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APPENDIX G

Noise and Vibration Evaluation Technical Report

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Pittsburg Data Hub

Noise & Vibration Technical Report

Pittsburg Data Hub

Noise & Vibration Technical Report

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Description	This technical report provides a summary of noise regulations relevant to the project, an analysis of existing conditions, and an assessment of potential noise impacts on noise-sensitive receptors. The assessment includes potential noise impacts from both construction and operation of the site.

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Acronyms and Abbreviations

ANSI	American National Standards Institute	in/sec	inches per second
ASTM	ASTM International	ISO	International Organization for Standardization
Cadna/A	Computer Aided Noise Abatement software from DataKustik GmbH	LAEQ	A-weighted time-average sound level
Caltrans	California Department of Transportation	m	meter
		mph	miles per hour
		MVA	Megavolt-amperes
CEC	California Energy Commission	MV	Megawatt
CEQA	California Environmental Quality Act	PMC	City of Pittsburgh Municipal Code
		PPV	peak particle velocity
dB	Decibel	Ramboll	Ramboll Americas Engineering Solutions
DNL	Day-night average sound level	SLM	sound level meter
FHWA	Federal Highway Administration	SPPE	Small power plant exemption
ft	feet	TNM	Traffic Noise Model
FTA	Federal Transit Authority	USEPA	United States Environmental Protection Agency
GBV	Ground-borne vibration	VdB	Decibels of vibration velocity
Hz	hertz (1/seconds)		

1. Introduction

The proposed Pittsburgh Data Hub project (“the Project”) involves the construction and operation of a 3-story data center. The facility will include 37 3-MW diesel backup generators. The Project will also include a 100-MVA substation just south of the data center. The Project will be located in the City of Pittsburgh along West Leland Road approximately 1/3-mile south of California State Route 4.

Project construction will occur intermittently over approximately 18 months and has been divided into several phases based on the construction schedule. Noise sources during construction will include stationary and mobile construction equipment, such as generators, loaders, graders, and haul trucks. During construction, Golf Club Road will be extended to provide site access during operations, and an access road to the northwest leading from West Leland Road will be constructed for use in emergencies. Upon completion of project construction and commissioning, noise sources during operations will include rooftop mechanical equipment and emergency generators located in an on-grade equipment yard.

This technical report provides a summary of noise regulations relevant to the project, an analysis of existing conditions, and an assessment of potential noise and vibration impacts on sensitive receptors. The assessment includes potential noise and vibration impacts from both construction and operation of the site.

2. Regulatory Setting

2.1 Federal Laws, Regulations, and Policies

2.1.1 US Federal Transit Administration

The Federal Transit Administration (FTA) provides guidelines for assessing the potential for adverse community reaction from construction activity. For detailed analysis, the criteria are an 8-hour L_{EQ} of 80 dBA during the day and 70 dBA during nighttime at residential receptors. The FTA states that if these criteria are exceeded, there may be adverse community reaction. These criteria are frequently used in the absence of any quantitative limits for construction noise from local agencies.

2.2 State Laws, Regulations, and Policies

2.2.1 California State Code

California Government Code section 65302 encourages each local government entity to implement a noise element as part of its general plan. In addition, the California Governor’s Office of Planning and Research has developed guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The City of Pittsburgh and Contra Costa County have developed guidelines that are summarized below.

2.2.2 California Department of Transportation

The California Department of Transportation (Caltrans) provides guidelines for construction vibration in its Transportation and Construction Vibration Guidance Manual. Included in the manual are recommended thresholds for both building damage potential and human annoyance from construction-related vibration. The recommended damage thresholds are summarized in

Table 2-1. The annoyance thresholds are summarized in Table 2-2. These criteria are frequently used in the absence of any quantitative limits for vibration from local agencies.

Table 2-1. Caltrans Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 2-2. Caltrans Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.04

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

2.3 Regional Laws, Regulations, and Policies

2.3.1 Contra Costa County Municipal Code

Contra Costa County does not have a dedicated noise ordinance, but it has established a nuisance ordinance related to grading activity. Section 716-8.1008 requires grading operations to be controlled to prevent nuisances to public and private ownerships because of noise or vibration.

2.3.2 Contra Costa County General Plan

The Contra Costa County 2040 General Plan includes a Noise Element that provides policies related to noise. Policy 11-1 provides noise and land use compatibility guidelines for new projects, summarized in Figure 2-1 below. In addition, the Noise Element includes the following noise policy related to construction noise:

Policy 11-8: Construction activities shall be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses and should be commissioned to occur

during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods.

Figure 11-6 Land Use Compatibility for Community Noise Environments

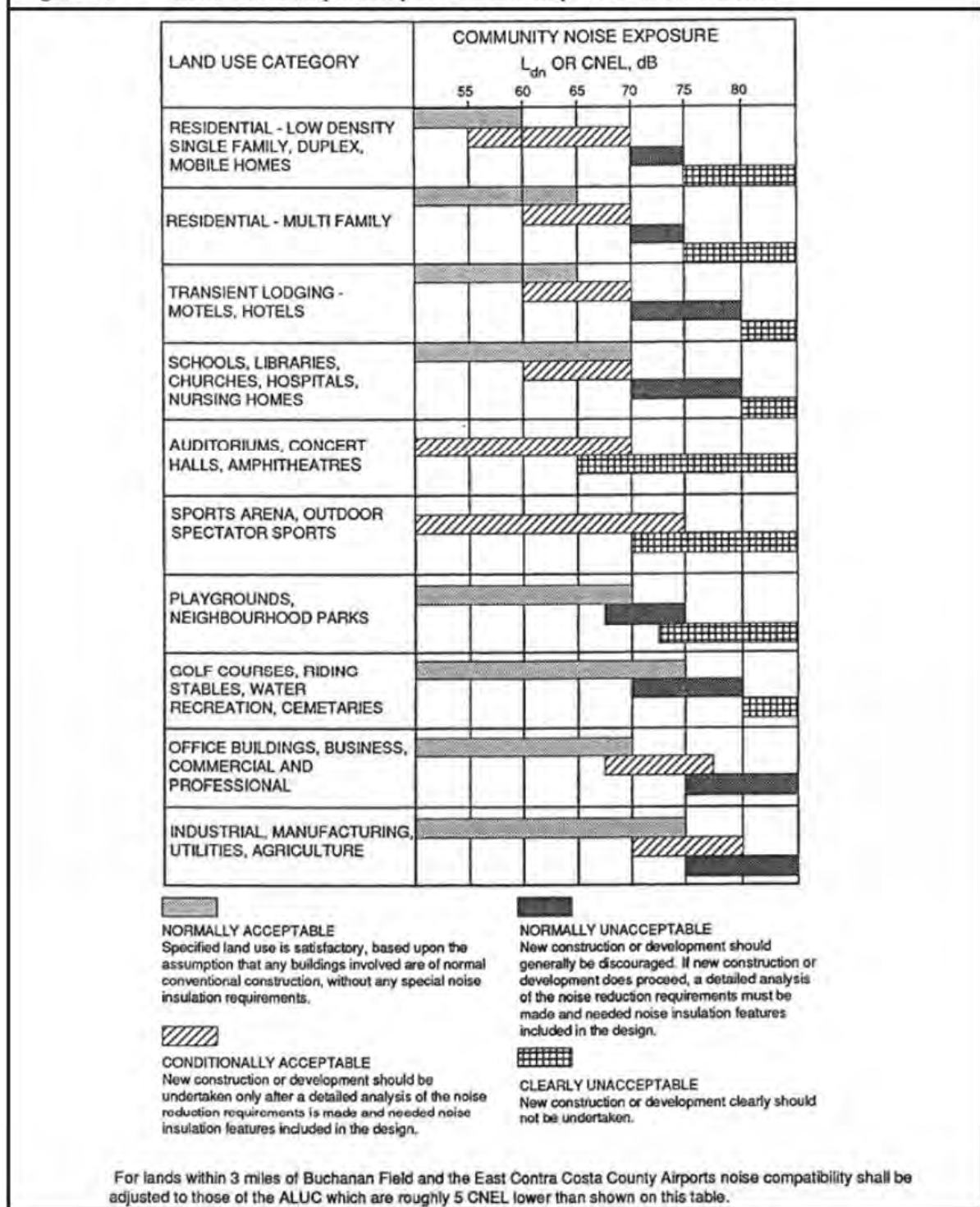


Figure 2-1. Contra Cost County Land Use Compatibility Guidelines

2.3.3 City of Pittsburgh Municipal Code

There are two sections of the Pittsburgh Municipal Code (PMC) relevant to Project noise. Chapter 9.44 includes the City's noise ordinance, while Chapter 18.82 includes the City's performance standards. Chapter 9.44 does not contain any quantitative sound level limits. Instead, it includes a list of prohibitions, including the following:

- The discharge of exhaust of stationary internal combustion engines (e.g., generators) except through a muffler or other noise control device
- The operation of pile drivers, steam shovels, pneumatic hammers, derricks, and steam or electric hoists between the hours of 10:00 p.m. and 7:00 a.m. except in the case of emergency
- The operation of any noise-producing blower, power fan, or engine unless noise from the source is sufficiently controlled.

Paragraph 18.82.040 requires compliance with Chapter 9.44 and prohibits construction noise on sites adjoining residential properties that exceed 65 dBA measured at the property line, except between the hours of 8:00 a.m. and 5:00 p.m. The PMC does not have any other quantitative sound level limits.

2.3.4 City of Pittsburgh General Plan

The City of Pittsburgh 2020 General Plan contains the following policies relevant to Project noise.

Goal 12-G-1: Protect public health and welfare by eliminating or minimizing the effects of existing noise problems, and by preventing increased noise levels in the future.

Policy 12-P-1: As part of development review, use Figure 12-3 to determine acceptable uses and installation requirements in noise-impacted areas.

Figure 12-3 is based on land use and noise exposure compatibility levels in Appendix A of the State of California General Plan Guidelines. The table is consistent with the provision of State law that requires special noise insulation for new multi-family housing units within 60 dB Ldn noise exposure contours. The table's land use categories do not correspond to the land use classifications on the General Plan Land Use Diagram, but to actual uses in development projects.

Figure 12-3 of the General Plan is provided below as Figure 2-2 of this report. While the compatibility guidelines are used for assessing noise exposure for new noise-sensitive projects (e.g., residential developments), they are also appropriate for assessing compatibility of new noise-generating projects, such as data centers.

Policy 12-P-7: Require the control of noise at the source through site design, building design, landscaping, hours of operation, and other techniques, for new development deemed to be noise generators.

Policy 12-P-8: Develop noise attenuation programs for mitigation of noise adjacent to existing residential areas, including such measures as wider setbacks, intense landscaping, double-pane windows, and building orientation muffling the noise source.

Policy 12-P-9: Limit generation of loud noises on construction sites adjacent to existing development to normal business hours to between 8:00 AM and 5:00 PM.

Policy 12-P-10: Reduce the impact of truck traffic noise on residential areas by limiting such traffic to appropriate truck routes. Consider methods to restrict truck travel times in sensitive areas.

Land Use Category	Exterior Day/Night Noise Levels DNL or Ldn, dB						INTERPRETATION
	55	60	65	70	75	80	
Residential—Single Family							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
Residential—Multiple Family							
Transient Lodging—Motels, Hotels							
Schools, Libraries, Churches, Hospitals*, Nursing Homes							Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.
Auditoriums, Concert Halls, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Parks							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 needed noise insulation features included in the design.
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing,							Clearly Unacceptable: New construction or development clearly should not be undertaken.

Source: Office of Planning and Research, State of California General Plan Guidelines, Appendix A: Guidelines for the Preparation and Content of the Noise Element of the General Plan, 1998.

*Because hospitals are often designed and constructed with high noise insulation properties, it is possible for them to be satisfactorily located in noisier areas.

Figure 12-3

Land Use Compatibility for Community Noise Environments

Figure 2-2. City of Pittsburgh Land Use Compatibility Guidelines

3. Environmental Setting

3.1 Noise- and Vibration-Sensitive Receptors

The locations of the noise- and vibration-sensitive receptors are shown in Figure 3-1 below. The noise- and vibration-sensitive receptors within 1000 feet the site include the following:

- Residences
 - Adjacent to the site along Golf Club Road
 - Approximately 85 feet northwest of the site across West Leland Road
 - Approximately 760 feet to the east along Orinda Circle, Brookshire Court, and Fairway Court
- School: Ranch Medanos Junior High School approximately 640 feet north of the site on Range Road
- Parks: John Henry Johnson Park approximately 250 feet to the west across West Leland Road
- The Church of Jesus Christ of Latter-day Saints approximately 200 feet north of the site on Golf Club Road



Figure 3-1. Noise- and Vibration-Sensitive Receptors Around the Project Site

3.2 Existing Sources of Noise and Vibration

The existing sources of noise include the following:

- CA-4 approximately 1/3-mile to the north
- Local roads around the Project site, including West Leland Road
- Rail lines approximately 4/5-mile to the north

There are no significant sources of vibration near the Project site.

3.3 Existing Ambient Sound Environment

To quantify the existing ambient sound environment for the purpose of assessing potential impacts from construction and operational noise, Ramboll conducted an ambient sound level survey at the Project site from 1 to 3 November 2023.

3.3.1 Measurement Procedures

The survey consisted of continuous 48-hour measurements at two locations using two Larson Davis LxT sound level meters, which meet ANSI S1.4 requirements for a Type 1 sound level meter. The locations for measurements were chosen based on the locations of future construction and operational activity, the locations of noise-sensitive receptors, and the locations of existing sources of sound. The measurements were made in general conformance to ANSI S12.9-1992/Part 2. The measurement locations are shown in Figure 3-2 and described in Table 3-1.

Table 3-1. Descriptions of sound monitoring locations

Tag	Location	Measurement Period	Nearest Noise-Sensitive Receptor(s)
L-1	South of residences on Golf Club Road	9:30 AM 11/1/23 - 9:45 AM 11/3/23	Residences along Golf Club Road
L-2	West of residences along Orinda Circle	9:45 AM 11/1/23 - 10:00 AM 11/3/23	Residences along Orinda Circle

The sound level meters were placed in weather-resistant cases, while the microphones were placed on tripods approximately 5 feet above grade. Figure 3-3 shows an example installation.



Figure 3-2. Sound monitoring locations.



Figure 3-3. Example Sound Level Meter Deployment (L-1)

3.3.2 Measurement Results & Discussion

The measured sound levels were DNL 56 dBA at L-1 and DNL 54 dBA at L-2, both of which would be considered “normally acceptable” for residential areas, based on the compatibility guidelines of the City of Pittsburg and Contra Costa County. The primary source of sound was local road traffic, with birds, distant trains, and general neighborhood activity also contributing to the sound environment. The most active local road was West Leland Road.

4. Thresholds of Significance

4.1 Significance Criteria

Based on the environmental checklist in Appendix G of the State CEQA Guidelines, the proposed Project would result in a significant noise or vibration impact if it would result in:

- a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or generate a substantial incremental increase in noise levels;
- b) Generation of excessive ground-borne vibration or ground-borne noise levels;
- c) For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted within two miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels.

Note that the Project site is not located within an airport land use plan and there are no public airports or public use airports within two miles of the Project. Also, there are no private airstrips

within the Project vicinity. The nearest public or public use airport is the Buchanan Field Airport, approximately 7.5 miles southwest of the Project area. Therefore, there would be no impact from Significance Criteria c), which is not considered further in this analysis.

4.2 Project Thresholds of Significance

4.2.1 Noise

4.2.1.1 Construction

The City of Pittsburg Municipal Code prohibits construction noise in excess of 65 dBA at residential properties outside of the hours of 8:00 a.m. and 5:00 p.m. However, it does not provide sound levels limits for construction activities between the hours of 8:00 a.m. and 5:00 p.m. FTA guidelines recommend a daytime criterion of an 8-hour L_{AEQ} of 80 dBA during the day, which this analysis adopts as a threshold for daytime construction noise.

4.2.1.2 Operations

The City of Pittsburg General Plan includes land use compatibility guidelines for environmental noise. "Normally Acceptable" sound levels at single-family residences and parks are DNL 60 dBA and DNL 70 dBA, respectively, which this project adopts as thresholds. The City of Pittsburg Municipal code does not include any quantitative limits relevant to operational noise. However, it does include qualitative requirements regarding noise control for generators and mechanical equipment.

4.2.2 Vibration

4.2.2.1 Construction

Neither the City of Pittsburg nor Contra Costa County have limits related to vibration in either their codes or general plans. To assess the impacts of Project vibration to sensitive receptors, this analysis uses the Caltrans guidelines discussed in Section 2.2.2 for both building damage potential and human annoyance.

4.2.2.2 Operations

The stationary equipment that would be on site for this Project are not significant sources of vibration. As a result, this report does not discuss vibration from these sources.

4.3 Summary

Table 4-1 provides a summary of the significance thresholds for this analysis.

Table 4-1. Thresholds of Significance

Significance Criteria	Significance Threshold	Source / Agency
a)	Construction sound level limits:	
	Maximum sound level of 65 dBA at residential receptors 5:00 p.m. to 8:00 a.m.	PMC
	Maximum 8-hr L_{AEQ} of 80 dBA or less 8:00 a.m. to 5:00 p.m.	FTA
	For permanent stationary noise sources:	
	- DNL equal to or less than 60 dBA at residences and schools ("normally acceptable") - DNL equal to or less than 70 dBA at parks ("normally acceptable")	City of Pittsburgh General Plan
	Include noise control measures for mechanical equipment and emergency generators	PMC
b)	Damage to structures: 0.12 in/sec PPV	Caltrans
	Annoyance: 0.04 in/sec PPV	Caltrans

5. Impact Analysis

5.1 Noise

For both operational noise and construction noise, noise emissions were predicted using the Computer Aided Noise Abatement (CadnaA) model (Datakustik, 2023). CadnaA industrial noise calculation procedure enables complete noise modeling of complex facilities using sound propagation factors as adopted by International Organization for Standardization (i.e., ISO 9613, ISO 17534). CadnaA considers distance, topography, intervening structures, atmospheric attenuation, ground effects, and vegetation when estimating sound levels from specific sources at distant receptor locations.

5.1.1 Construction Noise

Noise emissions predicted to occur during construction of the proposed Project were predicted at the nearest sensitive receivers to the project site using Cadna/A. Information regarding construction equipment specific to each phase, including assumed numbers of equipment and vehicle trips, is based on CalEEMod® outputs summarized in Appendix B. Included are stationary or mostly stationary equipment such as generators and compressors, and mobile equipment such as loaders, graders, and haul trucks. Source sound level data were estimated based on construction equipment noise data published by the U.S. Federal Highway Administration and the Federal Transit Administration. Example construction equipment sound levels are shown in Table 5-1. Specific construction equipment for this project and their associated sound levels are provided in Appendix C. For vehicle trips, sound levels were calculated using the Traffic Noise Model (TNM) module in Cadna/A.

Table 5-1. Common Construction Equipment Noise Levels

Equipment	L _{ASmax} @ 50 ft
Air Compressor	80
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	82
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	80
Paver	85
Pile-driver (Impact)	101
Pile-driver (Sonic)	95
Pneumatic Tool	85
Pump	77
Rail Saw	90
Rock Drill	95
Roller	85
Saw	76
Scarifier	83
Scraper	85
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	84

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, September 2018.

Noise emissions from construction activities will vary depending on the type of equipment in use, how many pieces of equipment are operating at any one time, the proximity of equipment to a noise receptor location (i.e., mobile equipment can be moved around a construction site), and the duration of equipment use. The assessment of construction noise impacts included consideration of these factors.

Construction activities would occur intermittently on the project site over the 18-month construction program and could expose noise sensitive receptors to temporary or extended duration increases in noise levels that exceed ambient levels. Project construction also is anticipated to result in temporary increases in truck traffic noise along local roads for hauling of

material. Each phase of construction was evaluated separately to identify the potential for impact from each phase with consideration of the factors identified above. Construction will occur during the daytime for 8 hours a day.

Sound levels from construction activity for each phase of construction were predicted at seven sensitive receptors around the project site, based on the cumulative noise contribution of both on-site construction equipment and off-site traffic such as worker vehicles, vendor vehicles, and haul trucks. The receptor locations are shown in Figure 5-1. The results of the noise modeling at each receptor during the five phases of construction are summarized in Table 5-2.

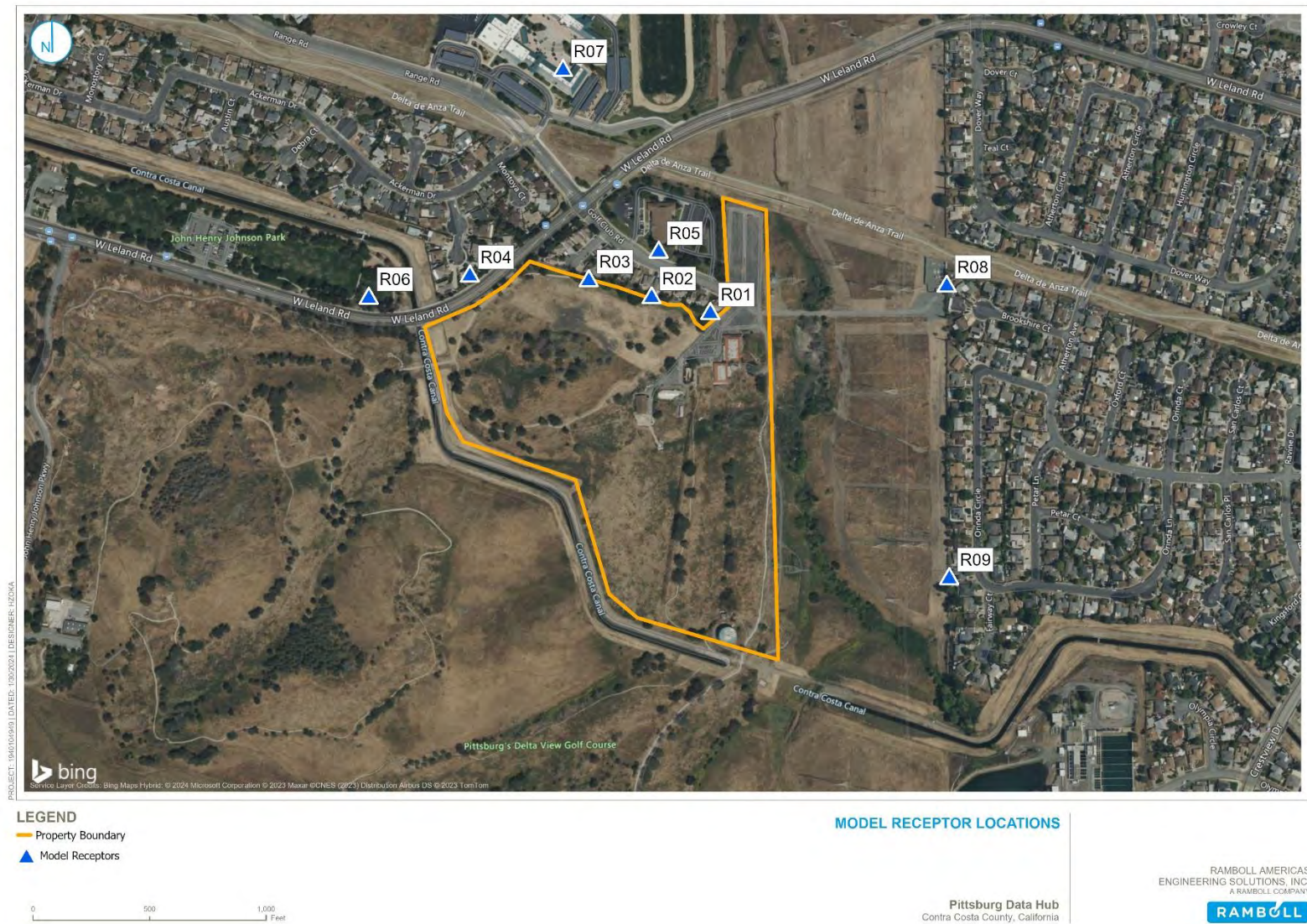


Figure 5-1. Noise Model Receptor Locations.

Table 5-2. Predicted Construction Noise (8-Hour L_{AEQ} , dB)

Receiver	Location	Sound Level by Phase					Significance Threshold	Threshold Exceedance during Any Phase?
		Site Preparation	Grading	Building Construction	Paving	Architectural Coating		
R1	Golf Club Rd Residence 1	62	61	60	57	52	80	No
R2	Golf Club Rd Residence 2	62	61	59	50	52	80	No
R3	Golf Club Ct Residence	62	62	61	53	54	80	No
R4	Shadow Ct Residence	59	59	57	54	51	80	No
R5	LDS Church	62	58	59	50	53	80	No
R6	John Henry Johnson Park	53	53	50	45	40	80	No
R7	Rancho Medanos Junior High	55	57	55	44	48	80	No
R8	Brookshire Ct Residence	57	57	55	46	46	80	No
R9	Orinda Ct Residence	54	54	52	46	36	80	No

As shown in Table 5-2, the significance thresholds are not exceeded during any phase of construction. Therefore, no mitigation is required.

5.1.2 Operational Noise

The primary sources of operational noise from the Project include the rooftop chillers that provide cooling to data center equipment and the emergency generators. Secondary noise sources include rooftop air handling units, two 50MVA transformers at the substation, and traffic from employees and visitors.

To reduce noise from the chillers, the chillers will utilize both a low-sound fan option and compressor enclosures. The generators will only run during maintenance and testing and during emergencies. Noise reduction measures utilized for the generators as part of the Project design are discussed in more detail below.

