.70	31.57	3.28	40.41	40.41	3.47	46.83	46.83	3.64	52.47	52.47	3.79
	1400	14.27	13.13	2.69	18.80	17.28	2.80	23.74	21.65	2.92	29.68	26.36	3.09	35.07	31.92	3.24	40.89	40.89	3.41	47.13	47.13	3.55	52.43	52.43	3.68
	1575	14.51	13.34	2.71	19.07	17.53	2.81	24.05	21.93	2.93	29.95	26.60	3.07	35.39	32.20	3.21	41.30	41.30	3.38	47.26	47.26	3.50	52.23	52.23	3.60
25HCE448 Outdoor Section With FB4CNP048L Indoor Section																									
65	1400	16.35	15.04	2.75	21.40	19.66	2.87	26.82	24.46	3.00	33.50	29.76	3.17	39.20	35.67	3.31	45.68	45.68	3.48	53.36	53.36	3.67	61.87	61.87	3.84
	1600	16.69	15.36	2.78	21.78	20.01	2.89	27.25	24.85	3.00	33.88	30.09	3.16	39.67	36.10	3.29	46.26	46.26	3.44	54.19	54.19	3.61	62.42	62.42	3.76
	1800	17.00	15.64	2.81	22.12	20.33	2.91	27.64	25.20	3.02	34.22	30.40	3.17	40.06	36.45	3.28	46.75	46.75	3.42	54.77	54.77	3.57	62.78	62.78	3.72
70	1400	15.48	14.25	2.85	20.60	18.93	2.97	26.05	23.75	3.11	32.86	29.19	3.29	38.68	35.20	3.45	45.00	45.00	3.62	52.51	52.51	3.82	61.02	61.02	4.00
	1600	15.80	14.54	2.87	20.97	19.27	2.99	26.47	24.14	3.12	33.35	29.62	3.28	39.10	35.58	3.42	45.56	45.56	3.58	53.28	53.28	3.75	61.59	61.59	3.92
	1800	16.05	14.76	2.91	21.28	19.55	3.02	26.84	24.47	3.13	33.71	29.94	3.29	39.47	35.92	3.42	46.04	46.04	3.56	53.98	53.98	3.72	61.98	61.98	3.87
85	1400	13.11	12.07	3.19	18.31	16.83	3.34	23.83	21.72	3.50	29.75	26.42	3.67	37.16	33.82	3.93	43.00	43.00	4.12	49.89	49.89	4.32	58.18	58.18	4.52
	1600	13.37	12.30	3.22	18.63	17.12	3.35	24.21	22.07	3.50	30.22	26.84	3.66	37.55	34.17	3.89	43.52	43.52	4.07	50.66	50.66	4.25	58.86	58.86	4.43
	1800	13.58	12.49	3.25	18.88	17.35	3.38	24.50	22.34	3.51	30.57	27.15	3.66	37.88	34.48	3.87	43.96	43.96	4.04	51.35	51.35	4.20	59.33	59.33	4.37
25HCE460 Outdoor Section With FX4DN(B,F)061L Indoor Section																									
65	1750	21.14	19.45	3.33	26.85	24.67	3.46	33.16	30.23	3.60	40.66	36.11	3.79	47.51	43.23	3.95	55.22	55.22	4.13	64.29	64.29	4.32	73.31	73.31	4.50
	2000	21.51	19.79	3.36	27.26	25.05	3.48	33.65	30.68	3.61	41.05	36.45	3.77	48.03	43.70	3.92	55.88	55.88	4.08	64.95	64.95	4.23	73.54	73.54	4.40
	2250	21.84	20.10	3.40	27.62	25.39	3.51	34.07	31.07	3.63	41.40	36.77	3.78	48.48	44.12	3.91	56.46	56.46	4.07	65.31	65.31	4.19	73.39	73.39	4.34
70	1750	20.38	18.75	3.48	26.13	24.01	3.62	32.40	29.54	3.76	40.19	35.69	3.97	46.94	42.71	4.14	54.50	54.50	4.32	63.44	63.44	4.51	72.41	72.41	4.70
	2000	20.74	19.08	3.51	26.54	24.39	3.64	32.87	29.97	3.77	40.59	36.05	3.96	47.44	43.17	4.11	55.15	55.15	4.27	64.14	64.14	4.42	72.69	72.69	4.60
	2250	21.08	19.40	3.55	26.91	24.73	3.67	33.30	30.36	3.79	40.95	36.37	3.96	47.88	43.57	4.09	55.71	55.71	4.25	64.55	64.55	4.38	72.63	72.63	4.53
75	1750	19.58	18.01	3.63	25.36	23.30	3.78	31.62	28.83	3.94	39.67	35.23	4.16	46.37	42.20	4.33	53.80	53.80	4.52	62.59	62.59	4.72	71.50	71.50	4.92
	2000	19.94	18.35	3.67	25.78	23.69	3.80	32.10	29.27	3.94	40.12	35.64	4.14	46.85	42.63	4.29	54.42	54.42	4.46	63.33	63.33	4.63	71.81	71.81	4.80
	2250	20.28	18.65	3.71	26.15	24.03	3.83	32.52	29.65	3.96	40.49	35.96	4.14	47.28	43.02	4.28	54.97	54.97	4.43	63.78	63.78	4.57	71.82	71.82	4.73

NOTE: When the required data falls between the published data, interpolation may be performed. Extrapolation is not an acceptable practice.