5.1.2.1 Normal Operations

Noise emissions from stationary mechanical and electrical equipment on site predicted to occur during operation of the proposed Project were estimated using the Datakustik Cadna/A noise model software. The model included stationary noise sources for noise from the rooftop chillers and secondary noise sources such as rooftop air handling units and the substation transformers. Additional information regarding the project site and layout of equipment is provided in Appendix D, while mechanical and electrical equipment is provided in Appendix E. The equipment is assumed to run at 100% capacity 24/7, which represents a conservative worst-case scenario.

Operational traffic would consist of 20 to 30 employees and 12 to 15 visitors per day, including deliveries. For the purpose of this analysis, it is assumed that five visitors per day would be delivery trucks. Because the facility would operate 24/7, to be conservative the analysis assumes the same rate of vehicle traffic between day and night.

The results of the noise modeling at each receptor during normal operations and associated thresholds of significance are summarized in the table below.

Table 5-3. Predicted Project Noise at Receptors from On-Site Equipment during Normal Operation

Receiver	Location	Project Noise (DNL)	Existing Ambient (DNL)	Project Noise + Ambient (DNL)	Significance Threshold (DNL)	Threshold Exceedance?
R1	Golf Club Rd Residence 1	57	56	59	60	No
R2	Golf Club Rd Residence 2	57	56	59	60	No
R3	Golf Club Ct Residence	56	56	59	60	No
R4	Shadow Ct Residence	55	56	58	60	No
R5	LDS Church	55	56	59	60	No
R6	John Henry Johnson Park	53	56	58	70	No
R7	Rancho Medanos Junior High	50	56	57	60	No

Receiver	Location	Project Noise (DNL)	Existing Ambient (DNL)	Project Noise + Ambient (DNL)	Significance Threshold (DNL)	Threshold Exceedance?
R8	Brookshire Ct Residence	51	54	56	60	No
R9	Orinda Ct Residence	52	54	56	60	No

As shown in the table, the significance threshold is not exceeded at any sensitive receptor. As a result, mitigation is not needed.

5.1.2.2 Emergency Generators

The PMC does not have quantitative sound level limits for operational noise (i.e., non-construction noise). As a result, there is no exemption, per se, for the use of emergency generators during a power outage. Instead, the PMC prohibits “the discharge of exhaust of stationary internal combustion engines (e.g., generators) except through a muffler or other noise control device.” The project generators would use acoustical enclosures rated to 75 dBA at 23 feet (7 m). The enclosures function as an acoustical enclosure to reduce noise radiated from the engine and includes an exhaust muffler so that the total contribution of noise radiating through the enclosure and out of the exhaust is no greater than 75 dBA measured at 23 feet from the generator. For reference, the highest resulting continuous sound level at a noise-sensitive receptor with all rooftop equipment running (e.g., chillers, rooftop units) and all 37 generators running during an emergency would be 57 dBA. If the generators were to run for 24 hours or more, the resulting DNL would be 63 dBA, which exceeds the existing ambient by 7 dB. However, power outages are typically infrequent and temporary, and therefore would not result in a significant impact.

Generator maintenance and testing would take place during daytime hours and would be limited to 34 hours per year per generator. Since the generators will be tested individually, sound levels during testing would be less than the sound levels during an emergency and would not exceed the significance thresholds.

5.2 Vibration

5.2.1 Construction Vibration

5.2.1.1 On-Site Construction Sources

Vibration from construction equipment and activity was predicted for each piece of equipment to three receptors. Construction vibration to receptors more than 500 feet from the edge of the construction site (R4, R6, R7, R8, R9) were not considered. Groundborne vibration dissipates rapidly over distance and would be minimal at distances greater than 500 feet.

The results of construction vibration calculations for the main site at each receptor and associated thresholds of significance are summarized in the table below. Construction vibration from

Table 5-4. On-Site Construction Vibration from Main Site

Receptors	Approx. Dist. to Receptor (ft)	Equipment Description and Vibration Amplitudes (PPV, in/sec)										Significance Thresholds (PPV, in/sec)		Threshold Exceedance?
		Tractors/ Loaders/ Backhoes	Rubber Tired Dozers	Excavators	Scrapers	Graders	Cranes	Forklifts	Pavers	Rollers	Paving Equipment	Structural Damage	Annoyance	
FTA Reference Vibration	25	0.089	0.089	0.089	0.089	0.089	0.089	0.003	0.21	0.21	0.21	--	--	--
R1	240	0.003	0.003	0.003	0.003	0.003	0.003	0.000	0.007	0.007	0.007	0.12	0.04	No
R2	320	0.002	0.002	0.002	0.002	0.002	0.002	0.000	0.005	0.005	0.005	0.12	0.04	No
R3	400	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.003	0.003	0.003	0.12	0.04	No
R5	500	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.002	0.002	0.002	0.12	0.04	No

As shown in the table above, the thresholds are not exceeded at any of the receptors.

The paving phase will also include the extension of Golf Club Road and the construction of an emergency access road one tying into West Leland Road northwest of the site. Paving activity will come as close as 50 feet to R1 and 90 feet to R4, resulting in vibration up to 0.07 in/sec PPV and 0.03 in/sec PPV, respectively. While the vibration at the R4 would not exceed any thresholds, vibration at R1 would result in the annoyance threshold being exceeded. However, paving activities within 50 feet of R1 would take place over 3 days at most. Given the temporary nature of the paving activity, this would not be a significant impact. In addition, the construction team would notify the residence when the paving activity is planned to occur.

5.2.1.2 Off-Site Construction Sources

Off-site vibration sources consist of haul trucks traveling to and from the site. According to FTA's *Transit Noise and Vibration Impact Assessment Manual*, vibration from trucks along roadways is unlikely to be perceptible, even if the receptor is close to a major roadway. As a result, vibration from off-site sources during construction would not exceed the significance thresholds.

5.2.2 Operational Vibration

As stated above in Section 4.2.2, the stationary equipment that would be on site for this Project are not significant sources of vibration. As a result, the significance thresholds for vibration would not be exceeded.

6. References

- Caltrans, 2020. Transportation and Vibration Guidance Manual, 2020 Update. April 2020.
- City of Pittsburgh
 - General Plan Pittsburgh 2020, Chapter 12 Noise. November 16, 2001, updated July 6, 2010. Accessed October 13, 2023.
 - Pittsburgh Municipal Code, Chapter 9.44 Noise and Chapter 18.82 Performance Standards. September 2023. Accessed October 13, 2023.
- Contra Costa County
 - Title 7 Building Regulations, Chapter 716-8 Grading. January 11, 2024. Accessed January 31, 2024.
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- Datakustik, 2023. CadnaA version 2023 (Build 197.5343) Noise Prediction Software.
- Federal Transit Administration, 2018. Transit Noise and Vibration Impact Assessment, Federal Transit Administration. September 2018.
- State of California, 2022. Government Code, title 7, Division 1, Chapter 3 [Section 65302]. January 1, 2022.
- U.S. Environmental Protection Agency, 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, Prepared by Office of Noise Abatement Control.

Appendix A – Noise & Vibration Principles and Terminology

This report uses several terms common to noise and vibration analysis. The following section provides a summary of acoustic principles and terminology to familiarize the reader.

A.1 Sound

Sound is the transmission of energy in the form of fluctuating pressure waves from a vibrating source through an elastic medium, such as air, that is detectable by the human ear. The pressure fluctuates above and below atmospheric pressure. The amplitude of the pressure fluctuation is typically described in terms of decibels (dB), while the rate of fluctuation per unit time (frequency) is described in hertz (Hz).

The decibel is a logarithmic ratio of a given sound pressure to a reference sound pressure. A logarithmic ratio is used for decibels since human hearing is roughly logarithmic, rather than linear. The reference sound pressure is roughly equal to the threshold of human hearing. Sound pressure levels below the human threshold of hearing are less than 0 dB, while levels above the human threshold of hearing are greater than 0 dB. Differences in sound level are also described in decibels. A 3-dB difference is considered “just noticeable”, a 5-dB difference is considered “clearly noticeable”, while a 10-dB difference is perceived as a doubling (or halving) in loudness. Table A- 1 provides a list of common noise sources, their sound level, and their subjective loudness.

Because the decibel is logarithmic, a doubling of sound energy from a noise source produces a 3-dB increase in sound level from that source, not a doubling of the loudness of the sound (which requires a 10-dB increase). For example, if traffic along a road is causing a 60 dB sound level at some nearby location, doubling the amount traffic on this same road would cause the sound level at this same location to increase to 63 dB. Such an increase might not be discernible in a complex acoustical environment.

The range of frequencies a healthy human ear can hear is approximately 20 Hz to 20,000 Hz. The human ear is not equally sensitive to all frequencies across the audible frequency spectrum. The human ear is most sensitive to mid frequencies (the frequency range associated with speech) and is less sensitive at low frequencies and very high frequencies. To account for this, frequency weighting networks have been developed to approximate the human ear’s frequency response at different sound pressure levels. The A-weighting network is used to approximate the frequency response of the human ear at normal sound levels. Measurements using the A-weighting network are described in terms of A-weighted decibels, often abbreviated colloquially as dBA or dB(A).

Table A- 1. Typical Sound Pressure Levels Associated with Common Noise Sources

Sound Pressure Level (dBA)	Subjective Evaluation	Environment	
		Outdoor	Indoor
140	Deafening	Jet aircraft at 75 ft	-
130	Threshold of pain	Jet aircraft during takeoff at a distance of 300 ft	-
120	Threshold of feeling	-	Hard rock band
110	Extremely Loud	Jet flyover at 1000 ft	-
100	Very Loud	Auto horn at 10 ft	-
90		Jackhammer at 50 ft	Noisy factory
80	Loud	Diesel truck (40 mph) at 50 ft, noisy urban street	Garbage disposal, cafeteria with sound-reflecting surfaces
70	Moderately Loud	Busy highway at 100 ft	Vacuum cleaner
60	Moderate	-	Face-to-face conversation
50	Quiet	Small town	Open office area
40			
30	Very quiet	-	Bedroom, typical residence (without TV or sound system)
20		Rustling leaves	Audiometric testing room, whisper
10	Just audible	-	Human breathing
0	Threshold of hearing	-	-

Adapted from Architectural Acoustics, M. David Egan, 1988; and EPA, 1974.

A.2 Sound Level Metrics

To better characterize changes in sound levels over time, several sound level metrics have been developed. The following is a summary of some of the more common metrics.

- Sound environments often vary in level over time. The equivalent-continuous sound level, L_{EQ} , is the steady-state sound level over a given time period that has the same total sound energy as the time-varying sound level measured over that same time period. L_{EQ} is the time-averaged sound energy of a measurement.
- The Day-Night Level, abbreviated as either DNL or L_{DN} , is an equivalent-continuous sound pressure level for a 24-hour period that includes a 10-dB penalty from 10:00 PM to 7:00 AM to reflect people's increased sensitivity to noise at night.

A.3 Noise and its Effects on People

Noise is sound that is considered undesirable or unpleasant. The effects of noise on people depends on a variety of factors, including the type of noise source, the context of the noise, and the sensitivity of the person.

The following factors affect how a noise source perceived:

- The sound level. Louder noise tends to be more annoying. In addition, noise sources that change in sound level over time are more noticeable than those that do not vary over time.
- The duration. Noise that is fairly steady over time tends to be less noticeable, while short, impulsive noises are more noticeable.
- The frequency spectrum. Broadband noise – noise that contains sound energy at many frequencies – is not as noticeable than noise that contains discrete tones. For example, the tone from a backup beeper is more noticeable than noise from a fan, even if they are producing the same overall sound level.
- Masking effects. Noise from one source can be masked – made less noticeable – by noise from one or more louder sources.

The extent to which a noise affects people can vary from subjective (causing annoyance) to physical (causing hearing loss). Where noise is loud enough to cause hearing loss, regulations such as those developed by OSHA have been adopted to mitigate hearing loss. In most environments, noise is not sufficiently loud to cause hearing loss but may still cause annoyance or impact people's productivity and general well-being. Note that the degree of annoyance caused by a given noise varies from person to person.

A.4 Sound Propagation Outdoors

The attenuation of sound over distance outdoors depends on the type of source and environmental factors. In the free field (i.e., no obstructions for the sound), sound from a source that can be considered a point spreads hemispherically, resulting in a sound attenuation rate of 6 dB per doubling of distance. Point sources include, for example, fans and individual vehicles such as trucks. Sound from a line source spreads in the shape of a half cylinder, with a sound attenuation rate of 3 dB per doubling of distance. One common type of line source is a highway. While highways have many point sources (vehicles), the constant stream of traffic results in the collection of point sources acting as a line source.

The environmental factors that affect the spread of sound outdoors include the following:

- Atmospheric effects. At short distances, atmospheric effects are negligible. However, at large distances, atmospheric effects can significantly impact the propagation of sound.
- Air absorption. Air absorbs a small amount of sound, primarily at high frequencies. The amount of sound air absorbs depends primarily on the relative humidity, but it also depends on temperature and pressure to a lesser extent. Air absorption can typically be ignored at distances of 100 m or less. At greater distances (e.g., 10,000 m), air absorption has a significant effect that must be accounted for. Air can also refract sound (bend the sound waves in a different direction) when there is a vertical temperature gradient in the atmosphere (i.e., the temperature changes with altitude). Sound waves will refract away from cooler temperatures and towards warmer temperatures.
- Wind. Wind can also play a role in sound propagation over large distances. Sound refracts in the direction the wind is traveling. The sound traveling downwind propagates more efficiently, resulting in less attenuation, while sound traveling upwind propagates less efficiently, resulting in more attenuation.

- Ground absorption. The amount of sound the ground absorbs varies based on the surface. For example, asphalt and bodies of water are more reflective, while soft, porous ground absorbs more sound.
- Vegetation. The amount of sound vegetation absorbs is typically low. However, sound traveling through 100 feet of dense woods or forest can be reduced up to 6 dB.
- Obstructions. Obstructions, such as buildings or hills, that break the line-of-sight between a noise source and receptor reduce sound levels by shielding the receptor from the source.
- Reflections. While obstructions between a source and receptor can reduce sound levels at the receptor, reflections from nearby surfaces (such as a wall or the façade of a building) that do not obstruct the line between the source and receptor can actually increase noise levels. For example, in an urban environment, the densely concentrated buildings create a “canyon effect,” where sound bouncing between the buildings can increase noise levels.

A.5 Environmental Noise Descriptors

Several descriptors can be used to differentiate types of sound and noise based on the context. Two descriptors relevant to this Project are defined below.

- Ambient sound. ANSI S12.9-2013/Part 1 defines ambient sound as *at a specified time, the all-encompassing sound associated with a given environment, being usually a composite of sound from many sources from many directions, near and far, including the specific sound source(s) of interest.*
- Ambient noise. ASTM C634-13 (R2021) defines ambient noise as *the composite of airborne sound from many sources near and far associated with a given environment. No particular sound is singled out for interest.*

A.6 Vibration

Vibration is the transmission of energy in the form of waves through the ground, man-made structures, or other solid objects. As with sound, the frequencies of vibration are described in hertz (Hz). The amplitude of vibration is typically described either as peak particle velocity (PPV) in units of inches per second (in/sec) or in decibels of vibration velocity, abbreviated as VdB.

Vibration is perceived tactilely whether through feet or hands or through the whole body while sitting or lying down. Like noise, vibration can be a source of annoyance and can cause sleep disturbance.

Most perceptible indoor vibration is caused by sources within buildings, such as equipment operation, movement of people, or slamming doors. Typical outdoor sources are heavy construction equipment and activities (such as blasting and pile driving), steel-wheeled trains, and heavy trucks on rough roads or offroad. It is unusual for vibration from sources such as buses and trucks on smooth roads to be perceptible, even in nearby locations.

Appendix B – Construction Information

Table A- 2. Construction Schedule

Construction Schedule
2232 Golf Club Rd
Pittsburg, CA

Construction Phase	Start	End	Days
Site Preparation	11/10/2025	11/23/2025	10
Grading	11/24/2025	1/11/2026	35
Building Construction	1/12/2026	3/8/2027	301
Paving	3/9/2027	4/5/2027	20
Architectural Coating	4/6/2027	5/3/2027	20

Table A- 3. Construction Trips

Construction Trips
2232 Golf Club Rd
Pittsburg, CA

Subphase	One Way Trips		
	Worker Trips (trips/day)	Vendor Trips (trips/day)	Hauling Trips (trips/day)
Site Preparation	17.5	0	146.7
Grading	20.0	0	105.0
Building Construction	198.0	78.7	0
Paving	15.0	0	0
Architectural Coating	39.7	0	0

Table A- 4. Construction Equipment List

Construction Equipment List
2232 Golf Club Rd
Pittsburg, CA

Construction Subphase ¹	Equipment ¹	Construction Equipment Tier ²	Number ¹	Daily Usage (hours/day) ¹	Horsepower ¹	Load Factor ¹
Site Preparation	Tractors/Loaders/Backhoes	Tier 4 Final	4	8	84	0.37
	Rubber Tired Dozers	Tier 4 Final	3	8	367	0.40
Grading	Excavators	Tier 4 Final	2	8	36	0.38
	Rubber Tired Dozers	Tier 4 Final	1	8	367	0.40
	Tractors/Loaders/Backhoes	Tier 4 Final	2	8	84	0.37
	Scrapers	Tier 4 Final	2	8	423	0.48
	Graders	Tier 4 Final	1	8	148	0.41
Building Construction	Cranes	Tier 4 Final	1	7	367	0.29
	Forklifts	Tier 4 Final	3	8	82	0.20
	Tractors/Loaders/Backhoes	Tier 4 Final	3	7	84	0.37
	Generator Sets	Tier 4 Final	1	8	14	0.74
	Welders	Tier 4 Final	1	8	46	0.45
Paving	Pavers	Tier 4 Final	2	8	81	0.42
	Rollers	Tier 4 Final	2	8	36	0.38
	Paving Equipment	Tier 4 Final	2	8	89	0.36
Architectural Coating	Air Compressors	Tier 4 Final	1	6	37	0.48

Appendix C – Construction Equipment Sound Levels

Table A- 5. Construction Equipment Sound Levels, based on FTA and FHWA

Construction Equipment Sound Levels								
Unique Equipment	Power Rating (HP)	Lmax SPL @ 50ft, A-wt	Leq SPL @ 50ft	Lmax SWL	Leq SWL	Acoustical Use Factor (from FHWA)	FTA source used	FHWA source used
Tractors/Loaders/Backhoes	84	84	80.0	118.6	114.6	40%	-	Tractor (Spec 721.560)
Rubber Tired Dozers	367	85	81.0	119.6	115.6	40%	-	
Excavators	36	85	81.0	119.6	115.6	40%	-	Excavator (Spec 721.560)
Scrapers	423	85	81.0	119.6	115.6	40%	Scraper	-
Graders	148	85	81.0	119.6	115.6	40%	Grader	-
Cranes	367	83	75.0	117.6	109.6	16%	Crane, Mobile	-
Forklifts	82	75	71.0	109.6	105.6	40%	-	Man Lift (actual measured)
Generator Sets	14	82	79.0	116.6	113.6	50%	Generator	-
Welders	46	74	70.0	108.6	104.6	40%	-	Welder/Torch (actual measured)
Pavers	81	85	82.0	119.6	116.6	50%	Paver	-
Rollers	36	85	78.0	119.6	112.6	20%	Roller	-
Paving Equipment	89	85	82.0	119.6	116.6	50%	Paver	-
Air Compressors	37	80	76.0	114.6	110.6	40%	Air compressor	-

Sources:

Federal Transit Administration, 2018. Transit Noise and Vibration Impact Assessment, Federal Transit Administration. September 2018.

FHWA, 2006. Roadway Construction Noise Model User's Guide. January 2006.

Appendix D – Project Drawings

OWNER

AVA|O|DIGITAL

CONTRACTOR

ARCHITECT

SNHA 130 East Randolph
Suite 3100
Chicago, IL 60601
WOOLPERT COMPANY 312.633.2900

MIL

Kimley»Horn

STRUCTURAL

P, FP, FA, TCOM



Mission Critical
Engineering
Member of WSP

C, CTRL, AV

PROGRESS SET
NOT FOR CONSTRUCTION

[illegible]

**AVAIO
PITTSBURG**

2232 Golf Club Rd,
Pittsburg, CA 94565

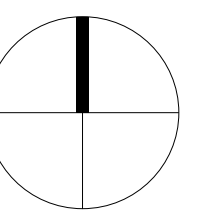
PPE Design Package

AMPUS SITE PLAN

A050

SCALE: Scale as Noted

1 CAMPUS SITE PLAN
1/64" = 1'-0"



PROGRESS SET
NOT FOR CONSTRUCTION

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**AVAIO
PITTSBURG**

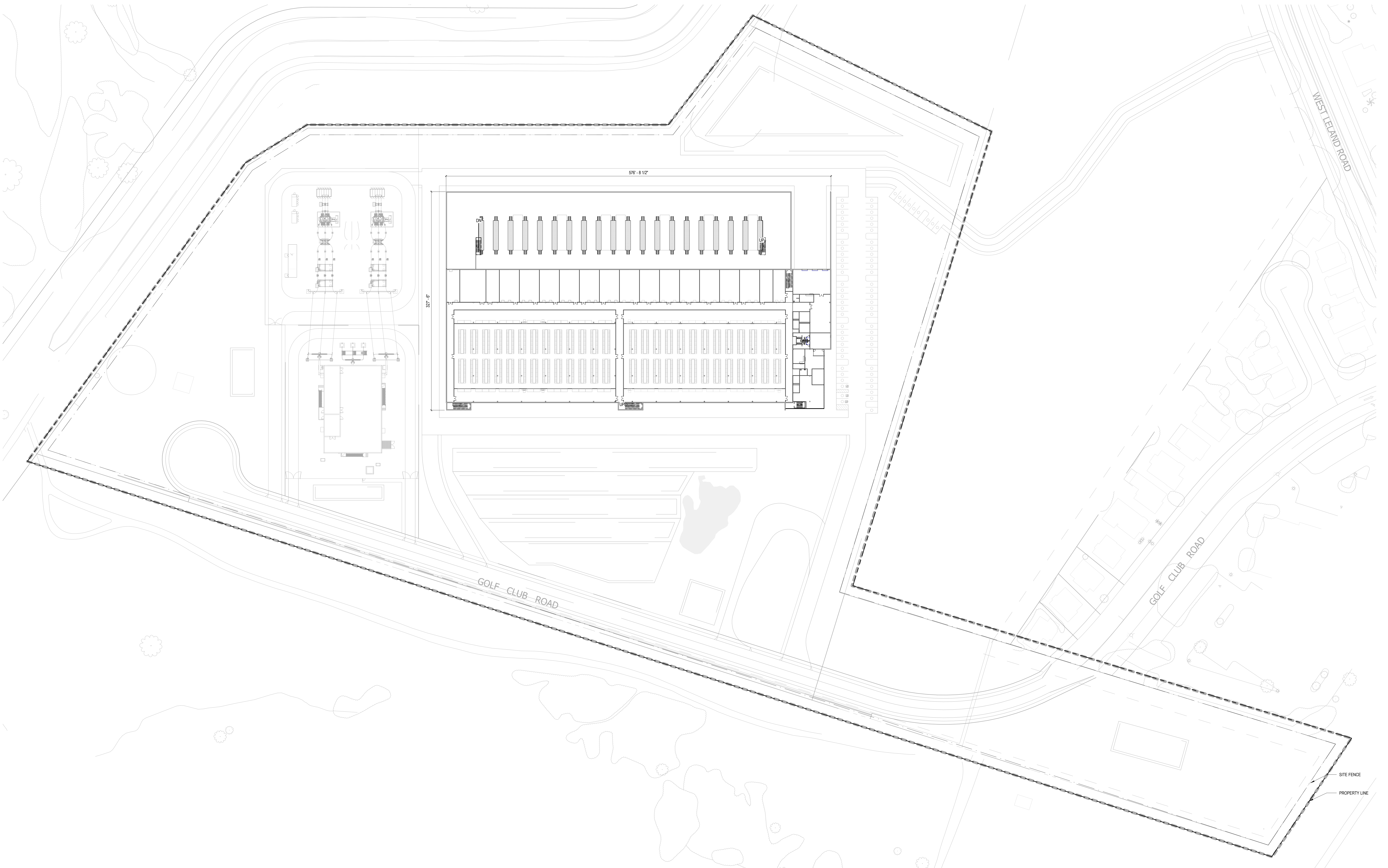
2232 Golf Club Rd,
Pittsburg, CA 94565

PPE Design Package

BUILDING SITE PLAN

A051

SCALE: Scale as Noted



PROGRESS SET
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**AVAIO
PITTSBURG**

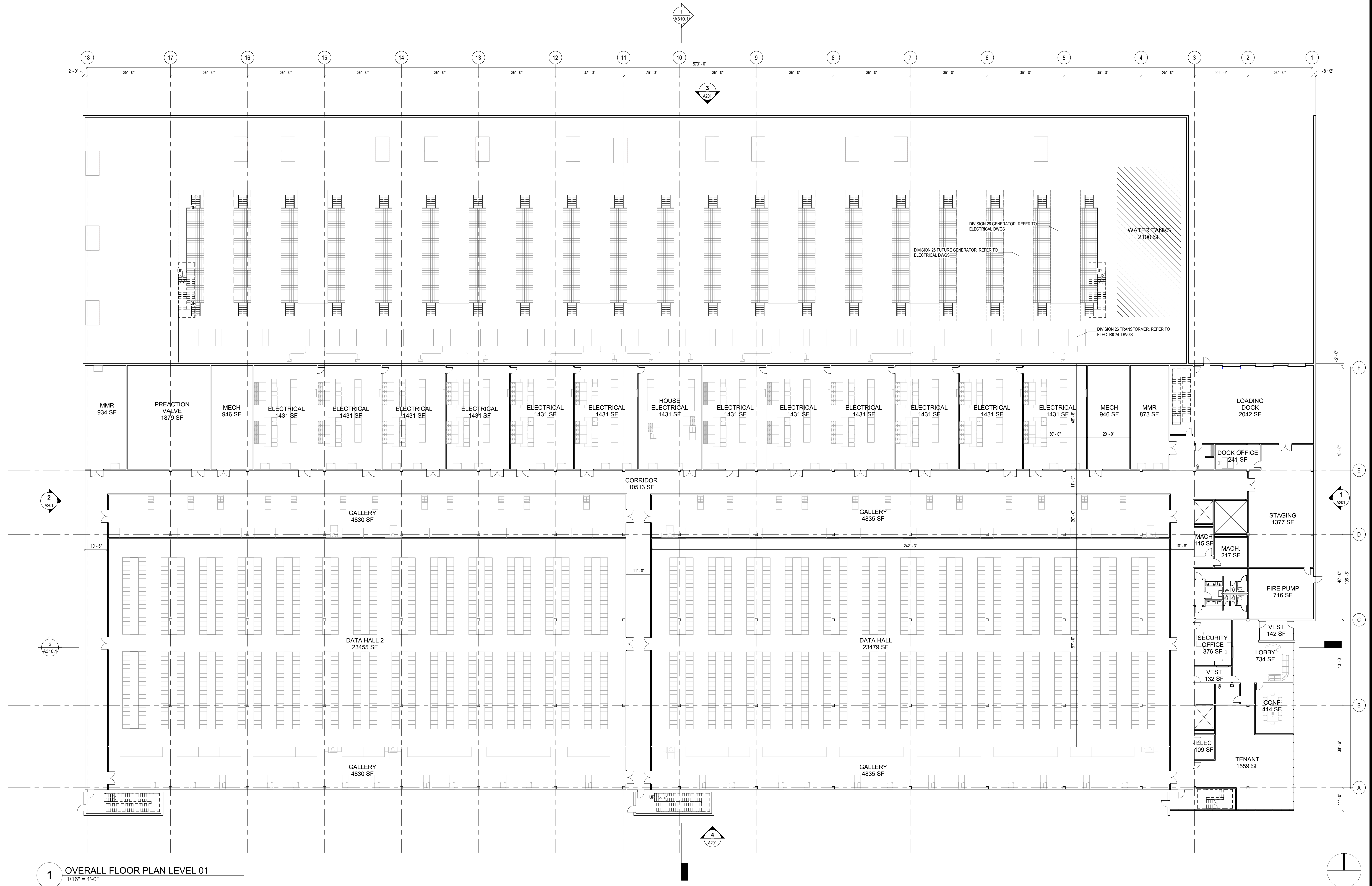
2232 Golf Club Rd,
Pittsburg, CA 94565

PPE Design Package

OVERALL FLOOR PLAN
LEVEL 01

A110.1

SCALE: Scale as Noted



OWNER

AVAIO | DIGITAL

CONTRACTOR

ARCHITECT

SNHA 130 East Randolph
Suite 3100
Chicago, IL 60601
A WOOLPERT COMPANY 312.653.2800

CIVIL

Kimley»Horn

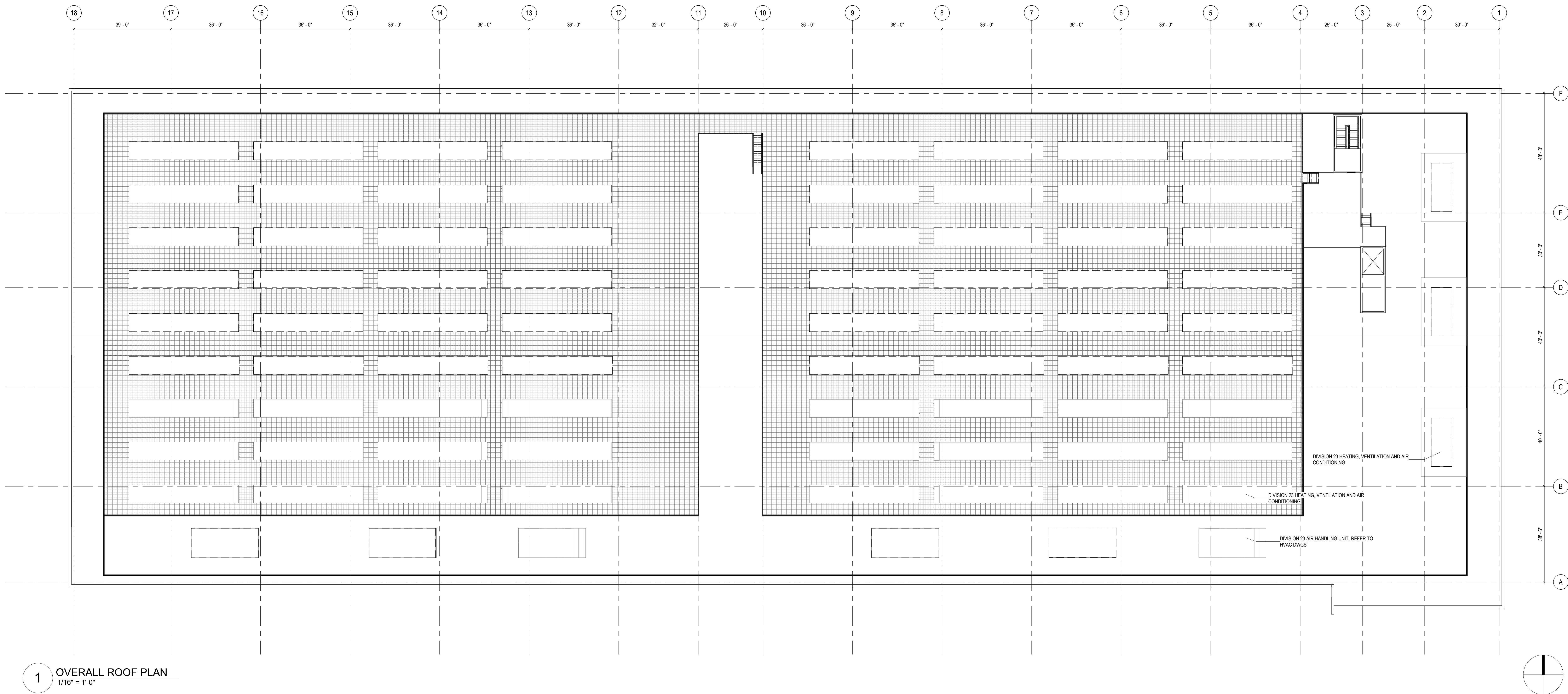
STRUCTURAL

MEP, FP, FA, TCOM

kW Mission Critical
Engineering
Member of WSP

SEC, CTRL, AV

PROGRESS SET
NOT FOR CONSTRUCTION



AVAIO | DIGITAL

ARCHITECT

SNHA
WOOLPERT COMPANY

MIL

Kimley»Horn

STRUCTURAL

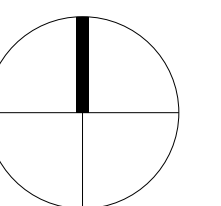
P, FP, FA, TCOM



Mission Critical
Engineering
Member of WSP

C, CTRL, AV

PROGRESS SET
NOT FOR CONSTRUCTION



**AVAIO
PITTSBURG**

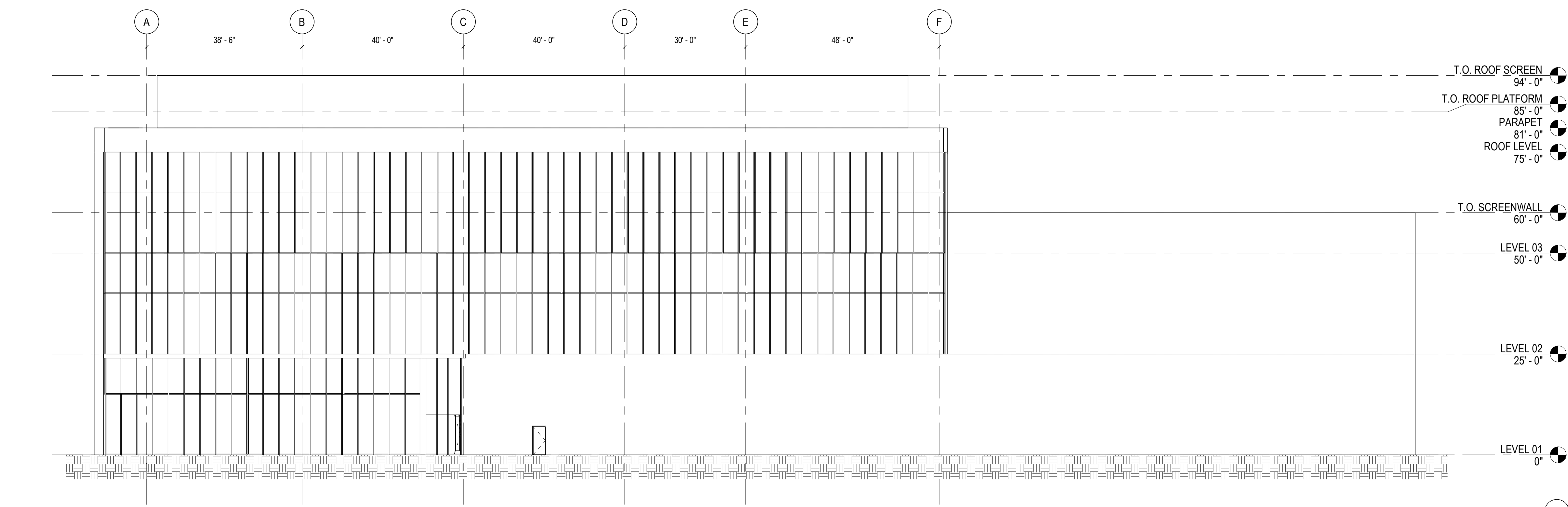
2232 Golf Club Rd,
Pittsburg, CA 94565

PPE Design Package

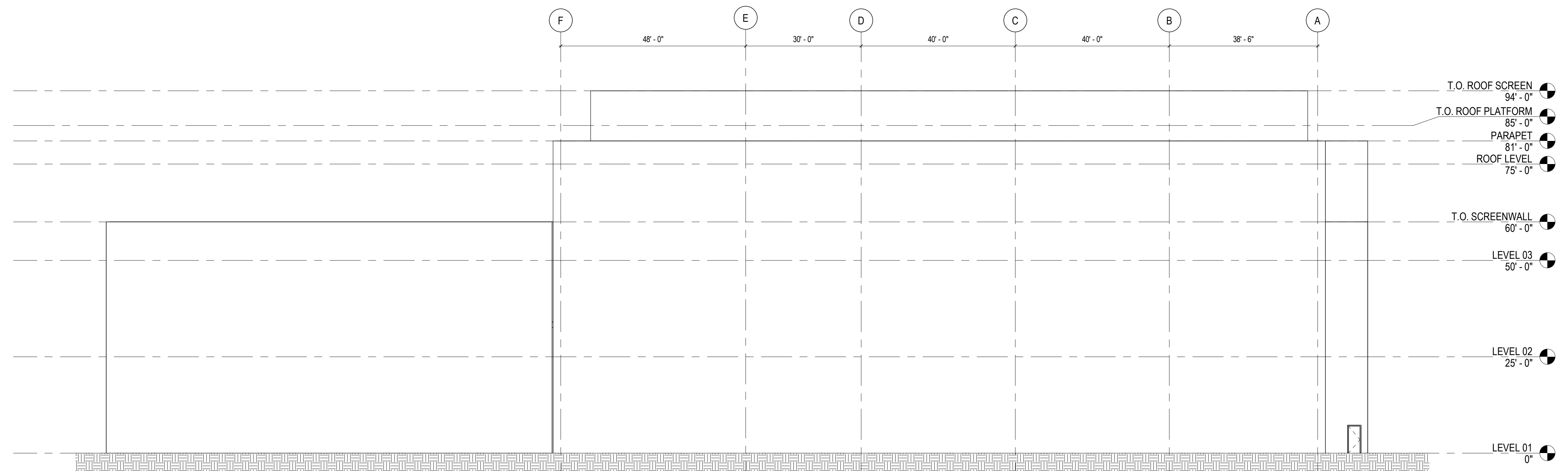
LEVATIONS 3D

A200

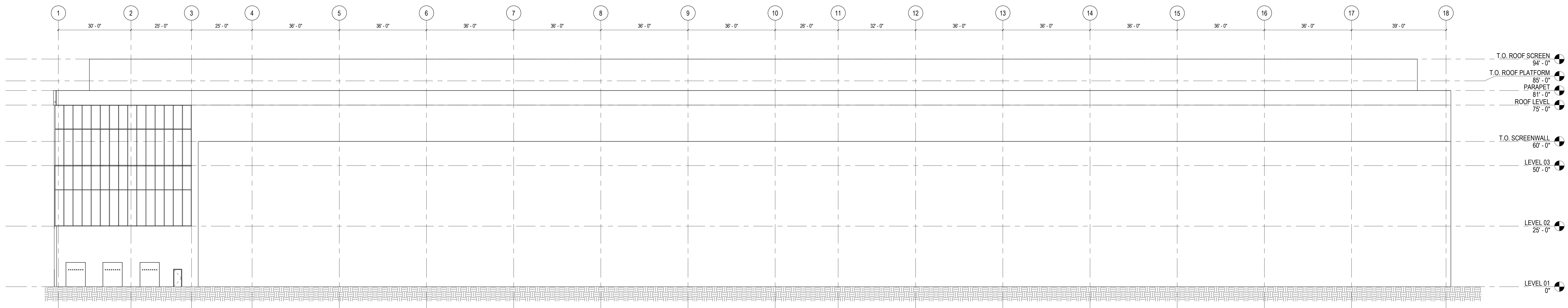
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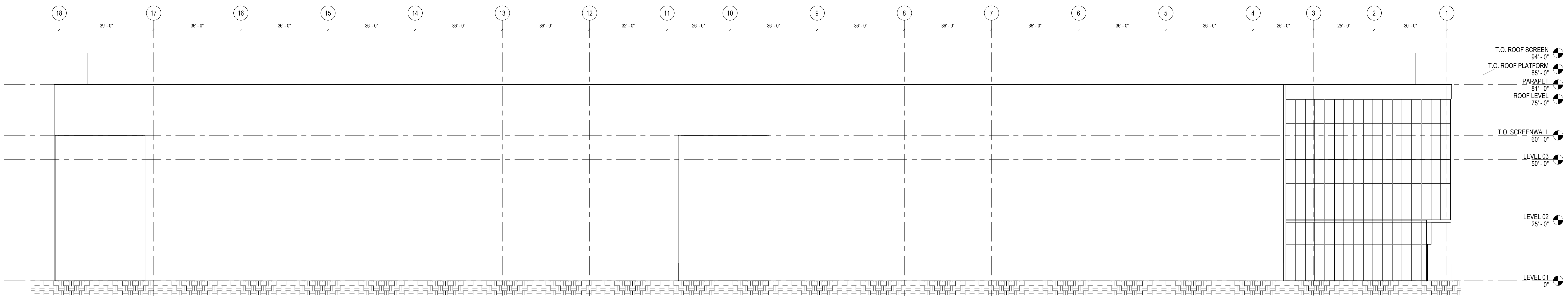
1 EAST ELEVATION
1/16" = 1'-0"



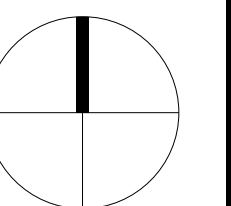
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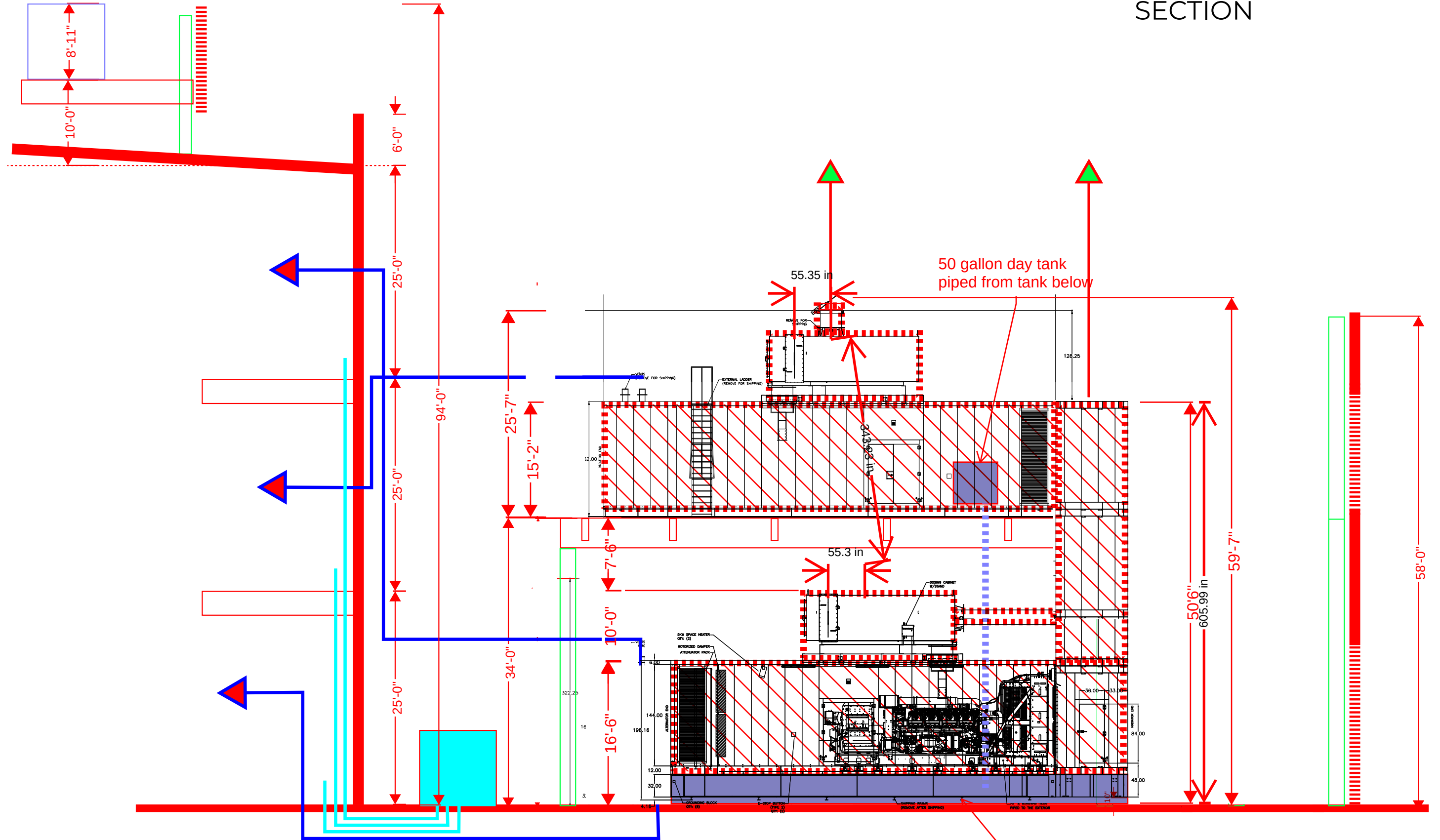
3 NORTH ELEVATION
1/16" = 1'-0"



4 SOUTH ELEVATION
1/16" = 1'-0"



SECTION



Appendix E – Mechanical and Electrical Equipment Information

Noise Pressure Levels					
Model	1812A	2212A	2512A	2812A	3212A
1000 Hz (dB)	54.8	57.4	57	57	57.2
2000 Hz (dB)	48.8	50.7	51.1	50.9	50.3
4000 Hz (dB)	42.4	44.2	43.9	44	44.5
8000 Hz (dB)	35.9	37.7	37.5	37.5	37.3
Tot Lp (dB(A))	58.6	61	60.6	60.7	60.6

Noise Pressure Levels					
Model	3612A	4212A	4812A	5622	6422
63 Hz (dB)	61.8	62.2	62.2	64.1	63.1
125 Hz (dB)	61.9	62.3	62.3	64.1	63.1
250 Hz (dB)	59.5	61	60.4	60.3	59.8
500 Hz (dB)	58	58.4	58.4	60.6	60.2
1000 Hz (dB)	57	57	57.8	58.7	58.1
2000 Hz (dB)	50.5	51.2	51.3	52.6	54.9
4000 Hz (dB)	44	43.8	44.3	45.7	45.2
8000 Hz (dB)	37.2	37.3	37.6	39.2	41.7
Tot Lp (dB(A))	60.6	61	61.3	62.5	62.6

Noise Power Levels					
Model	1812A	2212A	2512A	2812A	3212A
63 Hz (dB)	94.4	96.3	96.1	96.1	96.6
125 Hz (dB)	94.4	96.3	96.1	96.1	96.7
250 Hz (dB)	90.7	92.6	92.3	92.3	93.8
500 Hz (dB)	89.8	92.8	91.7	92	92.5
1000 Hz (dB)	88.5	91	90.7	90.7	92
2000 Hz (dB)	82.5	84.4	84.8	84.6	85.1
4000 Hz (dB)	76.1	77.9	77.6	77.7	79.3
8000 Hz (dB)	69.6	71.4	71.2	71.2	72.1
Tot Lw (dB(A))	92.3	94.7	94.3	94.4	95.4

Noise Power Levels					
Model	3612A	4212A	4812A	5622	6422
63 Hz (dB)	96.6	97.5	97.5	99.9	99.3
125 Hz (dB)	96.7	97.6	97.6	99.9	99.3
250 Hz (dB)	94.3	96.3	95.7	96.1	96
500 Hz (dB)	92.8	93.8	93.7	96.4	96.4
1000 Hz (dB)	91.8	92.3	93.1	94.5	94.3
2000 Hz (dB)	85.3	86.5	86.6	88.4	91.1
4000 Hz (dB)	78.8	79.1	79.6	81.5	81.4
8000 Hz (dB)	72	72.6	72.9	75	77.9
Tot Lw (dB(A))	95.4	96.3	96.6	98.3	98.7



Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-020-3-0-HB09-14A:M000-U0B-DPE-AFC-0DKAWBF-00-00A0000VB

Tag: DOAS-1

Job Information

Job Name: AVAIO-Pittsburg CA
Job Number: Selections 11/9/23
Site Altitude: 0 ft
Refrigerant: R-410A

Static Pressure

External: 2.00 in. wg.
Evaporator: 0.08 in. wg.
Filters Clean: 0.08 in. wg.
Dirt Allowance: 0.35 in. wg.

Cooling Section

	Gross	Net
Total Capacity:	206.92	201.58 MBH
Sensible Capacity:	164.09	158.76 MBH
Latent Capacity:	42.82 MBH	
Mixed Air Temp:	112.70 °F DB	76.90 °F WB
Entering Air Temp:	112.70 °F DB	76.90 °F WB
Lv Air Temp (Coil):	51.73 °F DB	51.61 °F WB
Lv Air Temp (Unit):	53.56 °F DB	52.38 °F WB
Supply Air Fan:	1 x 245D60 @ 1.88 BHP	
SA Fan RPM / Width:	1233 / 2.698"	
Evaporator Coil:	19.9 ft² / 6 Rows / 12 FPI	
Evaporator Face Velocity:	135.9 fpm	

Rating Information

Listing Model: RN-020-3-0-DABY-V0-21-000-A

Cooling Capacity (MBH): 235.0
Cooling EER: 12.1
Cooling IEER: 15.5
Rated in accordance with AHRI 340/360

Application EER @ Op. Conditions: 8.7

Electrical Data

Rating: 460/3/60
Unit FLA: 53
SCCR: 5 KAIC

Minimum Circuit Amp: 66
Maximum Overcurrent: 70

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		460	3			14.7
Compressor 2:	1		460	3			14.8
Condenser Fans:	2	1.00	460	1	1110	3.6	
Supply Fan:	1	3.00	460	3	1760	4.8	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW(dB):	88	88	91	93	90	88	83	75
Return LW(dB):	78	76	76	69	67	61	48	37

*Sound power levels are given for informational purposes only. The sound levels are not guaranteed.

Unit Information

Approx. Op./Ship Weights: 2626 / 2626 lbs. (±5%)
Supply CFM/ESP: 2700 / 2 in. wg.
Pre-Filter FV / Qty: 129.60 fpm / 6
Final Filter FV / Qty: 129.60 fpm / 6
Outside CFM: 2700
Ambient Temperature: 112.7 °F DB / 76.9 °F WB

Economizer: 0.00 in. wg.
Heating: 0.02 in. wg.
Cabinet: 0.07 in. wg.
Re-Heat Coil: 0.01 in. wg.
Total: 2.61 in. wg.

Heating Section

PreHeat Type: Std (No Preheat)
Heating Type: Electric Heat
Heating CFM: 2700
Total Capacity: 136.5 MBH
OA Temp: 24.4 °F DB / 21.7 °F WB
RA Temp: 75.0 °F DB / 62.0 °F WB
Entering Air Temp: 24.4 °F DB / 21.7 °F WB
Leaving Air Temp: 71.2 °F DB / 47.7 °F WB
Input: 40.0 kW
Heater Qty: 4
Electric Heat FLA: 48.1

Re-Heat Coil:

Capacity: 53 MBH
LA DB / WB: 70.00 °F / 58.91 °F
RH: 52%



24.5" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

JOB INFORMATION:

Job Name: AVAIO-Pittsburg CA
Job Tag: DOAS-1
Rep Firm: 791
Date: 11/09/2023

WHEEL SPECIFICATION:

Max RPM: 1,800
Diameter x Qty: 24.5 in. x 1
Width%: 82
Tip Speed: 7,909 FPM
Inertia: 10 WR²

OPERATING CONDITIONS:

Air Flow: 2,700 CFM
Static Pressure: 2.61 in. Wg.
Plenum DP: 0.00 in. Wg.
Inlet Grill DP: 0.00 in. Wg.
TSP: 2.61 in. Wg.
Site Altitude: 0.00 Ft
TSP @ Sea Level: 2.61 in. Wg.