* The Btuh heating capacity values shown are net integrated values from which the defrost effect has been subtracted. The Btuh heating from supplement heaters should be added to those values to obtain total Sys. capacity.

† The kW values include the compressor, outdoor fan motor, and indoor blower motor. The kW from supplement heaters should be added to these values to obtain total Sys. kilowatts.

EDB — Entering Dry Bulb

GUIDE SPECIFICATIONS
GENERAL

System Description

Outdoor-mounted, air-cooled, split-system heat pump unit suitable for ground or rooftop installation. Unit consists of a hermetic compressor, an air-cooled coil, propeller-type condenser fan, and a control box. Unit will discharge supply air upward as shown on contract drawings. Unit will be used in a refrigeration circuit to match up to a packaged fan coil or coil unit.

Quality Assurance

— Unit will be rated in accordance with the latest edition of AHRI Standard 240.

— Unit will be certified for capacity and efficiency, and listed in the latest AHRI directory.

— Unit construction will comply with latest edition of ANSI/ ASHRAE and with NEC.

— Unit will be constructed in accordance with UL standards and will carry the UL label of approval. Unit will have C-UL approval.

— Unit cabinet will be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 500-hr salt spray test.

— Air-cooled condenser coils are pressure tested and the outdoor unit is leak tested.

— Unit constructed in ISO9001 approved facility.

Delivery, Storage, and Handling

— Unit will be shipped as single package only and is stored and handled per unit manufacturer's recommendations.

Warranty (for inclusion by specifying engineer)

— U.S. and Canada only.

PRODUCTS

Equipment

— Factory assembled, single piece, air-cooled heat pump unit. Contained within the unit enclosure is all factory wiring, piping, controls, compressor, refrigerant charge Puron® (R-410A), and special features required prior to field start-up.

Unit Cabinet

— Unit cabinet will be constructed of galvanized steel, bonderized, and coated with a powder coat paint.

— Available with dense grille only.

Fans

— Condenser fan will be direct-drive propeller type, discharging air upward.

— Condenser fan motors will be totally enclosed, 1-phase type with class B insulation and permanently lubricated bearings.

— Shafts will be corrosion resistant.

— Fan blades will be statically and dynamically balanced.

— Condenser fan openings will be equipped with steel wire safety guards.

Compressor

— Compressor will be hermetically sealed.

— Compressor will be mounted on rubber vibration isolators.

Condenser Coil

— Condenser coil will be air cooled.

— Coil will be constructed of aluminum fins mechanically bonded to copper tubes which are then cleaned, dehydrated, and sealed.

Refrigeration Components

— Refrigeration circuit components will include liquid-line shutoff valve with sweat connections, vapor-line shutoff valve with sweat connections, system charge of Puron® (R-410A) refrigerant, POE compressor oil, accumulator, and reversing valve.

Operating Characteristics

— The capacity of the unit will meet or exceed _____ Btuh at a suction temperature of _____ °F/°C. The power consumption at full load will not exceed _____ kW.

— Combination of the unit and the evaporator or fan coil unit will have a total net cooling capacity of _____ Btuh or greater at conditions of _____ CFM entering air temperature at the evaporator at _____ °F wet bulb and _____ °F/°C dry bulb, and air entering the unit at _____ °F/°C.

— The system will have a SEER of _____ Btuh/watt or greater at DOE conditions.

Electrical Requirements

— Nominal unit electrical characteristics will be _____ v, single phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.

— Unit electrical power will be single point connection.

— Control circuit will be 24v.

Special Features

— Refer to section of this literature identifying accessories and descriptions for specific features and available enhancements.