MOTOR SELECTION:

Rated HP / Bypass: 3 / No
Frame Size: 182T
Nominal RPM: 1760
VAC/PH/HZ: 460/3/60
Efficiency: Premium / 0.895
Enclosure Type: ODP
Max Inertial Load: 29 WR²

FAN PERFORMANCE:

RPM: 1233
BHP: 1.88
Efficiency: 59.2%
In/Out Velocity: 826/909 FPM
Plenum Out Velocity: 45 FPM

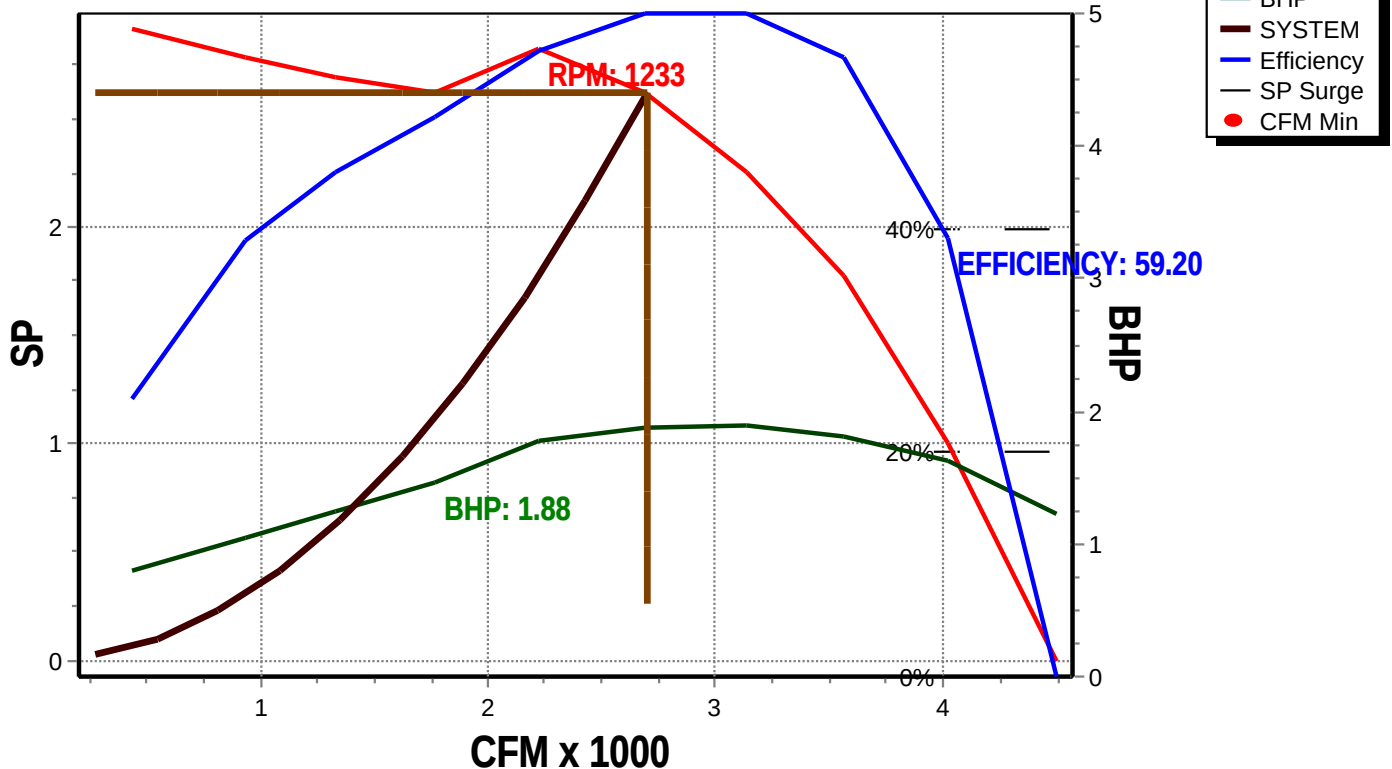
FAN SOUND POWER (Inlet/Outlet):

Octave Band:		(Re 10 ⁻¹² watts)						
1	2	3	4	5	6	7	8	
88	86	87	85	82	80	77	73	
88	88	91	94	93	91	86	78	

SOUND POWER A-Weighted: 90 / 96 dB

Max Duct SP with Blocked Airway: 2.8 in. Wg. @ 1233 rpm

Supply Fan Model: 245D60 @ 1233 RPM and 82% Width
Design Conditions: 2700 CFM @ 2.61" SP





Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-020-3-0-HB09-14A:M000-U0B-DPE-AFC-0DKAWBF-00-00A0000VB
Tag: DOAS-1

Job Name:
Job Number:

AVAIO-Pittsburg CA
Selections 11/9/23

Unit Submittal For:
Unit Submittal Date:

November 09, 2023

	Base Option	Description
R	Series	Roof Top Unit
N	Generation	Ninth Generation
020	Unit Size	Twenty
3	Voltage	460V/3Ø/60Hz
0	Interior Protection	Standard
H	Refrigerant Style	R-410A Variable Capacity Scroll Compressor + Two-Step Compressor - High Efficiency
B	Unit Configuration	Air-Cooled Cond. + 6 Row Evap. Coil
0	Coil Coating	Standard
9	Cooling/Heat Pump Staging	Modulating - 1 VCC + 1 Staged Comp.
1	Heating Type	Electric Heat
4	Heating Designation	Heat 4 - 40 kW
A	Heating Staging	Modulating/SCR Electric - 0-10V Control Signal

	Feature Option	Description
M	1A. RA/OA Section	Motorized 100% Outside Air Dampers - No RA Opening
0	1B. RA/EA Blower Configuration	Standard - None
0	1C. RA/EA Blower	Standard - None
0	1D. RA/EA Blower Motor	Standard - None
U	2. OA Control	2 Position Actuator
0	3. Heat Options	Standard
B	4. Maintenance Options	115V Convenience Outlet - Factory Wired
D	5A. SA Blower Configuration	1 Blower + Premium Efficiency Motor + 1 VFD
P	5B. SA Blower	24" Direct Drive Backward Curved Plenum - 60% Width
E	5C. SA Motor	3.0 hp - 1760 rpm
A	6A. Pre Filter Type	2" Pleated Pre Filter - 30% Eff
F	6B. Unit Filter Type	4" Pleated - 65% Eff - MERV 11
C	6C. Filter Options	Clogged Filter Switch + Magnehelic Gauge
0	7. Refrigeration Control	Standard - Adj Comp. Cooling Lock Out Through Unit Controls
D	8. Refrigeration Options	Modulating Hot Gas Reheat
K	9. Refrigeration Accessories	ECM Condenser Fan - Head Pressure Control + Sight Glass
A	10. Power Options	Non-fused Disconnect Power Switch - 100 Amps
W	11. Safety Options	Remote Safety Shutdown Terminals + High Condensate Level Switch
B	12. Controls	Phase & Brown Out Protection
F	13. Special Controls	Make Up Air Unit Controller - CV Cool + CV Heat
0	14A. Outside Air Configuration	Standard - None
0	14B. Preheat Sizing	Standard - None
0	15. Glycol Percent	Water or No WSHP
0	16. Interior Cabinet Options	Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan
A	17. Exterior Cabinet Options	Base Insulation
0	18. Electrical Rating	Standard - 5 KAIC
0	19. Code Options	Standard - ETL U.S.A. Listing
0	20. Crating	Standard
0	21. Water-Cooled Cond.	Standard - None
V	22. Control Vendors	VCC-X Controls + Integrated BACnet MSTP
B	23. Type	Standard - Includes AAON Gray Paint



VCCX Components

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN - 020 - 3 - 0 - HB09 - 14A : M000 - U0B - DPE - AFC - 0DKAWBF - 00 - 00A0000VB

Tag: DOAS-1

Job Name:

AVAIO-Pittsburg CA

VCCX For:

Job Number:

Selections 11/9/23

VCCX Date:

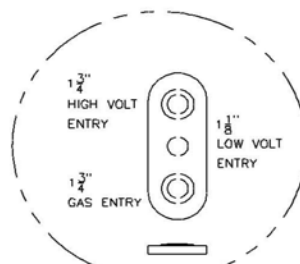
November 09, 2023

Hardware Included For VCCX Controller

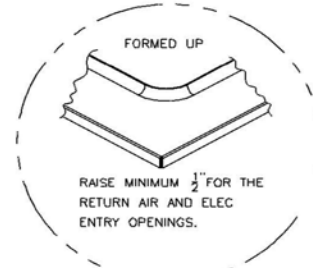
Part #	Included Parts	Assigned Channel	BACnet Point
ASM01698	VCCX2 CONTROLLER		
ASM01692	OSA Temp/Hum Sensor	EBUS2 communicating sensor	AI:16, AI:17, AI:18, AI:19
R82890	Supply Temp Sensor - Field Installed	VCCX control point AI 3	AI:9
	Supply Fan Control Signal 0-10VDC	VCCX control point AO 1	AI:22
	Economizer	VCCX control point AO 2	AI:30
	Modulated Heating (0-10VDC)	VCCX control point AO 3	AI:35
R62330	Proof of Air Flow	VCCX control point BI 1	BI:6, BI:24
R64580	Dirty Filter Sensor	VCCX control point BI 2	BI:25
	Safety Shut Down	VCCX control point BI 8	BI:26
	Supply Fan	Configured Relay Point	BI:47
	Heat 1	Configured Relay Point	BI:48
ASM02201	DIGITAL REFRIGERATION MODULE		
R42680	Comp Discharge Temp A	RSMD point TEMP1	AI:66
V38391	Suction Pressure Sensor A	RSMD point SP-1	AI:48
V38410	Discharge Pressure Sensor A	RSMD point HP-1	AI:50
V38410	Discharge Pressure Sensor B	RSMD point HP-2	AI:75
	Modulated Condenser Signal B	RSMD point AO2	AI:47
	Modulated Condenser Signal A	RSMD point AO1	AI:46
	Comp Status Input A	RSMD point BIN1	BI:77
	Comp Status Input B	RSMD point BIN2	BI:78
	Emergency Shutdown	RSMD point BIN4	BI:83
	Comp Unload Signal A	RSMD point T1	AI:44
	Comp Enable A	RSMD Fixed Relay point	BI:84
	Comp Enable B	RSMD Fixed Relay point	BI:85
ASM01670	MODULATING HOT GAS REHEAT MODULE		
	Reheat HGR Valve	MHGRV-X	AI:42

RN SERIES C - CABINET STANDARD ~ 16-30 TON

CLEARANCES	
LOCATION	• UNIT SIZE • 16 - 30 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE (FRONT)	48
LEFT SIDE	6
RIGHT SIDE	60
TOP	UNOBSTRUCTED



DETAIL A

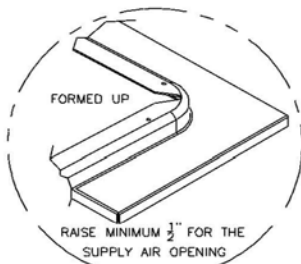


DETAIL B

NUMBER OF CONDENSER FANS

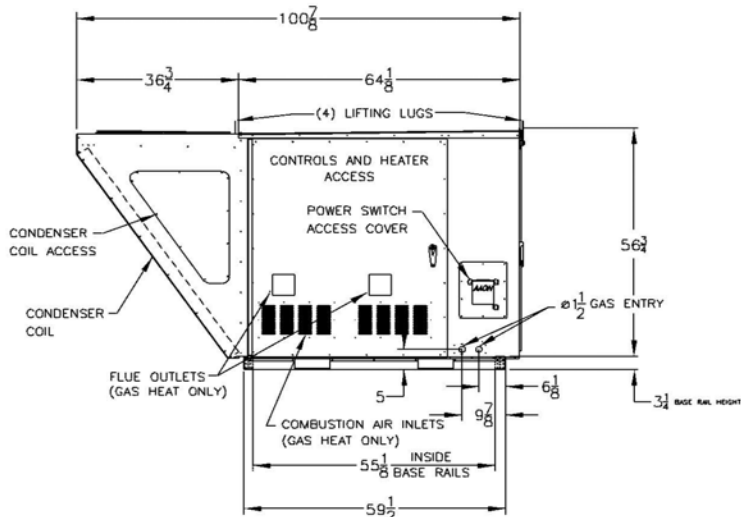
16, 18 & 20 TON - 2 FANS

25 & 30 TON - 3 FANS



DETAIL C

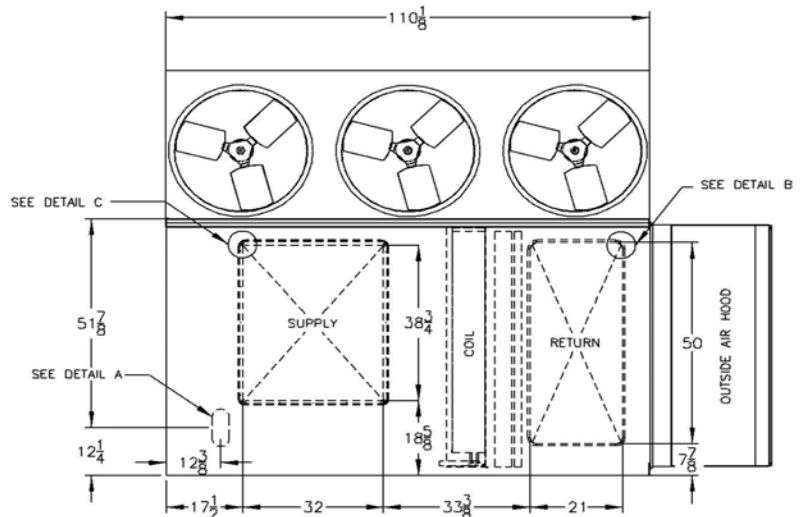
FRONT VIEW



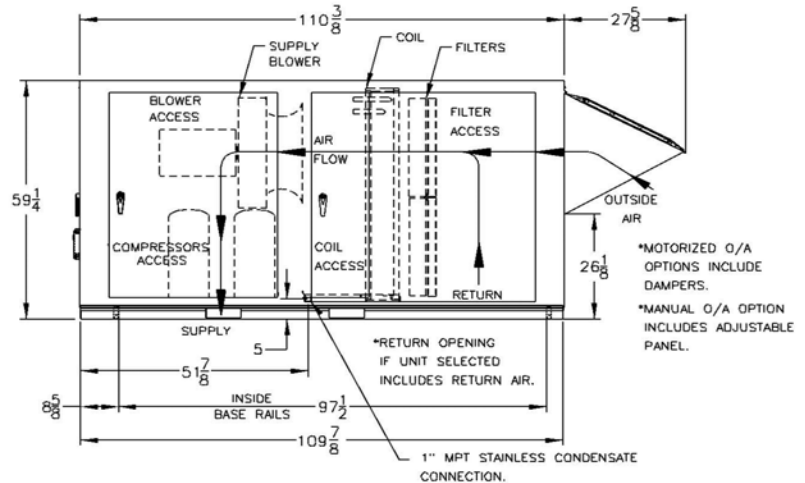
RNC-00001 REV:E 08/20/14 MLW

NOTE: ALL DIMENSIONS ARE IN INCHES

TOP VIEW



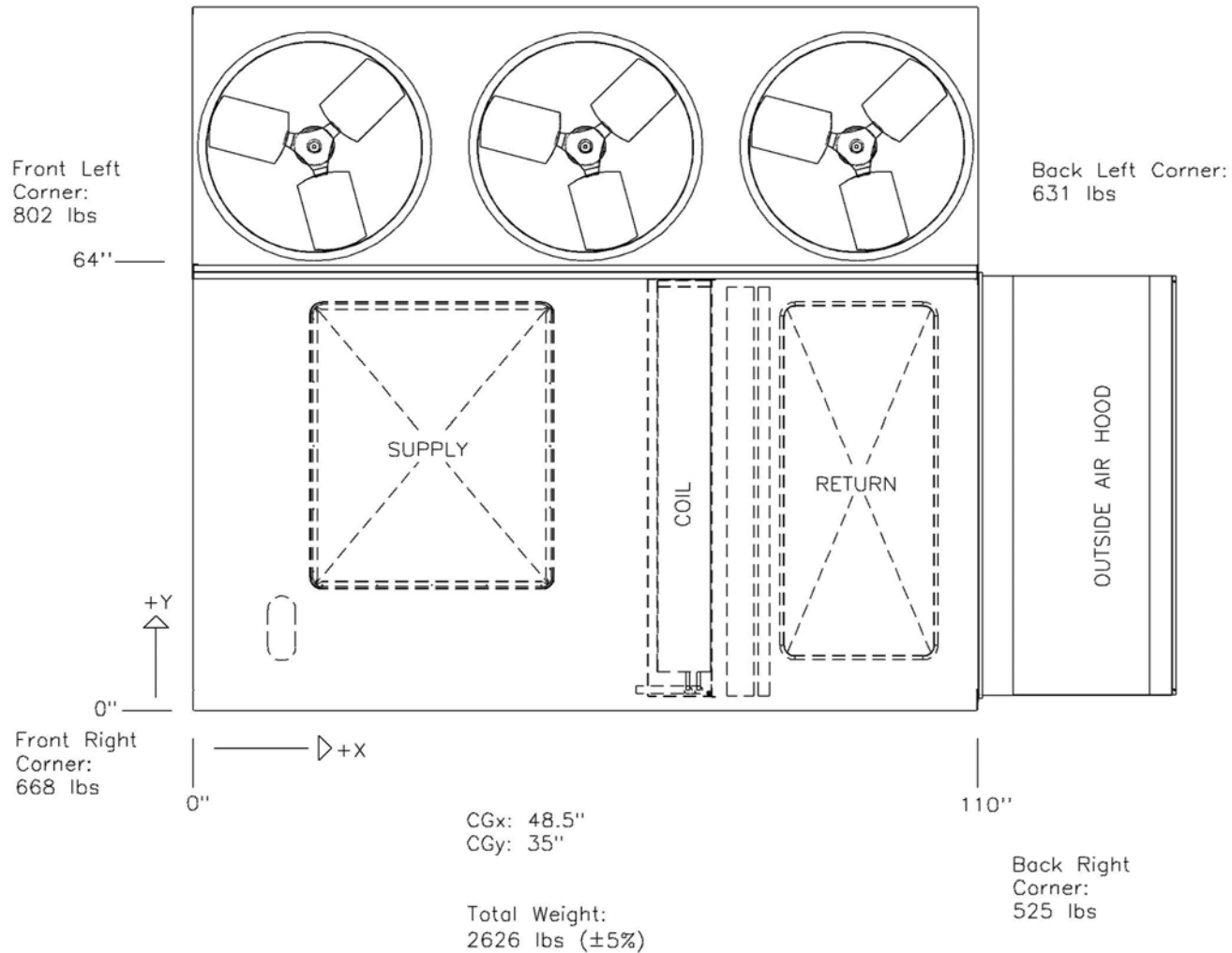
RIGHT SIDE VIEW



RNC CABINET AIR COOLED CONDENSING UNIT



RN-020-3-0-HB09-14A:M000-U0B-DPE-AFC-0DKAWBF-00-00A0000VB



Disclaimer:
This weight estimate does not account for any SPAs.



Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-013-3-0-HB09-13A:M000-U0B-DHE-AFC-0DKAWBF-00-00A0000VB

Tag: DOAS-2

Job Information

Job Name: AVAIO-Pittsburg CA
Job Number: Selections 11/9/23
Site Altitude: 0 ft
Refrigerant: R-410A

Static Pressure

External: 2.00 in. wg.
Evaporator: 0.08 in. wg.
Filters Clean: 0.09 in. wg.
Dirt Allowance: 0.35 in. wg.

Cooling Section

	Gross	Net
Total Capacity:	139.21	135.46 MBH
Sensible Capacity:	112.88	109.14 MBH
Latent Capacity:	26.32 MBH	
Mixed Air Temp:	112.70 °F DB	76.90 °F WB
Entering Air Temp:	112.70 °F DB	76.90 °F WB
Lv Air Temp (Coil):	53.24 °F DB	53.09 °F WB
Lv Air Temp (Unit):	55.06 °F DB	53.84 °F WB
Supply Air Fan:	1 x RN185D70 @ 1.32 BHP	
SA Fan RPM / Width:	1694 / 2.869"	
Evaporator Coil:	14.6 ft² / 6 Rows / 12 FPI	
Evaporator Face Velocity:	130.3 fpm	

Rating Information

Listing Model: RN-013-3-0-DABY-V0-21-000-A

Cooling Capacity (MBH): 148.0
Cooling EER: 12.1
Cooling IEER: 16.6
Rated in accordance with AHRI 340/360

Application EER @ Op. Conditions: 9.0

Electrical Data

Rating: 460/3/60
Unit FLA: 41
SCCR: 5 KAIC

Minimum Circuit Amp: 51
Maximum Overcurrent: 60

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		460	3			9.7
Compressor 2:	1		460	3			9.9
Condenser Fans:	2	1.00	460	1	1110	3.6	
Supply Fan:	1	3.00	460	3	1760	4.8	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW(dB):	83	81	85	81	72	71	67	61
Return LW(dB):	74	70	73	65	60	55	44	32

*Sound power levels are given for informational purposes only. The sound levels are not guaranteed.

Unit Information

Approx. Op./Ship Weights: 1856 / 1856 lbs. (±5%)
Supply CFM/ESP: 1900 / 2 in. wg.
Pre-Filter FV / Qty: 136.80 fpm / 4
Final Filter FV / Qty: 136.80 fpm / 4
Outside CFM: 1900
Ambient Temperature: 112.7 °F DB / 76.9 °F WB

Economizer: 0.00 in. wg.
Heating: 0.02 in. wg.
Cabinet: 0.08 in. wg.
Re-Heat Coil: 0.01 in. wg.
Total: 2.63 in. wg.

Heating Section

PreHeat Type: Std (No Preheat)
Heating Type: Electric Heat
Heating CFM: 1900
Total Capacity: 102.4 MBH
OA Temp: 24.4 °F DB / 21.7 °F WB
RA Temp: 75.0 °F DB / 62.0 °F WB
Entering Air Temp: 24.4 °F DB / 21.7 °F WB
Leaving Air Temp: 74.3 °F DB / 49.1 °F WB
Input: 30.0 kW
Heater Qty: 3
Electric Heat FLA: 36.1

Re-Heat Coil:

Capacity: 34 MBH
LA DB / WB: 70.00 °F / 59.65 °F
RH: 55%



18.5" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

JOB INFORMATION:

Job Name: AVAIO-Pittsburg CA
Job Tag: DOAS-2
Rep Firm: 791
Date: 11/09/2023
Date: 11/09/2023

WHEEL SPECIFICATION:

Max RPM: 2,200
Diameter x Qty: 18.5 in. x 1
CFM: 1900
Tip Speed: 8,205 FPM
Inertia: 8,205 FPM

OPERATING CONDITIONS:

Air Flow: 1,900 CFM
Static Pressure: 2.63 in. Wg.
Plenum DP: 0.00 in. Wg.
Inlet Grill DP: 0.00 in. Wg.
TSP: 2.63 in. Wg.
Site Altitude: 0.00 Ft
TSP @ Sea Level: 2.63 in. Wg.

MOTOR SELECTION:

Rated HP / Bypass: 3 / No
Frame Size: 182T
Nominal RPM: 1760
VAC/PH/HZ: 460/3/60
Efficiency: Premium / 0.895
Enclosure Type: ODP
Max Inertial Load: 29 WR²

FAN PERFORMANCE:

RPM: 1694
BHP: 1.32
Efficiency: 59.8%
In/Out Velocity: / FPM
Plenum Out Velocity: 32 FPM

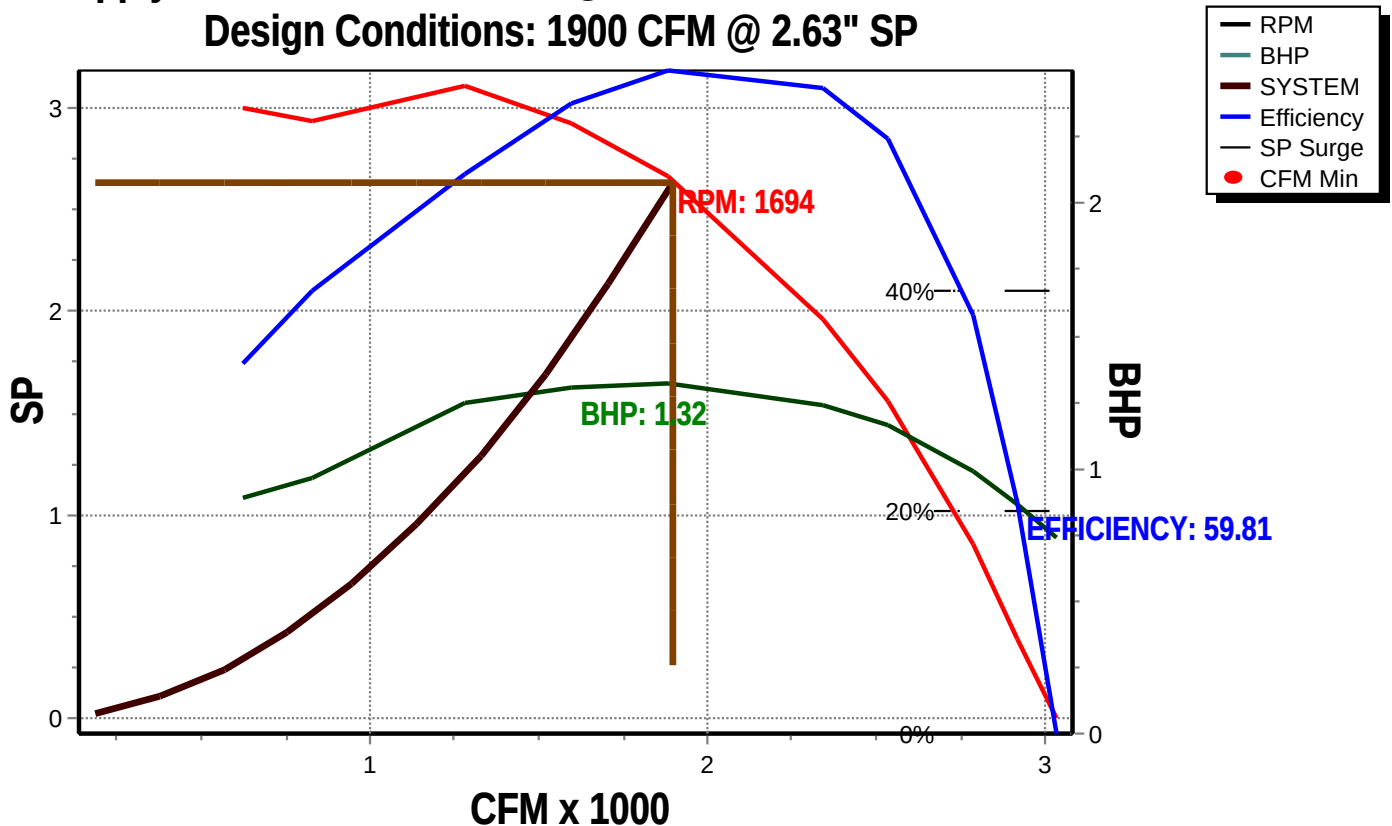
FAN SOUND POWER (Inlet/Outlet):

Octave Band:	(Re 10 ⁻¹² watts)							
	1	2	3	4	5	6	7	8
	83	81	85	82	75	74	71	65
	83	81	85	82	75	74	71	65

SOUND POWER A-Weighted: 85 / 85 dB

Max Duct SP with Blocked Airway: 3.1 in. Wg. @ 1694 rpm

Supply Fan Model: RN185D70 @ 1694 RPM and 99% Width Design Conditions: 1900 CFM @ 2.63" SP





Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-013-3-0-HB09-13A:M000-U0B-DHE-AFC-0DKAWBF-00-00A0000VB
Tag: DOAS-2

Job Name:
Job Number:

AVAIO-Pittsburg CA
Selections 11/9/23

Unit Submittal For:
Unit Submittal Date:

November 09, 2023

	Base Option	Description
R	Series	Roof Top Unit
N	Generation	Ninth Generation
013	Unit Size	Thirteen
3	Voltage	460V/3Ø/60Hz
0	Interior Protection	Standard
H	Refrigerant Style	R-410A Variable Capacity Scroll Compressor + Two-Step Compressor - High Efficiency
B	Unit Configuration	Air-Cooled Cond. + 6 Row Evap. Coil
0	Coil Coating	Standard
9	Cooling/Heat Pump Staging	Modulating - 1 VCC + 1 Staged Comp.
1	Heating Type	Electric Heat
3	Heating Designation	Heat 3 - 30 kW
A	Heating Staging	Modulating/SCR Electric - 0-10V Control Signal

	Feature Option	Description
M	1A. RA/OA Section	Motorized 100% Outside Air Dampers - No RA Opening
0	1B. RA/EA Blower Configuration	Standard - None
0	1C. RA/EA Blower	Standard - None
0	1D. RA/EA Blower Motor	Standard - None
U	2. OA Control	2 Position Actuator
0	3. Heat Options	Standard
B	4. Maintenance Options	115V Convenience Outlet - Factory Wired
D	5A. SA Blower Configuration	1 Blower + Premium Efficiency Motor + 1 VFD
H	5B. SA Blower	18.5" Direct Drive Backward Curved Plenum - 70% Width
E	5C. SA Motor	3.0 hp - 1760 rpm
A	6A. Pre Filter Type	2" Pleated Pre Filter - 30% Eff
F	6B. Unit Filter Type	4" Pleated - 65% Eff - MERV 11
C	6C. Filter Options	Clogged Filter Switch + Magnehelic Gauge
0	7. Refrigeration Control	Standard - Adj Comp. Cooling Lock Out Through Unit Controls
D	8. Refrigeration Options	Modulating Hot Gas Reheat
K	9. Refrigeration Accessories	ECM Condenser Fan - Head Pressure Control + Sight Glass
A	10. Power Options	Non-fused Disconnect Power Switch - 100 Amps
W	11. Safety Options	Remote Safety Shutdown Terminals + High Condensate Level Switch
B	12. Controls	Phase & Brown Out Protection
F	13. Special Controls	Make Up Air Unit Controller - CV Cool + CV Heat
0	14A. Outside Air Configuration	Standard - None
0	14B. Preheat Sizing	Standard - None
0	15. Glycol Percent	Water or No WSHP
0	16. Interior Cabinet Options	Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan
A	17. Exterior Cabinet Options	Base Insulation
0	18. Electrical Rating	Standard - 5 KAIC
0	19. Code Options	Standard - ETL U.S.A. Listing
0	20. Crating	Standard
0	21. Water-Cooled Cond.	Standard - None
V	22. Control Vendors	VCC-X Controls + Integrated BACnet MSTP
B	23. Type	Standard - Includes AAON Gray Paint



VCCX Components

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN - 013 - 3 - 0 - HB09 - 13A : M000 - U0B - DHE - AFC - 0DKAWBF - 00 - 00A0000VB

Tag: DOAS-2

Job Name:

AVAIO-Pittsburg CA

VCCX For:

Job Number:

Selections 11/9/23

VCCX Date:

November 09, 2023

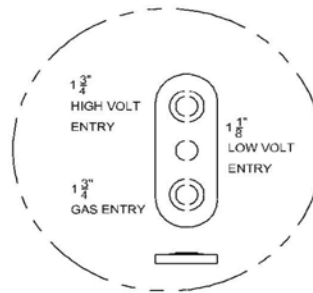
Hardware Included For VCCX Controller

Part #	Included Parts	Assigned Channel	BACnet Point
ASM01698	VCCX2 CONTROLLER		
ASM01692	OSA Temp/Hum Sensor	EBUS2 communicating sensor	AI:16, AI:17, AI:18, AI:19
R82890	Supply Temp Sensor - Field Installed	VCCX control point AI 3	AI:9
	Supply Fan Control Signal 0-10VDC	VCCX control point AO 1	AI:22
	Economizer	VCCX control point AO 2	AI:30
	Modulated Heating (0-10VDC)	VCCX control point AO 3	AI:35
R62330	Proof of Air Flow	VCCX control point BI 1	BI:6, BI:24
R64580	Dirty Filter Sensor	VCCX control point BI 2	BI:25
	Safety Shut Down	VCCX control point BI 8	BI:26
	Supply Fan	Configured Relay Point	BI:47
	Heat 1	Configured Relay Point	BI:48
ASM02201	DIGITAL REFRIGERATION MODULE		
R57800	Comp Discharge Temp A	RSMD point TEMP1	AI:66
V38391	Suction Pressure Sensor A	RSMD point SP-1	AI:48
V38410	Discharge Pressure Sensor A	RSMD point HP-1	AI:50
V38391	Suction Pressure Sensor B	RSMD point SP-2	AI:73
V38410	Discharge Pressure Sensor B	RSMD point HP-2	AI:75
	Modulated Condenser Signal B	RSMD point AO2	AI:47
	Modulated Condenser Signal A	RSMD point AO1	AI:46
	Comp Status Input A	RSMD point BIN1	BI:77
	Comp Status Input B	RSMD point BIN2	BI:78
	Emergency Shutdown	RSMD point BIN4	BI:83
	Comp Part Load Signal B	RSMD point T2	AI:45
	Comp Unload Signal A	RSMD point T1	AI:44
	Comp Enable A	RSMD Fixed Relay point	BI:84
	Comp Enable B	RSMD Fixed Relay point	BI:85
ASM01670	MODULATING HOT GAS REHEAT MODULE		
	Reheat HGR Valve	MHGRV-X	AI:42

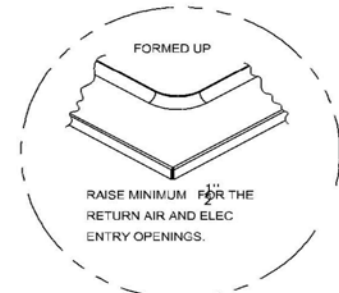
RNB 9-15 TON STANDARD

AAON®

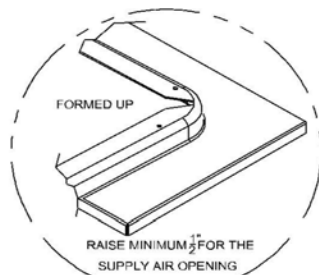
CLEARANCES	
LOCATION	• UNIT SIZE • 9 - 15 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE (FRONT)	48
LEFT SIDE	6
RIGHT SIDE	48
TOP	UNOBSTRUCTED



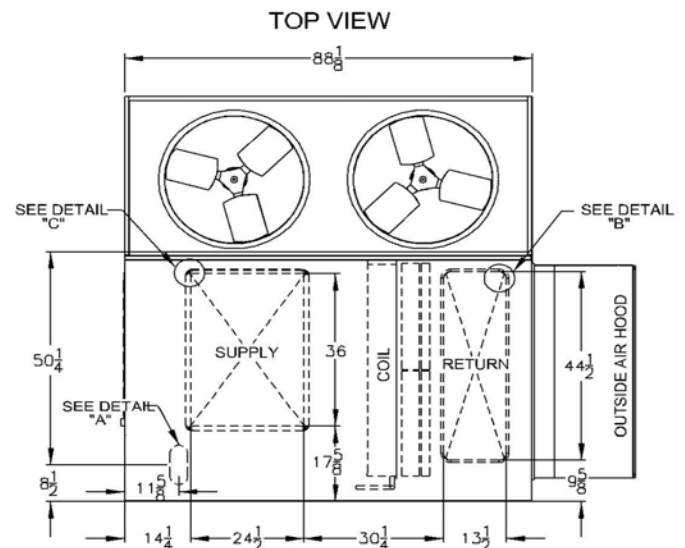
DETAIL A



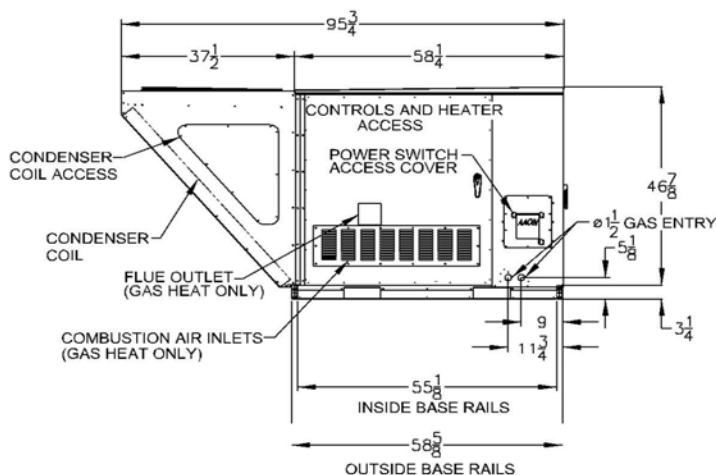
DETAIL B



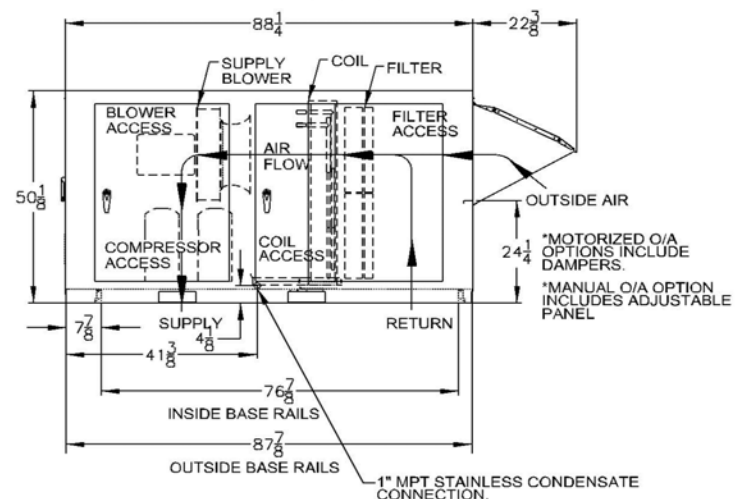
DETAIL C



FRONT VIEW



RIGHT SIDE VIEW

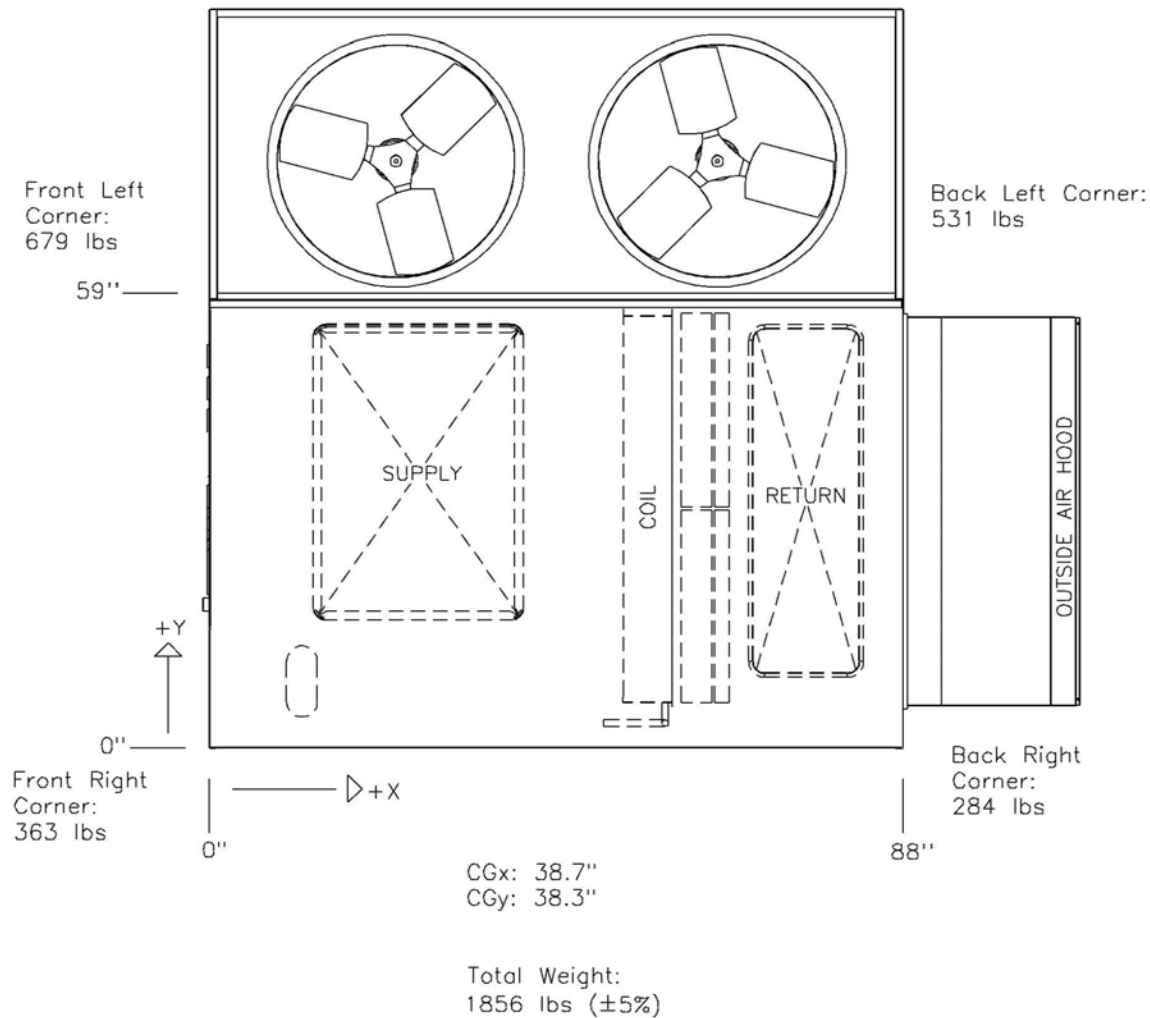


RNB-00001 REV:D 06/17/20 CAR
RNB-00001 REV:C 08/19/14 MLW
NOTE: ALL DIMENSIONS ARE IN INCHES

RNB CABINET AIR COOLED CONDENSING UNIT



RN-013-3-0-HB09-13A:M000-U0B-DHE-AFC-ODKAWBF-00-00A0000VB



Disclaimer:
This weight estimate does not account for any SPAs.



Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

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RN-030-3-0-EB09-16A:M000-U0B-DPF-AFC-0DKAWBF-00-00A0000VB

Tag: DOAS-3

Job Information

Job Name: AVAIO-Pittsburg CA
Job Number: Selections 11/9/23
Site Altitude: 0 ft
Refrigerant: R-410A

Static Pressure

External: 2.00 in. wg.
Evaporator: 0.15 in. wg.
Filters Clean: 0.12 in. wg.
Dirt Allowance: 0.35 in. wg.

Cooling Section

	Gross	Net
Total Capacity:	287.64	281.05 MBH
Sensible Capacity:	223.52	216.93 MBH
Latent Capacity:	64.13 MBH	
Mixed Air Temp:	112.70 °F DB	76.90 °F WB
Entering Air Temp:	112.70 °F DB	76.90 °F WB
Lv Air Temp (Coil):	50.39 °F DB	50.28 °F WB
Lv Air Temp (Unit)	52.08 °F DB	51.02 °F WB
Digital Comp. Capacity Ratio:	100%	
Supply Air Fan:	1 x 245D60 @ 2.32 BHP	
SA Fan RPM / Width:	1307 / 3.257"	
Evaporator Coil:	19.9 ft ² / 6 Rows / 12 FPI	
Evaporator Face Velocity:	181.3 fpm	

Rating Information

Listing Model: RN-030-3-0-BABY-V0-21-000-A

Cooling Capacity (MBH): 308.0
Cooling EER: 10.8
Cooling IEER: 13.2
Rated in accordance with AHRI 340/360

Application EER @ Op. Conditions: 8.1

Electrical Data

Rating: 460/3/60
Unit FLA: 80
SCCR: 5 KAIC

Minimum Circuit Amp: 82
Maximum Overcurrent: 90

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		460	3			23.1
Compressor 2:	1		460	3			23.1
Condenser Fans:	3	1.00	460	1	1110	3.6	
Supply Fan:	1	5.00	460	3	1760	7.6	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW(dB):	90	89	92	95	92	90	84	78
Return LW(dB):	80	78	77	71	69	62	50	39

*Sound power levels are given for informational purposes only. The sound levels are not guaranteed.

Unit Information

Approx. Op./Ship Weights: 2711 / 2711 lbs. (±5%)
Supply CFM/ESP: 3600 / 2 in. wg.
Pre-Filter FV / Qty: 172.80 fpm / 6
Final Filter FV / Qty: 172.80 fpm / 6
Outside CFM: 3600
Ambient Temperature: 112.7 °F DB / 76.9 °F WB

Economizer: 0.00 in. wg.
Heating: 0.05 in. wg.
Cabinet: 0.10 in. wg.
Re-Heat Coil: 0.02 in. wg.
Total: 2.79 in. wg.

Heating Section

PreHeat Type: Std (No Preheat)
Heating Type: Electric Heat
Heating CFM: 3600
Total Capacity: 204.8 MBH
OA Temp: 24.4 °F DB / 21.7 °F WB
RA Temp: 75.0 °F DB / 62.0 °F WB
Entering Air Temp: 24.4 °F DB / 21.7 °F WB
Leaving Air Temp: 77.1 °F DB / 50.4 °F WB
Input: 60.0 kW
Heater Qty: 6
Electric Heat FLA: 72.2

Re-Heat Coil:

Capacity: 76 MBH
LA DB / WB: 70.00 °F / 58.27 °F
RH: 49%



24.5" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

JOB INFORMATION:

Job Name: AVAIO-Pittsburg CA
Job Tag: DOAS-3
Rep Firm: 791
Date: 11/09/2023

WHEEL SPECIFICATION:

Max RPM: 1,800
Diameter x Qty: 24.5 in. x 1
Width%: 99
Tip Speed: 8,383 FPM
Inertia: 10 WR²

OPERATING CONDITIONS:

Air Flow: 3,600 CFM
Static Pressure: 2.79 in. Wg.
Plenum DP: 0.00 in. Wg.
Inlet Grill DP: 0.00 in. Wg.
TSP: 2.79 in. Wg.
Site Altitude: 0.00 Ft
TSP @ Sea Level: 2.79 in. Wg.

MOTOR SELECTION:

Rated HP / Bypass: 5 / No
Frame Size: 184T
Nominal RPM: 1760
VAC/PH/HZ: 460/3/60
Efficiency: Premium / 0.895
Enclosure Type: ODP
Max Inertial Load: 52 WR²

FAN PERFORMANCE:

RPM: 1307
BHP: 2.32
Efficiency: 68.3%
In/Out Velocity: 1101/1212 FPM
Plenum Out Velocity: 60 FPM

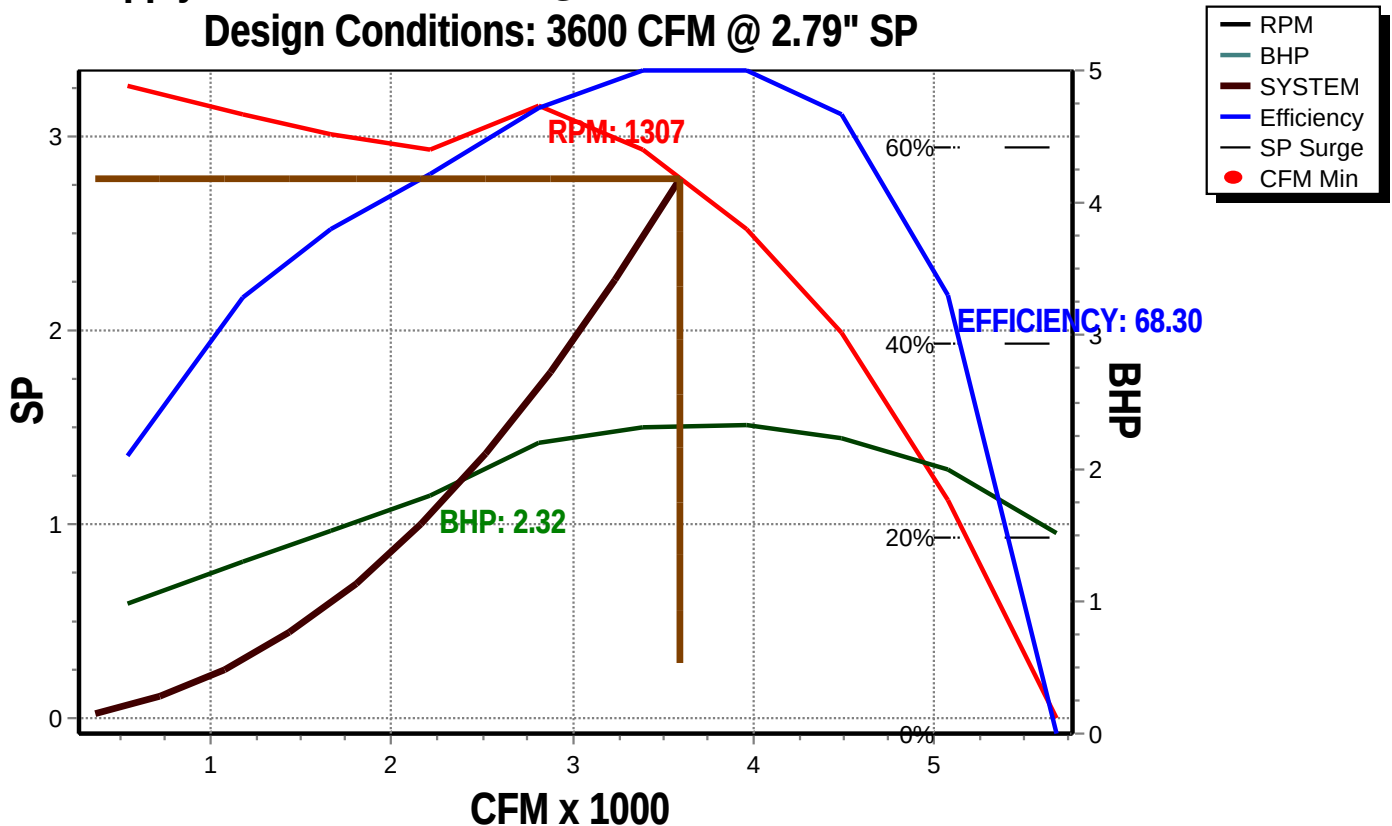
FAN SOUND POWER (Inlet/Outlet):

Octave Band:	1	2	3	4	5	6	7	8
(Re 10 ⁻¹² watts)	90	88	88	87	84	82	80	76
	90	89	92	96	95	93	88	81

SOUND POWER A-Weighted: 92 / 98 dB

Max Duct SP with Blocked Airway: 3.2 in. Wg. @ 1307 rpm

Supply Fan Model: 245D60 @ 1307 RPM and 99% Width Design Conditions: 3600 CFM @ 2.79" SP





Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-030-3-0-EB09-16A:M000-U0B-DPF-AFC-0DKAWBF-00-00A0000VB
Tag: DOAS-3

Job Name:
Job Number:

AVAIO-Pittsburg CA
Selections 11/9/23

Unit Submittal For:
Unit Submittal Date:

November 09, 2023

	Base Option	Description
R	Series	Roof Top Unit
N	Generation	Ninth Generation
030	Unit Size	Thirty
3	Voltage	460V/3Ø/60Hz
0	Interior Protection	Standard
E	Refrigerant Style	R-410A Variable Capacity Scroll Compressor (VCC)
B	Unit Configuration	Air-Cooled Cond. + 6 Row Evap. Coil
0	Coil Coating	Standard
9	Cooling/Heat Pump Staging	Modulating - 1 VCC + 1 On/Off Comp.
1	Heating Type	Electric Heat
6	Heating Designation	Heat 6 - 60 kW
A	Heating Staging	Modulating/SCR Electric - 0-10V Control Signal

	Feature Option	Description
M	1A. RA/OA Section	Motorized 100% Outside Air Dampers - No RA Opening
0	1B. RA/EA Blower Configuration	Standard - None
0	1C. RA/EA Blower	Standard - None
0	1D. RA/EA Blower Motor	Standard - None
U	2. OA Control	2 Position Actuator
0	3. Heat Options	Standard
B	4. Maintenance Options	115V Convenience Outlet - Factory Wired
D	5A. SA Blower Configuration	1 Blower + Premium Efficiency Motor + 1 VFD
P	5B. SA Blower	24" Direct Drive Backward Curved Plenum - 60% Width
F	5C. SA Motor	5.0 hp - 1760 rpm
A	6A. Pre Filter Type	2" Pleated Pre Filter - 30% Eff
F	6B. Unit Filter Type	4" Pleated - 65% Eff - MERV 11
C	6C. Filter Options	Clogged Filter Switch + Magnehelic Gauge
0	7. Refrigeration Control	Standard - Adj Comp. Cooling Lock Out Through Unit Controls
D	8. Refrigeration Options	Modulating Hot Gas Reheat
K	9. Refrigeration Accessories	ECM Condenser Fan - Head Pressure Control + Sight Glass
A	10. Power Options	Non-fused Disconnect Power Switch - 100 Amps
W	11. Safety Options	Remote Safety Shutdown Terminals + High Condensate Level Switch
B	12. Controls	Phase & Brown Out Protection
F	13. Special Controls	Make Up Air Unit Controller - CV Cool + CV Heat
0	14A. Outside Air Configuration	Standard - None
0	14B. Preheat Sizing	Standard - None
0	15. Glycol Percent	Water or No WSHP
0	16. Interior Cabinet Options	Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan
A	17. Exterior Cabinet Options	Base Insulation
0	18. Electrical Rating	Standard - 5 KAIC
0	19. Code Options	Standard - ETL U.S.A. Listing
0	20. Crating	Standard
0	21. Water-Cooled Cond.	Standard - None
V	22. Control Vendors	VCC-X Controls + Integrated BACnet MSTP
B	23. Type	Standard - Includes AAON Gray Paint



VCCX Components

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-030-3-0-EB09-16A:M000-U0B-DPF-AFC-0DKAWBF-00-00A0000VB

Tag: DOAS-3

Job Name:

AVAIO-Pittsburg CA

VCCX For:

Job Number:

Selections 11/9/23

VCCX Date:

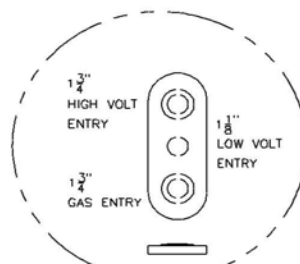
November 09, 2023

Hardware Included For VCCX Controller

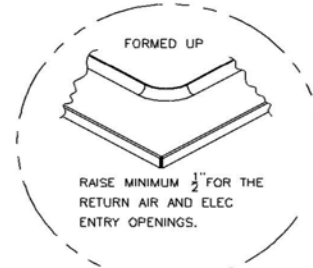
Part #	Included Parts	Assigned Channel	BACnet Point
ASM01698	VCCX2 CONTROLLER		
ASM01692	OSA Temp/Hum Sensor	EBUS2 communicating sensor	AI:16,AI:17,AI:18,AI:19
R82890	Supply Temp Sensor - Field Installed	VCCX control point AI 3	AI:9
	Supply Fan Control Signal 0-10VDC	VCCX control point AO 1	AI:22
	Economizer	VCCX control point AO 2	AI:30
	Modulated Heating (0-10VDC)	VCCX control point AO 3	AI:35
R62330	Proof of Air Flow	VCCX control point BI 1	BI:6, BI:24
R64580	Dirty Filter Sensor	VCCX control point BI 2	BI:25
	Safety Shut Down	VCCX control point BI 8	BI:26
	Supply Fan	Configured Relay Point	BI:47
	Heat 1	Configured Relay Point	BI:48
	Heat 2	Configured Relay Point	BI:49
ASM02201	DIGITAL REFRIGERATION MODULE		
R42680	Comp Discharge Temp A	RSMD point TEMP1	AI:66
V38391	Suction Pressure Sensor A	RSMD point SP-1	AI:48
V38410	Discharge Pressure Sensor A	RSMD point HP-1	AI:50
V38410	Discharge Pressure Sensor B	RSMD point HP-2	AI:75
	Modulated Condenser Signal AB	RSMD point AO1	AI:46
	Comp Status Input A	RSMD point BIN1	BI:77
	Comp Status Input B	RSMD point BIN2	BI:78
	Emergency Shutdown	RSMD point BIN4	BI:83
	Comp Unload Signal A	RSMD point T1	AI:44
	Comp Enable A	RSMD Fixed Relay point	BI:84
	Comp Enable B	RSMD Fixed Relay point	BI:85
ASM01670	MODULATING HOT GAS REHEAT MODULE		
	Reheat HGR Valve	MHGRV-X	AI:42

RN SERIES C - CABINET STANDARD ~ 16-30 TON

CLEARANCES	
LOCATION	• UNIT SIZE • 16 - 30 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE (FRONT)	48
LEFT SIDE	6
RIGHT SIDE	60
TOP	UNOBSTRUCTED



DETAIL A

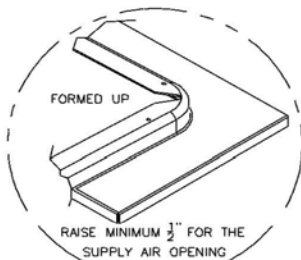


DETAIL B

NUMBER OF CONDENSER FANS

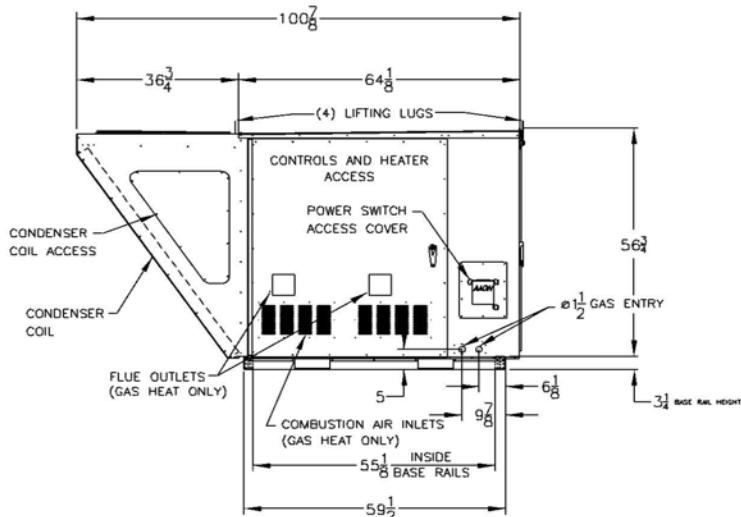
16, 18 & 20 TON - 2 FANS

25 & 30 TON - 3 FANS



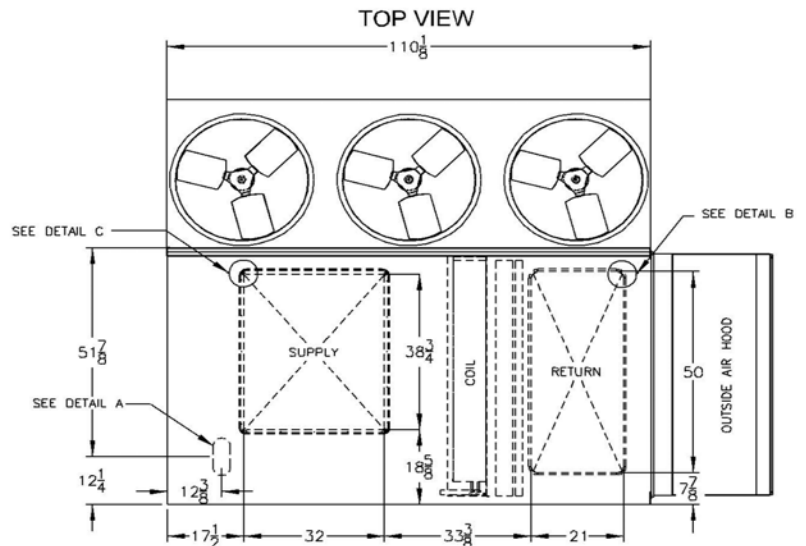
DETAIL C

FRONT VIEW

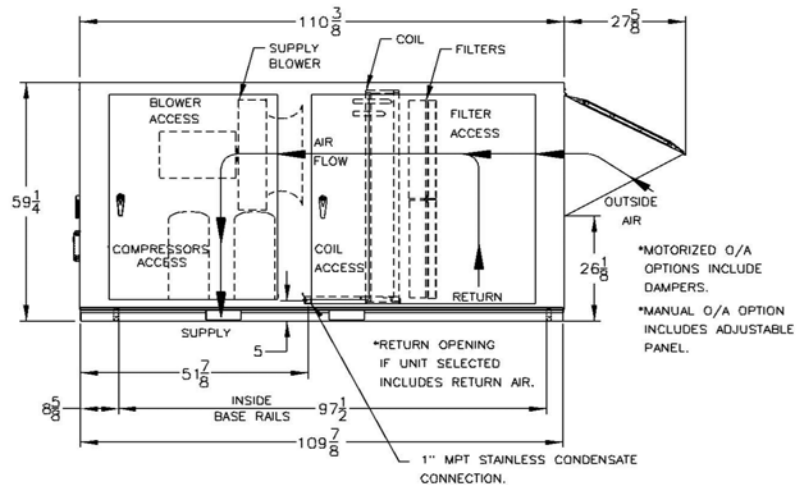


RNC-00001 REV:E 08/20/14 MLW

NOTE: ALL DIMENSIONS ARE IN INCHES



RIGHT SIDE VIEW



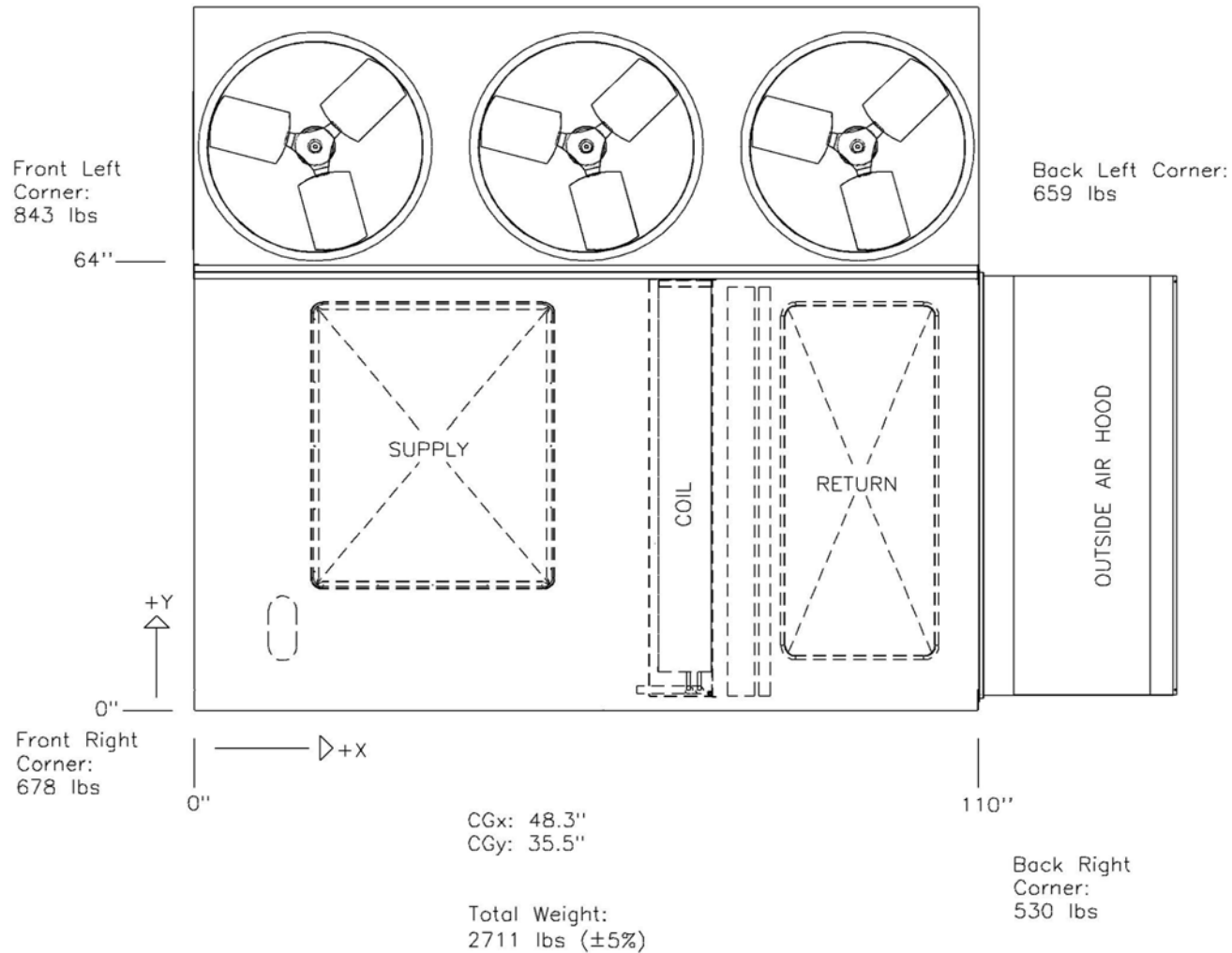
*MOTORIZED O/A OPTIONS INCLUDE DAMPERS.

*MANUAL O/A OPTION INCLUDES ADJUSTABLE PANEL.

RNC CABINET AIR COOLED CONDENSING UNIT



RN-030-3-0-EB09-16A:M000-U0B-DPF-AFC-ODKAWBF-00-00A0000VB



Disclaimer:
This weight estimate does not account for any SPAs.



Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

RNA - 070 - D - A - 3 - EAB0B - A02N0 : 00 - AAHAM - F00 - 00000 - ABCBM - WC - BB0J -
00 - E0 - C - AV0 - EB - DA0B - 00 - 000 - A00A00 - C000AF - 000000B

10A 10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

Tag: RTU-1, 2 & 3

Job Information

Job Name: AVAIO-Pittsburg CA
Job Number: Selections 11/9/23
Site Altitude: 0 ft
Refrigerant: R-410A

Unit Information

Approx. Op./Ship Weights: 7887 / 7887 lbs. (±5%)
Supply CFM/ESP: 23500 / 2.50 in. wg.
Coil Filter FV / Qty: 489.58 fpm / 24
Exhaust CFM/ESP/TPSP: 23500 / 0.50 / 1.21 in. wg.
Outside CFM: 5000
Ambient Temperature: 97.9 °F DB / 66.9 °F WB
Return Temperature: 72.4 °F DB / 62.0 °F WB

Static Pressure

External: 2.50 in. wg.
Evaporator: 0.70 in wg
Coil Filters Clean: 0.72 in wg
Dirt Allowance 0.35 in. wg.

Economizer: 0.24 in wg
Heating: 0.03 in wg
Cabinet: 0.26 in. wg.
Re-Heat Coil: 0.20 in wg
Total: 5.32 in wg

Cooling Section

	Gross	Net
Total Capacity:	759.20	664.80 MBH
Sensible Capacity:	657.80	563.40 MBH
Latent Capacity:	101.40 MBH	
Mixed Air Temp:	77.60 °F DB	62.90 °F WB
Entering Air Temp:	77.60 °F DB	62.90 °F WB
Lv Air Temp (Coil):	51.30 °F DB	51.20 °F WB
Lv Air Temp (Unit)	54.90 °F DB	52.70 °F WB
Supply Air Fan:	DT - 2 x 300 @ 17.25 BHP Ea.	
SA Fan RPM / Width:	1541 / 6.0400"	
Exhaust Air Fan:	1 x MW3505-35-RN @ 10.08 BHP	
EA Fan RPM / Width:	1438 / °	
Evaporator Coil:	43.8 ft² / 6 Rows / 12 FPI	
Evaporator Face Velocity:	537.1 fpm	

Heating Section

PreHeat Type: Std (No Preheat)
Heating Type: Electric Heat
Heating CFM: 7000
Total Capacity: 273.0 MBH
OA Temp: 33.1 °F DB / 27.9 °F WB
RA Temp: 66.0 °F DB / 50.1 °F WB
Entering Air Temp: 33.1 °F DB / 27.9 °F WB
Leaving Air Temp: 69.1 °F DB / 47.3 °F WB
Input: 80 kW
Heater Qty: 96.2
Electric Heat FLA:
Re-Heat Coil:
Capacity: 466.7 MBH
LA DB / WB: 70.0 °F / 58.7 °F
RH: 50.9%

Rating Information

Listing Model: RN-070-3-0-BABY-V0-21-000-A

Cooling EER: 10.1

Outside the scope of AHRI Standard 340/360 (I-P). Rated using procedure described in AHRI 340/360 (I-P).

Application EER @ Op. Conditions: 7.0

Electrical Data

Rating:	460V/3Ø/60Hz	Minimum Circuit Amp:	211
Unit FLA:	204	Maximum Overcurrent:	225
SCCR:	10 KAIC		

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	2		460	3			26.9
Compressor 2:	2		460	3			26.9
Condenser Fans:	6	1	460	1	1100	3.6	
Supply Fan:	2	20	460	3	1760	27	
Exhaust Fan:	1	15	460	3	1760	21	

Cabinet Sound Power Levels*

Unit Rating

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW(dB):	100	98	99	102	100	97	92	86
Return LW(dB):	96	97	90	88	90	88	85	82

**Sound power levels are given for informational purposes only. The sound levels are not guaranteed.*



30.0" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

JOB INFORMATION:

Job Name: AVAIO-Pittsburg CA
Job Tag: RTU-1, 2 & 3
Rep Firm: 791
Date: 11/09/2023

WHEEL SPECIFICATION:

Max RPM: 1,800
Diameter x Qty: 30.0 in. x 2
Width%: 92
Tip Speed: 12,103 FPM
Inertia: 31 WR²

OPERATING CONDITIONS:

Air Flow: 23,500 CFM
Static Pressure: 5.32 in. Wg.
Plenum DP: 0.00 in. Wg.
Inlet Grill DP: 0.00 in. Wg.
TSP: 5.32 in. Wg.
Site Altitude: 0.00 Ft
TSP @ Sea Level: 5.32 in. Wg.

MOTOR SELECTION:

Rated HP / Bypass: 20 x 2 / No
Frame Size: 256T
Nominal RPM: 1760
VAC/PH/HZ: 460V/3Ø/60Hz
Efficiency: Premium / 0.93
Enclosure Type: ODP
Max Inertial Load: 0 WR²

FAN PERFORMANCE:

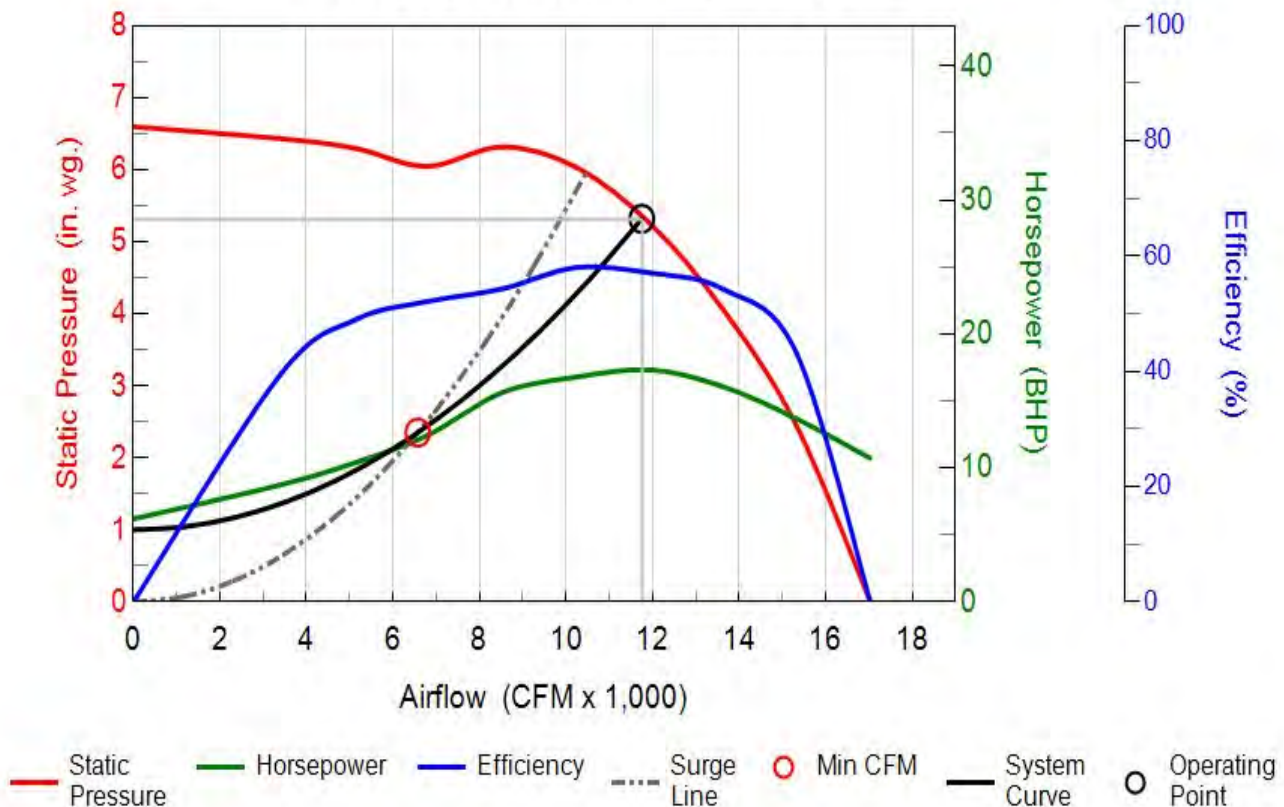
RPM: 1541
BHP: 17.25
Efficiency: 57.1%
In/Out Velocity: 1978/2600 FPM
Plenum Out Velocity: 265 FPM
Max Duct SP with Blocked Airway: 6.3 in. Wg. @ 1541 rpm

FAN SOUND POWER x 2 Fans (In/Out):

Octave Band:		(Re 10 ⁻¹² watts)						
1	2	3	4	5	6	7	8	
93	94	93	92	93	92	88	83	
99	97	98	102	101	98	94	88	

SOUND POWER A-Weighted: 98 / 105 dB

Supply Fan Model: 300 x 2 @ 1541 RPM and 92% Width
Design Conditions: 11750 CFM @ 5.32" SP





3505-35 Axial Fan

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

JOB INFORMATION:

Job Name: AVAIO-Pittsburg CA
Job Tag: RTU-1, 2 & 3
Rep Firm: 791
Date: 11/09/2023

WHEEL SPECIFICATION:

Max RPM: 1,760
Diameter x Qty: 35.5 in. x 1
CFM: 23500
Tip Speed: 13,365 FPM
Inertia: 9 WR²

OPERATING CONDITIONS:

Air Flow: 23,500 CFM
Static Pressure: 0.67 in. Wg.
Relief Dampers DP: 0.54 in. Wg.

TSP: 1.21 in. Wg.
Site Altitude: 0.00 Ft
TSP @ Sea Level: 1.21 in. Wg.