SYSTEM DESIGN SUMMARY

1. Intended for outdoor installation with free air inlet and outlet. Outdoor fan external static pressure available is less than 0.01-in. wc.
2. Minimum outdoor operating air temperature without low-ambient operation accessory is 55°F (12.8°C).
3. Maximum outdoor operating air temperature for cooling mode is 125°F (51.7°C).
4. Minimum outdoor operating air temperature for heating mode is –30°F (–34.4°C).
5. Maximum outdoor operating air temperature for heating mode is 66°F (18.9°C).
6. For reliable operation, unit should be level in all horizontal planes.
7. For interconnecting refrigerant tube lengths greater than 80 ft (23.4 m) and/or elevation differences between indoor and outdoor units greater than 20 ft (6.1 m), consult Residential Piping and Longline Guideline and Service Manual available from equipment distributor.
8. If any refrigerant tubing is buried, provide a 6 in. (152.4 mm) vertical rise to the valve connections at the unit. Refrigerant tubing lengths up to 36 in. (914.4 mm) may be buried without further consideration. Do not bury refrigerant lines longer than 36 in. (914.4 mm).
9. Use only copper wire for electric connection at unit. Aluminum and clad aluminum are not acceptable for the type of connector provided.
10. Do not apply capillary tube indoor coils to these units.
11. Factory-supplied filter drier must be installed.

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ATTACHMENT "B"

TEMPORARY EXTERIOR QUILTED CURTAINS SPECIFICATION

SOUND SEAL® SOUND CURTAINS
EXTERIOR GRADE NOISE CONTROL

Water Fountain Area

Water Tower

Typically installed on. . .

- Engineered Steel structures
- Chain-link Fences
- Wood Framing

UNIVERSITY AT ALBANY;
ALBANY, NY

Situation: Sand blasting and repainting the 248' tall water tower; and refurbishing water fountain area while classes are in session.
Sound Seal Solution: BBC Exterior Grade Sound Curtains specified–BBC-13X-2" for water tower higher wind exposure areas, BBC-EXT-N-2" for lower water tower areas and water fountain area.

PISCATAQUA BRIDGE;
PORTSMOUTH, NH – KITTERY, ME

Situation: Repainting bridge work. Compressors and generators located below bridge disturbing community.
Sound Seal Solution: BBC-13X-2" Sound Curtain panels to enclose equipment.

EXTERIOR GRADE NOISE CONTROL PRODUCTS

SOUND SEAL

www.soundcurtains.com

PERMANENT STYLE SOUND CURTAINS

"Most Durable"
BBC-EXT-R Style
BBC-EXT-R Sound Curtain Panels feature our durable reinforced noise barrier and a UV and tear resistant exterior grade faced quilted fiberglass sound absorber sewn with a Gore Tenera exterior grade thread.

- For use on permanent outdoor installations
- 1 lb. psf or 2 lb. psf reinforced noise barrier
- Wind Load > 120 mph
- 1"-thick or 2"-thick quilted fiberglass sound absorber
- STC values ranging from 29 to 38
- NRC values ranging from .65 to .75

Applications. . .
- HVAC Equipment
- Compressors, Generators
- Dust Collectors
- Shredders

BBC-EXT-R-2" Sound Curtains enclose pumps and compressors.

BBC-13X-2" Sound Curtains were specified on Boston's "Big Dig" project

CONSTRUCTION SITE SOUND CURTAINS

"Most Specified"
BBC-13X-2"

BBC-13X-2" Sound Curtain Panels combine the benefits of both a Noise Barrier (Rated in STC) and a Sound Absorber (Rated in NRC) in one product.
This product utilizes a durable, tear resistance reinforced noise barrier with a vinyl faced quilted fiberglass sound absorber.

- Class A flammability rated
- 2-inch thick vinyl faced quilted fiberglass absorber
- Fabricated with grommets across top and bottom and exterior grade Velcro seams along edges
- Acoustical Ratings: STC 32, NRC .85

Typically installed on. . .
- Chain-link Fences
- Wooden support Structures
- Double Jersey Barriers

A specified and approved product used to comply with the New York City Noise Ordinance Code.

CONSTRUCTION SITE SOUND CURTAINS

"Most Economic"
BBC-EXT-N Style

BBC-EXT-N Sound Curtain Panels combine a money saving non-reinforced noise barrier with a UV and tear resistant exterior grade faced quilted fiberglass sound absorber.

- For use on construction sites
- 1lb. psf or 2 lb. psf non-reinforced noise barrier
- 1"-thick or 2"-thick quilted fiberglass sound absorber
- STC values ranging from 27 to 38
- NRC values ranging from .70 to .85

Typically installed on. . .
- Chain-link Fences
- Double Jersey Barriers

Applications. . .
- Commercial & Industrial Construction
- Highway & Bridge Construction
- Drilling Sites
- Mass Transit construction

EXTERIOR SOUND ABSORBERS

Add Sound Absorption to. . .
- Permanent concrete enclosures
- Temporary Plywood barriers
- Solid wooden fences

Typically installed on. . .
- Concrete wall structures
- Solid wood Fences

QFA-EXT Style

These Sound absorptive panels feature our UV and tear resistant exterior grade faced quilted fiberglass sound absorber sewn with a Gore Tenera thread.