MOTOR SELECTION:

Rated HP / Bypass: 15 / No
Frame Size: 254T
Nominal RPM: 1760
VAC/PH/HZ: 460V/3Ø/60Hz
Efficiency: Premium / 0.93
Enclosure Type: ODP
Max Inertial Load: 0 WR²

FAN PERFORMANCE:

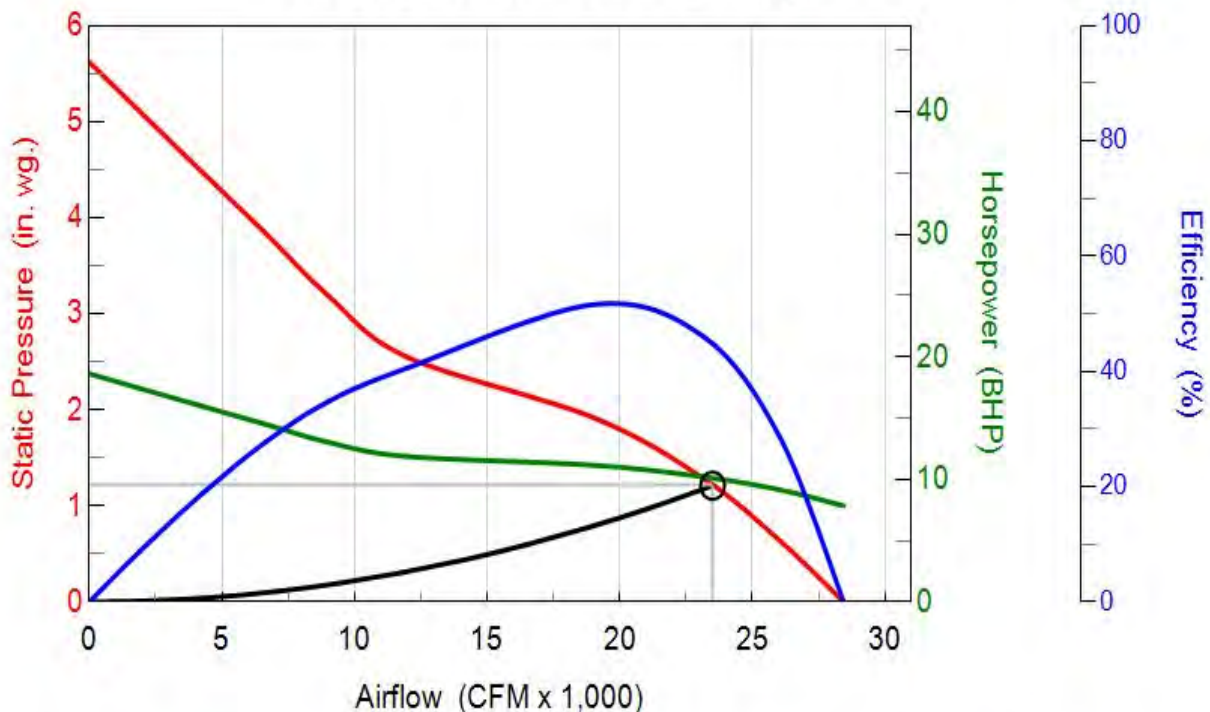
RPM: 1438
BHP: 10.08
Efficiency: 44.5%
In/Out Velocity: 2611/2611 FPM
Plenum Out Velocity: 265 FPM

FAN SOUND POWER (Inlet/Outlet):

Octave Band:	1	2	3	4	5	6	7	8
(Re 10 ⁻¹² watts)	96	97	94	95	94	91	88	85
	96	97	94	95	94	91	88	85

SOUND POWER A-Weighted: 99 / 99 dB

Exhaust Fan Model: MW3505-35 @ 1438 RPM and 100% Width
Design Conditions: 23500 CFM @ 1.21" SP



— Static Pressure — Horsepower — Efficiency - - - Surge Line — System Curve ○ Operating Point



Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

RNA - 070 - D - A - 3 - EAB0B - A02N0 : 00 - AAHAM - F00 - 00000 - ABCBM - WC - BB0J -
00 - E0 - C - AV0 - EB - DA0B - 00 - 000 - A00A00 - C000AF - 000000B

10A 10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

Tag: RTU-1, 2 & 3

Job Name:

AVAIO-Pittsburg CA

Unit Submittal For:

Job Number:

Selections 11/9/23

Unit Submittal Date:

November 09, 2023

	Base Option	Description
RN	Generation	RN Series
A	Major Revision	Major Revision A
070	Unit Size	Seventy
D	Series	D Series
A	Minor Revision	Minor Revision A
3	Voltage	460V/3?/60Hz
E	Compressor Style	R410A Variable Capacity Scroll Comp (4-circuit)
A	Condenser Style	Microchannel Air-Cooled Condenser
B	Indoor Coil Configuration	6 Row Evaporator
0	Cooling Heat Exchanger Construction	Standard
B	Cooling Staging	2 Variable Capacity Comp + 2 On/Off Comp
A	Heat Type	Electric Heat (Vertical Unit Configuration)
0	Heat Construction	Standard
2	Heat Designation	80 kW
N	Heat Staging	Modulating SCR Electric - Temperature Control
0	Heat Pump Auxiliary Heating	No Heat Pump

	Feature Option	Description
0	1. Unit Orientation	Standard Access - Hinged Access Doors with Lockable Handles
0	2. Supply & Return Locations	Bottom Supply--Bottom Return
A	3A. Supply Fan Quantity	2 Fans
A	3B. Supply Fan Configuration	1 Fan per VFD + Full Width Fan
H	3C. Supply Fan Size	30" Direct Drive Backward Curved Aluminum
A	3D. Supply Fan Motor Type	High Efficiency Open Motor (1,800 nominal rpm)
M	3E. Supply Fan Motor Size	20 hp
F	4A. Outside Air Section	Economizer + Power Exhaust (Axial Fans)
0	4B. Energy Recovery Type	No Energy Recovery
0	4C. Energy Recovery Size	No Energy Recovery
0	5A. Return Fan Quantity	No Return Fan
0	5B. Return Fan Configuration	No Return Fan
0	5C. Return Fan Size	No Return Fan
0	5D. Return Fan Motor Type	No Return Fan
0	5E. Return Fan Motor Size	No Return Fan
A	6A. Exhaust Fan Quantity	1 Fan
B	6B. Exhaust Fan Configuration	1 Fan per VFD + Full Width Fan
C	6C. Exhaust Fan Size	36" Axial Fan
B	6D. Exhaust Fan Motor Type	High Efficiency Open Motor (1,800 nominal rpm)
M	6E. Exhaust Fan Motor Size	15 hp
W	7. Outside Air Control	FDD Fully Modulating Actuator - Enthalpy Limit
C	Return and Exhaust Air	
B	8. Options	Standard Barometric Relief EA Dampers
B	9A. Unit Filter Type	2" Pleated MERV 8 + 4" Pleated MERV 11
B	9B. Unit Filter Size & Location	High Efficiency Filters in Standard Position
0	9C. Final Filter Type	No Final Filters



Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

RNA - 070 - D - A - 3 - EAB0B - A02N0 : 00 - AAHAM - F00 - 00000 - ABCBM - WC - BB0J -
00 - E0 - C - AV0 - EB - DA0B - 00 - 000 - A00A00 - C000AF - 000000B

Tag: RTU-1, 2 & 3

Job Name:

AVAIO-Pittsburg CA

Unit Submittal For:

Job Number:

Selections 11/9/23

Unit Submittal Date:

November 09, 2023

	Feature Option	Description
J	9D. Filter Options	CFS + Magnehelic Gauge - Unit Filters
0	10A. Refrigeration Control A	Standard - Adj Comp. Cooling Lock Out Through Unit Controls
0	10B. Refrigeration Control B	Standard
E	11A. Refrigeration Options A	Parallel Modulating Hot Gas Reheat Microchannel Coil [MHGR-MC] - Lead Circuit
0	11B. Refrigeration Options B	Standard Packaged Unit
C	12. Refrigeration Accessories	Sight Glass + Compressors Isolation Valves
A	13A. Unit Disconnect Type	Single Point Power - Non-fused Disconnect Power Switch
V	13B. Disconnect 1 Size	250 Amps
0	13C. Disconnect 2 Size	Standard
E	14. Safety Options	Remote Safety Shutdown Terminals
B	15. Electrical Accessories	Phase & Brown Out Protection
D	16A. Control Sequence	VAV Unit Controller - VAV Cool + CAV Heat
A	16B. Control Supplier	AAON Controls
0	16C. Control Supplier Options	None
B	16D. BMS Connection & Diagnostics	BACnet MSTP
0	17A. Preheat Configuration	Standard - None
0	17B. Preheat Sizing	Standard - None
0	18A. Option Box Location	None
0	18B. Option Box Size	None
0	18C. Option Box Accessories	None
A	19. Outside Air Accessories	Outside Air Hood
0	20. Cabinet Options	Standard - None
0	21. Accessories	Standard
A	22. Maintenance Accessories	Factory Wired 115V Convenience Outlet
0	23. Code Options	Standard - ETL U.S.A. Listing
0	24. Shipping Splits	Standard
C	Air-Cooled Condenser Accessories	ECM Condenser Fan Head Pressure Control
0	Evap-Cooled Condenser Accessories	Standard
0	Water-Cooled Condenser Accessories	None
0	27. Energy Recovery Accessories	None
A	29. VFD Options	Shaft grounding kit on all SA, RA, EA motors
F	30. Miscellaneous Options	Condensate Overflow Switch + SCCR (10kA)
0	31. Blank	Standard
0	32. Blank	Standard
0	33. Blank	Standard
0	34. Blank	Standard
0	35. Warranty	Standard Warranty
0	36. Cabinet Material	Galvanized Cabinet - Double Wall + R-13 Foam Insulation
B	37. Specials & Paint	Premium AAON Gray Paint Exterior Paint



VCCX Components

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

RNA - 070 - D - A - 3 - EAB0B - A02N0 : 00 - AAHAM - F00 - 00000 - ABCBM - WC - BB0J -
00 - E0 - C - AV0 - EB - DA0B - 00 - 000 - A00A00 - C000AF - 000000B

10A 10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

Tag: RTU-1, 2 & 3

Job Name: AVAIO-Pittsburg CA
Job Number: Selections 11/9/23

VCCX For:
VCCX Date: November 09, 2023

Hardware Included For VCCX Controller

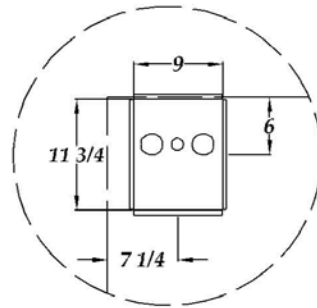
Part #	Included Parts	Assigned Channel	BACnet Point
ASM01698	VCCX2 CONTROLLER		
ASM01692	OSA Temp/Hum Sensor	EBUS2 communicating sensor	AI:16, AI:17, AI:18, AI:19
ASM01820	Space Digital Temp/Hum Sensor	EBUS3 communicating sensor	AI:12, AI:13
R82890	Supply Temp Sensor - Field Installed	VCCX control point AI 3	AI:9
ASM01832	Building Pressure Sensor	VCCX control point AI 5	AI:23
ASM01840	Return Air Temp/Hum	EBUS6 communicating sensor	AI:14, AI:15
ASM01640	Duct Static Pressure Sensor	VCCX control point AI 8	AI:21
	Economizer	VCCX control point AO 2	AI:30
	Modulated Heating (0-10VDC)	VCCX control point AO 3	AI:35
	Building Pressure Control Signal	VCCX control point AO 4	AI:24
R62330	Proof of Air Flow	VCCX control point BI 1	BI:6, BI:24
R64580	Dirty Filter Sensor	VCCX control point BI 2	BI:25
	Supply Fan	Configured Relay Point	BI:47
	Exhaust Fan	Configured Relay Point	BI:48
	Heat 1	Configured Relay Point	BI:49
	Heat 2	Configured Relay Point	BI:50
	Morning Warm-Up	Configured Relay Point	BI:51
ASM01691	EM1 EXPANSION MODULE		
	Economizer Position Feedback (title 24)	EM1 expansion point AI4	AI:31
ASM02201	DIGITAL REFRIGERATION MODULE 1		
R42680	Comp Discharge Temp A	RSMD 1 point TEMP1	AI:66
V38391	Suction Pressure Sensor A	RSMD 1 point SP-1	AI:48
V38391	Suction Pressure Sensor C	RSMD 1 point SP-2	AI:73
	Comp Status Input A	RSMD 1 point BI1	BI:77
	Comp Status Input C	RSMD 1 point BI2	BI:78
	Emergency Shutdown	RSMD 1 point BI4	BI:83
	Comp Unload Signal A	RSMD 1 point T1	AI:44
	Comp Enable A	RSMD 1 Fixed Relay point	BI:84
	Comp Unload Signal B	RSMD 1 point T2	AI:45
	Comp Enable C	RSMD 1 Fixed Relay point	BI:85
ASM02201	DIGITAL REFRIGERATION MODULE 2		
R42680	Comp Discharge Temp B	RSMD 2 point TEMP1	AI:91
V38391	Suction Pressure Sensor B	RSMD 2 point SP-1	AI:73
V38391	Suction Pressure Sensor D	RSMD 2 point SP-2	AI:74
	Comp Status Input B	RSMD 2 point BI1	BI:89
	Comp Status Input D	RSMD 2 point BI2	BI:90
	Emergency Shutdown	RSMD 2 point BI4	BI:95
	Comp Unload Signal B	RSMD point T1	AI:69
	Comp Enable B	RSMD 2 Fixed Relay point	BI:96
	Comp Unload Signal D	RSMD point T2	AI:70
	Comp Enable D	RSMD 2 Fixed Relay point	BI:97
ASM01670	MODULATING HOT GAS REHEAT MODULE		
	Reheat HGR Valve	MHGRV-X	AI:42
	Reheat 2 Position HGR Valve Enable	MHGRV-X	

RN UNITS 50-70 TON

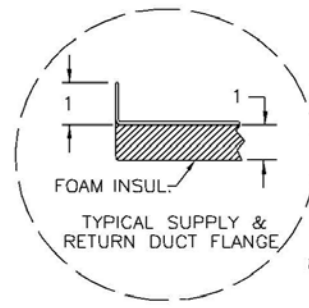
AIR COOLED, POWER EXHAUST



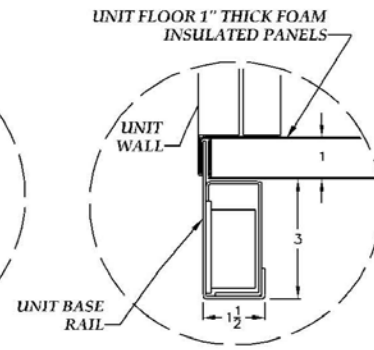
CLEARANCES	
LOCATION	UNIT SIZE
	50-70 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE (FRONT)	48
LEFT SIDE	48
RIGHT SIDE	70
TOP	UNOBSTRUCTED
NOTE: RIGHT AND LEFT SIDE UNIT CLEARANCES ARE INTERCHANGEABLE ON UNITS THAT DO NOT HAVE THE HYDRONIC HEATING OPTION. (UNITS WITH HYDRONIC HEAT MUST HAVE 70" RIGHT SIDE ACCESS FOR SERVICE.)	



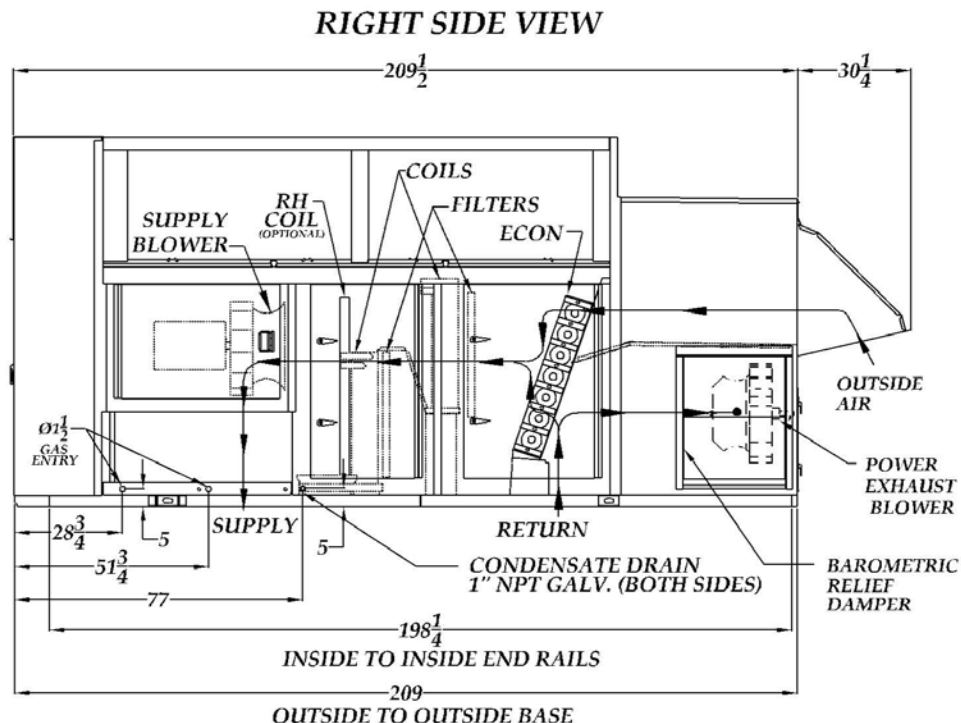
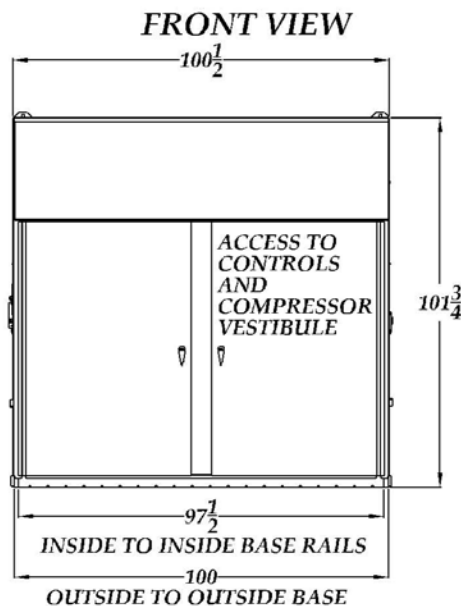
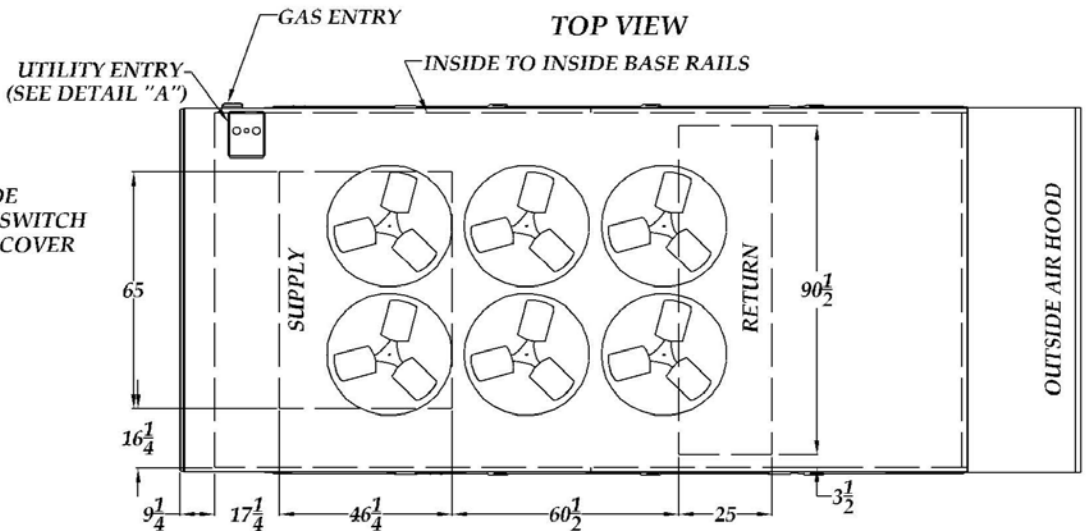
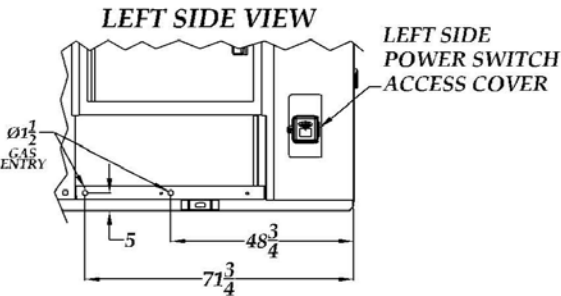
DETAIL A
UTILITY ENTRY



DETAIL B



BASE RAIL
CLEARANCE



CAT000305 RNA-D REV:D 01/05/23 JWC
ALL DIMENSIONS ARE IN INCHES

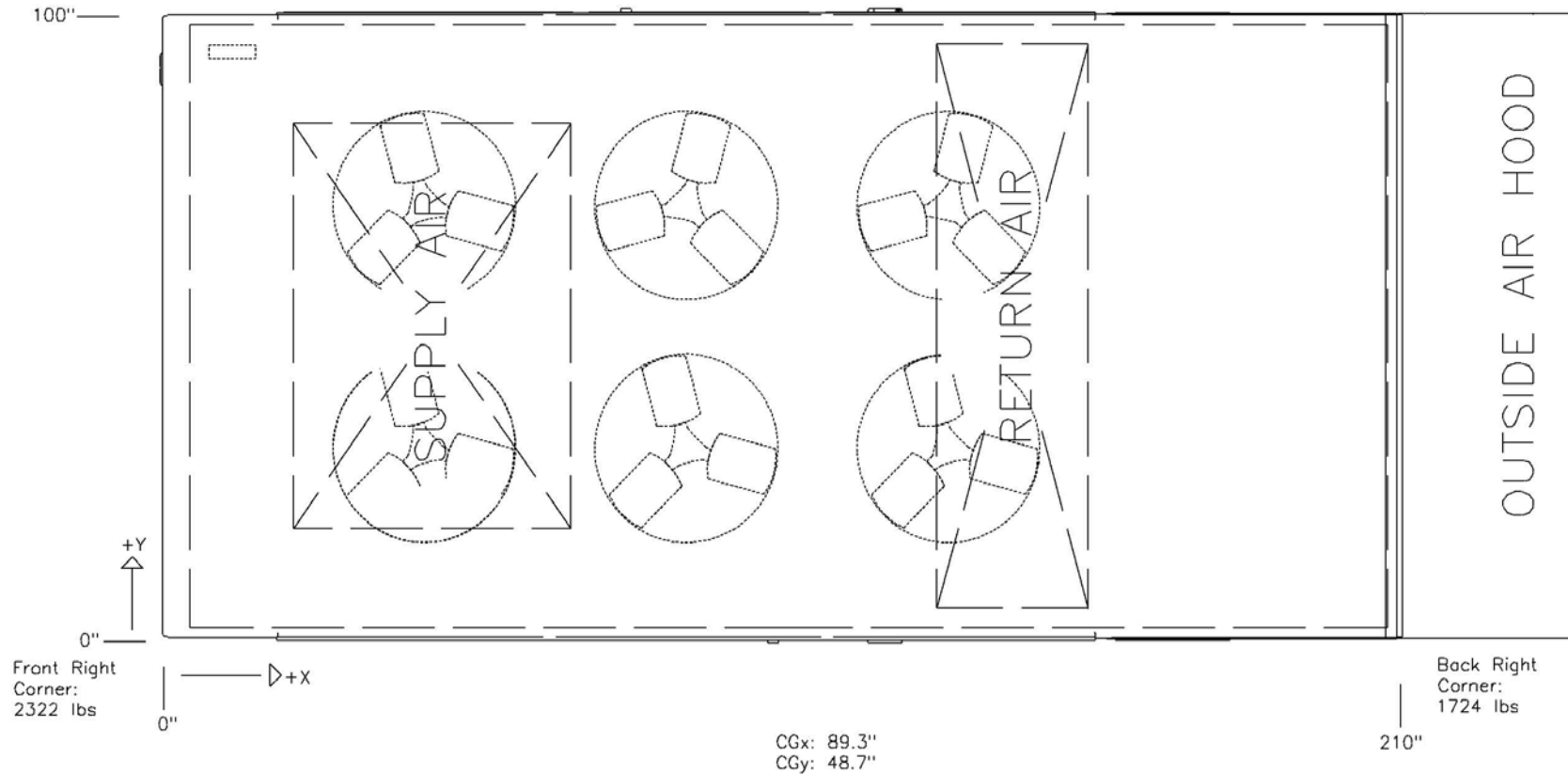
RND CABINET AIR COOLED CONDENSING UNIT POWER EXHAUST



RNA-070-D-A-3-EAB0B-A02N0:00-AAHAM-F00-00000-ABCBM-WC-BB0J-00-E0-C-AV0-EB-DA0B-00-000-A00A00-C000AF-000000B

Front Left
Corner:
2204 lbs

Back Left Corner:
1637 lbs



Disclaimer:
This weight estimate does not account for any SPAs.



Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-020-3-0-HB09-14A:M000-U0B-DPE-AFC-0DKAWBF-00-00A0000VB

Tag: DOAS-1

Job Information

Job Name: AVAIO-Pittsburg CA
Job Number: Selections 11/9/23
Site Altitude: 0 ft
Refrigerant: R-410A

Static Pressure

External: 2.00 in. wg.
Evaporator: 0.08 in. wg.
Filters Clean: 0.08 in. wg.
Dirt Allowance: 0.35 in. wg.

Cooling Section

	Gross	Net
Total Capacity:	206.92	201.58 MBH
Sensible Capacity:	164.09	158.76 MBH
Latent Capacity:	42.82 MBH	
Mixed Air Temp:	112.70 °F DB	76.90 °F WB
Entering Air Temp:	112.70 °F DB	76.90 °F WB
Lv Air Temp (Coil):	51.73 °F DB	51.61 °F WB
Lv Air Temp (Unit):	53.56 °F DB	52.38 °F WB
Supply Air Fan:	1 x 245D60 @ 1.88 BHP	
SA Fan RPM / Width:	1233 / 2.698"	
Evaporator Coil:	19.9 ft ² / 6 Rows / 12 FPI	
Evaporator Face Velocity:	135.9 fpm	

Rating Information

Listing Model: RN-020-3-0-DABY-V0-21-000-A

Cooling Capacity (MBH): 235.0
Cooling EER: 12.1
Cooling IEER: 15.5
Rated in accordance with AHRI 340/360

Application EER @ Op. Conditions: 8.7

Electrical Data

Rating: 460/3/60
Unit FLA: 53
SCCR: 5 KAIC

Minimum Circuit Amp: 66
Maximum Overcurrent: 70

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		460	3			14.7
Compressor 2:	1		460	3			14.8
Condenser Fans:	2	1.00	460	1	1110	3.6	
Supply Fan:	1	3.00	460	3	1760	4.8	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW(dB):	88	88	91	93	90	88	83	75
Return LW(dB):	78	76	76	69	67	61	48	37

*Sound power levels are given for informational purposes only. The sound levels are not guaranteed.