- 1-inch, 2-inch, or 4-inch thick
- NRC values ranging from .65 to .95
- Exterior grade facing on one or both sides
- Superior UV resistance

Check out www.**soundcurtains**.com to see why Sound Seal has become a New York City suggested vendor… and to see how Sound Seal can provide the sound barrier solution your city or town may require to comply with local noise ordinances.

Sound Seal Sound Curtain Panels are used for both permanent and construction site noise control. Our modular Sound Curtains offer noise control that is simple, cost effective, and proven to work.

- Reduce outdoor construction and/or community noise
- High actual noise reduction up to 20 dB(A)
- Economical alternative to rigid acoustical panel systems
- Easily installed, relocated, or modified

Flexible configurations to suit your needs for easy set-up, easy maneuverability.

- Custom engineered systems for any application
- Durable and washable
- A variety of colors
- Designs blend with landscape

Sound Seal Sound Curtains help you get the job done without hassle and on time.

- Comply with city noise codes
- Avoid litigation from neighbors
- End costly delays and work stoppages due to noise
- Expedite options ship in one week or less

SOUNDSEAL SOLUTIONS AT WORK

BOSTON'S BIG DIG

Situation: Noise control measures specified by engineers

Sound Seal Solution: 10 dB(A) noise reduction; modular panels moved as project progressed

NEW YORK CITY

Situation: Contractor must comply with NYC Noise Ordinance before project may proceed

Sound Seal Solution: BBC-EXT Sound Curtains installed around job site

INDIANAPOLIS, IN

Situation: Dust collector behind manufacturing facility creating neighborhood noise problem

Sound Seal Solution: BBC-EXT-R -2" Sound Curtains installed on chain link fence offers long term effective noise reduction of 15 dB(A)

CALPINE CALIFORNIA NATURAL GAS, SACRAMENTO, CA

Situation: Neighborhood noise, restricted work hours; high winds

Sound Seal Solution: BBC-EXT Sound Curtains installed on engineer certified steel tube frame yields 16 dB(A) noise reduction

Who is Sound Seal?

Since 1978, Sound Seal has been a leader in the acoustics field, offering a complete line of soundproofing and noise control products for industrial, architectural, construction, and HVAC markets. Our product lines can be installed in almost any location, and include:

- Wood Ceilings
- Wood Wall Panels
- Acoustical Wall Panels
- Ceiling Panels
- Acoustical Floor Underlayments
- Acoustic Pipe and Duct Wraps
- Noise Barriers
- Sound Curtains

With the widest product selection in the soundproofing industry, and sound control solutions for every type of noise problem, our expert staff is available to advise you about product selection and installation.

Block Sound Outside

Absorb Sound Inside

SOUND SEAL®

www.soundcurtains.com
www.soundseal.com
T-**800-569-1294**

SS110 7/12

FSC www.fsc.org MIX Paper from responsible sources FSC® C006634

BBC-13X Sound Curtains

Sound Seal's **BBC-13X** offers the benefits of both a noise barrier and a sound absorber for outdoor applications. The BBC-13X consists of a one-inch thick vinyl-coated-fiberglass-cloth faced quilted fiberglass that is bonded to a one-pound per sq. ft. reinforced loaded vinyl noise barrier. **"X"** style Sound Curtain panels are constructed with grommets across the top and **bottom, and exterior grade** Velcro seals along the vertical edges. The product is also available in roll form with edges bound or unbound.

- Class A (or 1) flammability rated per ASTM E 84
- For use on Indoor or Outdoor Applications
- Available facing colors: gray, tan, black, or off-white
- Available barrier colors: gray, tan, blue or olive drab

Applications:

Even in the harshest environments, with a minimum life span of 5 years* and wind load ratings of 120 mph, this product is typically used as a **temporary noise barrier on outdoor applications such as construction site noise mitigation projects**. Also available with a two-pound psf noise barrier or a two-inch thick quilted fiberglass sound absorber for better acoustical performance.

Product Data:

Description	Vinyl coated fiberglass cloth facing on 1" quilted fiberglass
	1lb-psf reinforced loaded vinyl barrier
Flammability	Flame Spread: 23.0
	Smoke density: 30.0
Nominal thickness	1.0 inch
Temperature range	-20° to +180° F
Standard roll size	54" wide x 25' long
Weight	1.2 lb psf

Acoustical Performance:

Sound Transmission Loss

	OCTAVE BAND FREQUENCIES (Hz)						
Product	**125**	**250**	**500**	**1000**	**2000**	**4000**	**STC**
BBC-13 X	11	16	24	30	35	35	27

ASTM E-90 & E 413

Sound Absorption Data

	OCTAVE BAND FREQUENCIES (Hz)						
Product	**125**	**250**	**500**	**1000**	**2000**	**4000**	**NRC**
BBC-13 X	.12	.47	.85	.84	.64	.62	.70

ASTM C 423
* when properly installed.