Unit Information

Approx. Op./Ship Weights: 2626 / 2626 lbs. (±5%)
Supply CFM/ESP: 2700 / 2 in. wg.
Pre-Filter FV / Qty: 129.60 fpm / 6
Final Filter FV / Qty: 129.60 fpm / 6
Outside CFM: 2700
Ambient Temperature: 112.7 °F DB / 76.9 °F WB

Economizer: 0.00 in. wg.
Heating: 0.02 in. wg.
Cabinet: 0.07 in. wg.
Re-Heat Coil: 0.01 in. wg.
Total: 2.61 in. wg.

Heating Section

PreHeat Type: Std (No Preheat)
Heating Type: Electric Heat
Heating CFM: 2700
Total Capacity: 136.5 MBH
OA Temp: 24.4 °F DB / 21.7 °F WB
RA Temp: 75.0 °F DB / 62.0 °F WB
Entering Air Temp: 24.4 °F DB / 21.7 °F WB
Leaving Air Temp: 71.2 °F DB / 47.7 °F WB
Input: 40.0 kW
Heater Qty: 4
Electric Heat FLA: 48.1

Re-Heat Coil:

Capacity: 53 MBH
LA DB / WB: 70.00 °F / 58.91 °F
RH: 52%



24.5" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

JOB INFORMATION:

Job Name: AVAIO-Pittsburg CA
Job Tag: DOAS-1
Rep Firm: 791
Date: 11/09/2023

WHEEL SPECIFICATION:

Max RPM: 1,800
Diameter x Qty: 24.5 in. x 1
Width%: 82
Tip Speed: 7,909 FPM
Inertia: 10 WR²

OPERATING CONDITIONS:

Air Flow: 2,700 CFM
Static Pressure: 2.61 in. Wg.
Plenum DP: 0.00 in. Wg.
Inlet Grill DP: 0.00 in. Wg.
TSP: 2.61 in. Wg.
Site Altitude: 0.00 Ft
TSP @ Sea Level: 2.61 in. Wg.

MOTOR SELECTION:

Rated HP / Bypass: 3 / No
Frame Size: 182T
Nominal RPM: 1760
VAC/PH/HZ: 460/3/60
Efficiency: Premium / 0.895
Enclosure Type: ODP
Max Inertial Load: 29 WR²

FAN PERFORMANCE:

RPM: 1233
BHP: 1.88
Efficiency: 59.2%
In/Out Velocity: 826/909 FPM
Plenum Out Velocity: 45 FPM

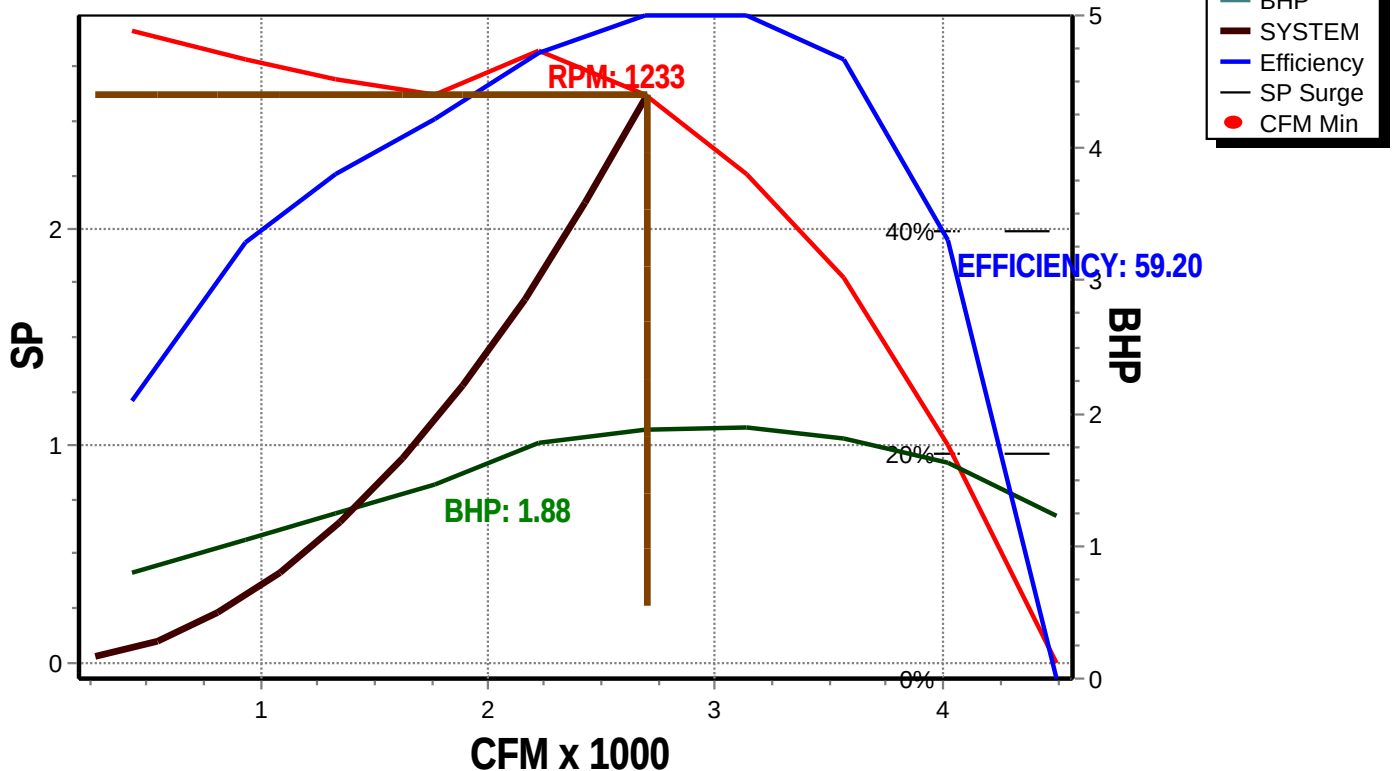
FAN SOUND POWER (Inlet/Outlet):

Octave Band:		(Re 10 ⁻¹² watts)						
1	2	3	4	5	6	7	8	
88	86	87	85	82	80	77	73	
88	88	91	94	93	91	86	78	

SOUND POWER A-Weighted: 90 / 96 dB

Max Duct SP with Blocked Airway: 2.8 in. Wg. @ 1233 rpm

Supply Fan Model: 245D60 @ 1233 RPM and 82% Width Design Conditions: 2700 CFM @ 2.61" SP





Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-020-3-0-HB09-14A:M000-U0B-DPE-AFC-0DKAWBF-00-00A0000VB
Tag: DOAS-1

Job Name:
Job Number:

AVAIO-Pittsburg CA
Selections 11/9/23

Unit Submittal For:
Unit Submittal Date:

November 09, 2023

	Base Option	Description
R	Series	Roof Top Unit
N	Generation	Ninth Generation
020	Unit Size	Twenty
3	Voltage	460V/3Ø/60Hz
0	Interior Protection	Standard
H	Refrigerant Style	R-410A Variable Capacity Scroll Compressor + Two-Step Compressor - High Efficiency
B	Unit Configuration	Air-Cooled Cond. + 6 Row Evap. Coil
0	Coil Coating	Standard
9	Cooling/Heat Pump Staging	Modulating - 1 VCC + 1 Staged Comp.
1	Heating Type	Electric Heat
4	Heating Designation	Heat 4 - 40 kW
A	Heating Staging	Modulating/SCR Electric - 0-10V Control Signal

	Feature Option	Description
M	1A. RA/OA Section	Motorized 100% Outside Air Dampers - No RA Opening
0	1B. RA/EA Blower Configuration	Standard - None
0	1C. RA/EA Blower	Standard - None
0	1D. RA/EA Blower Motor	Standard - None
U	2. OA Control	2 Position Actuator
0	3. Heat Options	Standard
B	4. Maintenance Options	115V Convenience Outlet - Factory Wired
D	5A. SA Blower Configuration	1 Blower + Premium Efficiency Motor + 1 VFD
P	5B. SA Blower	24" Direct Drive Backward Curved Plenum - 60% Width
E	5C. SA Motor	3.0 hp - 1760 rpm
A	6A. Pre Filter Type	2" Pleated Pre Filter - 30% Eff
F	6B. Unit Filter Type	4" Pleated - 65% Eff - MERV 11
C	6C. Filter Options	Clogged Filter Switch + Magnehelic Gauge
0	7. Refrigeration Control	Standard - Adj Comp. Cooling Lock Out Through Unit Controls
D	8. Refrigeration Options	Modulating Hot Gas Reheat
K	9. Refrigeration Accessories	ECM Condenser Fan - Head Pressure Control + Sight Glass
A	10. Power Options	Non-fused Disconnect Power Switch - 100 Amps
W	11. Safety Options	Remote Safety Shutdown Terminals + High Condensate Level Switch
B	12. Controls	Phase & Brown Out Protection
F	13. Special Controls	Make Up Air Unit Controller - CV Cool + CV Heat
0	14A. Outside Air Configuration	Standard - None
0	14B. Preheat Sizing	Standard - None
0	15. Glycol Percent	Water or No WSHP
0	16. Interior Cabinet Options	Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan
A	17. Exterior Cabinet Options	Base Insulation
0	18. Electrical Rating	Standard - 5 KAIC
0	19. Code Options	Standard - ETL U.S.A. Listing
0	20. Crating	Standard
0	21. Water-Cooled Cond.	Standard - None
V	22. Control Vendors	VCC-X Controls + Integrated BACnet MSTP
B	23. Type	Standard - Includes AAON Gray Paint



VCCX Components

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-020-3-0-HB09-14A:M000-U0B-DPE-AFC-0DKAWBF-00-00A0000VB

Tag: DOAS-1

Job Name:

AVAIO-Pittsburg CA

VCCX For:

Job Number:

Selections 11/9/23

VCCX Date:

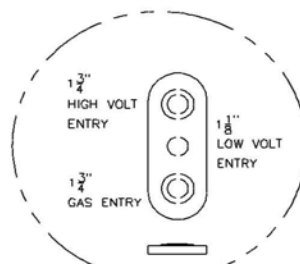
November 09, 2023

Hardware Included For VCCX Controller

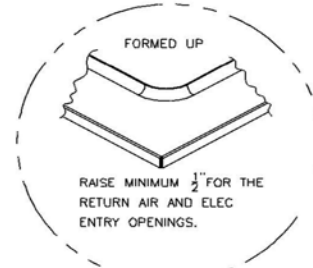
Part #	Included Parts	Assigned Channel	BACnet Point
ASM01698	VCCX2 CONTROLLER		
ASM01692	OSA Temp/Hum Sensor	EBUS2 communicating sensor	AI:16, AI:17, AI:18, AI:19
R82890	Supply Temp Sensor - Field Installed	VCCX control point AI 3	AI:9
	Supply Fan Control Signal 0-10VDC	VCCX control point AO 1	AI:22
	Economizer	VCCX control point AO 2	AI:30
	Modulated Heating (0-10VDC)	VCCX control point AO 3	AI:35
R62330	Proof of Air Flow	VCCX control point BI 1	BI:6, BI:24
R64580	Dirty Filter Sensor	VCCX control point BI 2	BI:25
	Safety Shut Down	VCCX control point BI 8	BI:26
	Supply Fan	Configured Relay Point	BI:47
	Heat 1	Configured Relay Point	BI:48
ASM02201	DIGITAL REFRIGERATION MODULE		
R42680	Comp Discharge Temp A	RSMD point TEMP1	AI:66
V38391	Suction Pressure Sensor A	RSMD point SP-1	AI:48
V38410	Discharge Pressure Sensor A	RSMD point HP-1	AI:50
V38410	Discharge Pressure Sensor B	RSMD point HP-2	AI:75
	Modulated Condenser Signal B	RSMD point AO2	AI:47
	Modulated Condenser Signal A	RSMD point AO1	AI:46
	Comp Status Input A	RSMD point BIN1	BI:77
	Comp Status Input B	RSMD point BIN2	BI:78
	Emergency Shutdown	RSMD point BIN4	BI:83
	Comp Unload Signal A	RSMD point T1	AI:44
	Comp Enable A	RSMD Fixed Relay point	BI:84
	Comp Enable B	RSMD Fixed Relay point	BI:85
ASM01670	MODULATING HOT GAS REHEAT MODULE		
	Reheat HGR Valve	MHGRV-X	AI:42

RN SERIES C - CABINET STANDARD ~ 16-30 TON

CLEARANCES	
LOCATION	• UNIT SIZE • 16 - 30 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE (FRONT)	48
LEFT SIDE	6
RIGHT SIDE	60
TOP	UNOBSTRUCTED



DETAIL A

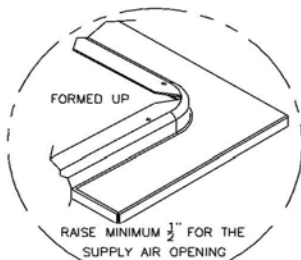


DETAIL B

NUMBER OF CONDENSER FANS

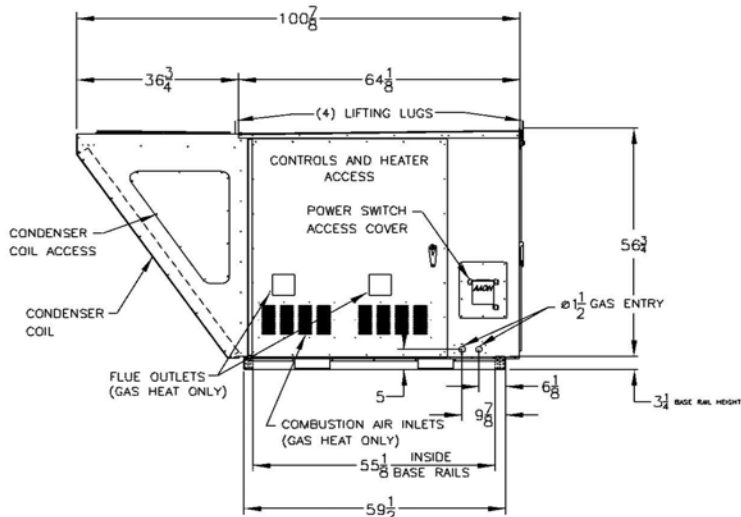
16, 18 & 20 TON - 2 FANS

25 & 30 TON - 3 FANS



DETAIL C

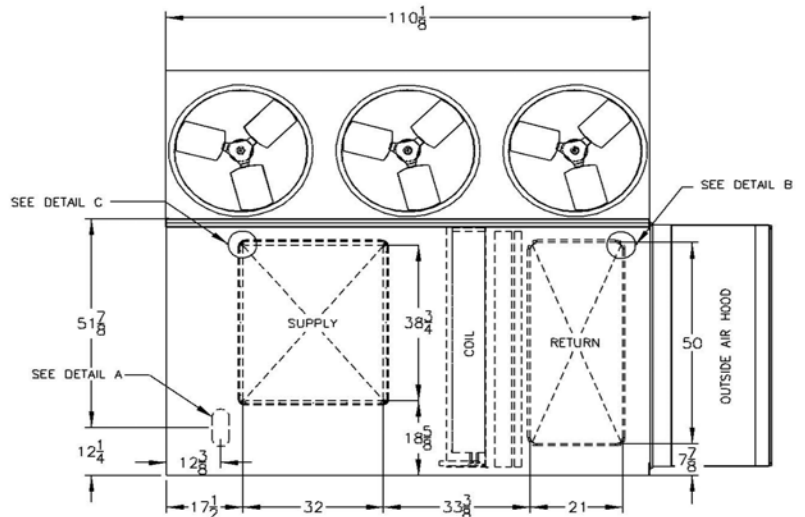
FRONT VIEW



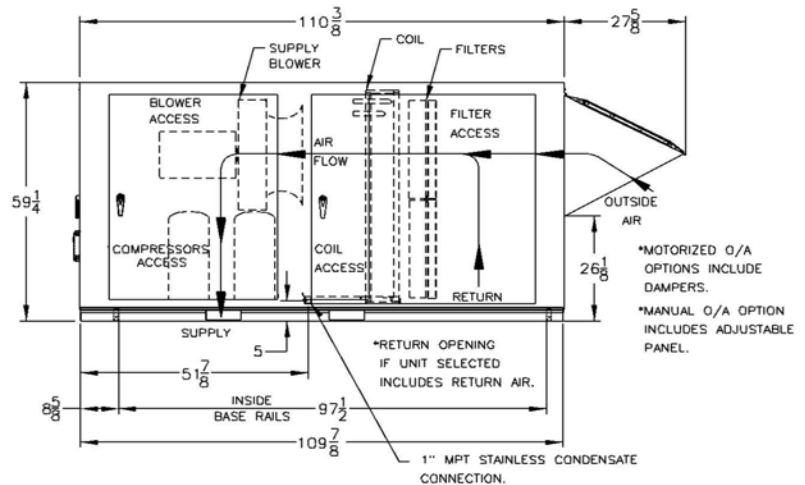
RNC-00001 REV:E 08/20/14 MLW

NOTE: ALL DIMENSIONS ARE IN INCHES

TOP VIEW



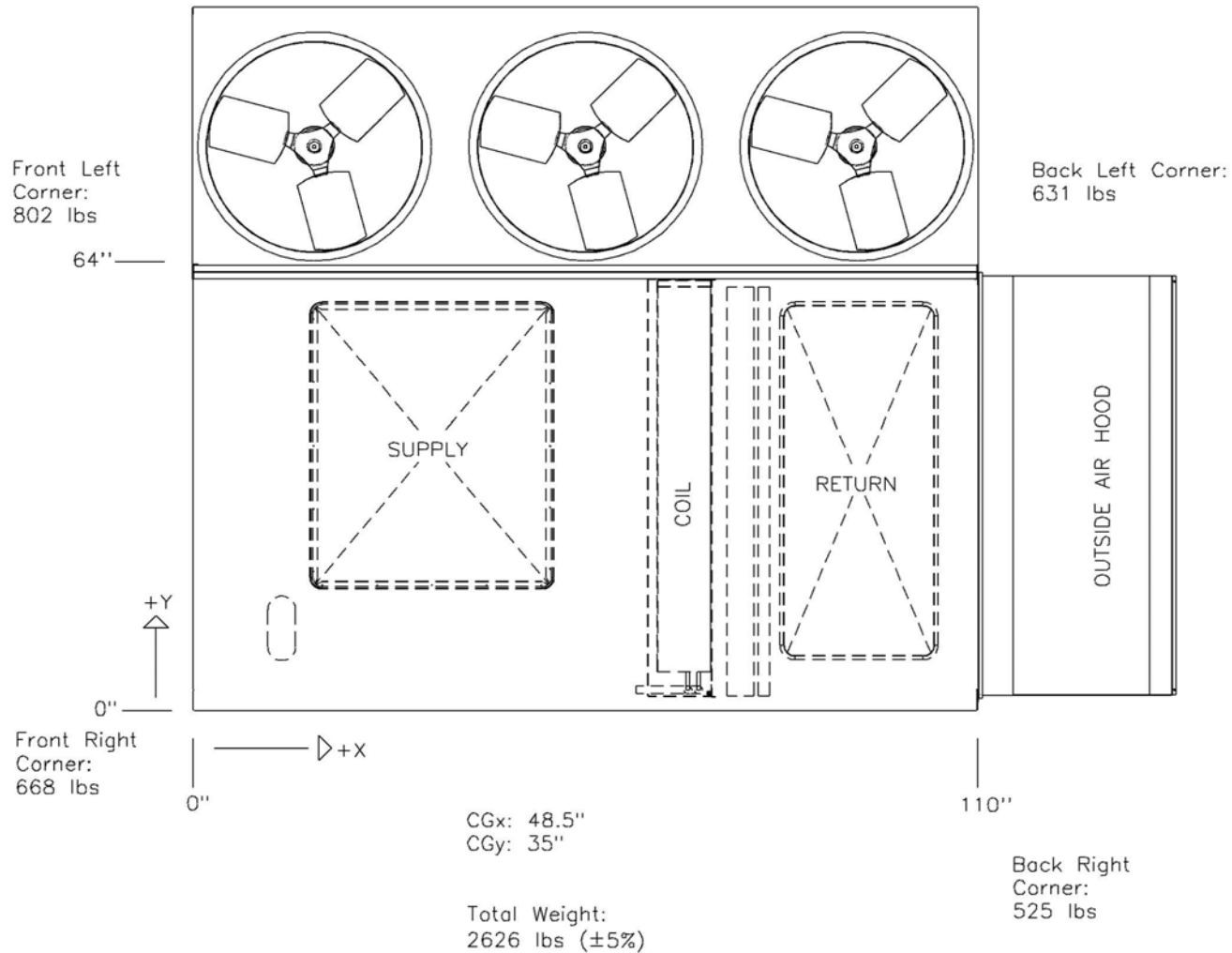
RIGHT SIDE VIEW



RNC CABINET AIR COOLED CONDENSING UNIT



RN-020-3-0-HB09-14A:M000-U0B-DPE-AFC-0DKAWBF-00-00A0000VB



Disclaimer:
This weight estimate does not account for any SPAs.



Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-013-3-0-HB09-13A:M000-U0B-DHE-AFC-0DKAWBF-00-00A0000VB

Tag: DOAS-2

Job Information

Job Name: AVAIO-Pittsburg CA
Job Number: Selections 11/9/23
Site Altitude: 0 ft
Refrigerant: R-410A

Static Pressure

External: 2.00 in. wg.
Evaporator: 0.08 in. wg.
Filters Clean: 0.09 in. wg.
Dirt Allowance: 0.35 in. wg.

Cooling Section

	Gross	Net
Total Capacity:	139.21	135.46 MBH
Sensible Capacity:	112.88	109.14 MBH
Latent Capacity:	26.32 MBH	
Mixed Air Temp:	112.70 °F DB	76.90 °F WB
Entering Air Temp:	112.70 °F DB	76.90 °F WB
Lv Air Temp (Coil):	53.24 °F DB	53.09 °F WB
Lv Air Temp (Unit):	55.06 °F DB	53.84 °F WB
Supply Air Fan:	1 x RN185D70 @ 1.32 BHP	
SA Fan RPM / Width:	1694 / 2.869"	
Evaporator Coil:	14.6 ft² / 6 Rows / 12 FPI	
Evaporator Face Velocity:	130.3 fpm	

Rating Information

Listing Model: RN-013-3-0-DABY-V0-21-000-A

Cooling Capacity (MBH): 148.0
Cooling EER: 12.1
Cooling IEER: 16.6
Rated in accordance with AHRI 340/360

Application EER @ Op. Conditions: 9.0

Electrical Data

Rating: 460/3/60
Unit FLA: 41
SCCR: 5 KAIC

Minimum Circuit Amp: 51
Maximum Overcurrent: 60

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		460	3			9.7
Compressor 2:	1		460	3			9.9
Condenser Fans:	2	1.00	460	1	1110	3.6	
Supply Fan:	1	3.00	460	3	1760	4.8	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW(dB):	83	81	85	81	72	71	67	61
Return LW(dB):	74	70	73	65	60	55	44	32

*Sound power levels are given for informational purposes only. The sound levels are not guaranteed.

Unit Information

Approx. Op./Ship Weights: 1856 / 1856 lbs. (±5%)
Supply CFM/ESP: 1900 / 2 in. wg.
Pre-Filter FV / Qty: 136.80 fpm / 4
Final Filter FV / Qty: 136.80 fpm / 4
Outside CFM: 1900
Ambient Temperature: 112.7 °F DB / 76.9 °F WB

Economizer: 0.00 in. wg.
Heating: 0.02 in. wg.
Cabinet: 0.08 in. wg.
Re-Heat Coil: 0.01 in. wg.
Total: 2.63 in. wg.

Heating Section

PreHeat Type: Std (No Preheat)
Heating Type: Electric Heat
Heating CFM: 1900
Total Capacity: 102.4 MBH
OA Temp: 24.4 °F DB / 21.7 °F WB
RA Temp: 75.0 °F DB / 62.0 °F WB
Entering Air Temp: 24.4 °F DB / 21.7 °F WB
Leaving Air Temp: 74.3 °F DB / 49.1 °F WB
Input: 30.0 kW
Heater Qty: 3
Electric Heat FLA: 36.1

Re-Heat Coil:

Capacity: 34 MBH
LA DB / WB: 70.00 °F / 59.65 °F
RH: 55%



18.5" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

JOB INFORMATION:

Job Name: AVAIO-Pittsburg CA
Job Tag: DOAS-2
Rep Firm: 791
Date: 11/09/2023
11/09/2023

WHEEL SPECIFICATION:

Max RPM: 2,200
Diameter x Qty: 18.5 in. x 1
CFM: 1900
Tip Speed: 8,205 FPM
Inertia: 8,205 FPM

OPERATING CONDITIONS:

Air Flow: 1,900 CFM
Static Pressure: 2.63 in. Wg.
Plenum DP: 0.00 in. Wg.
Inlet Grill DP: 0.00 in. Wg.
TSP: 2.63 in. Wg.
Site Altitude: 0.00 Ft
TSP @ Sea Level: 2.63 in. Wg.

MOTOR SELECTION:

Rated HP / Bypass: 3 / No
Frame Size: 182T
Nominal RPM: 1760
VAC/PH/HZ: 460/3/60
Efficiency: Premium / 0.895
Enclosure Type: ODP
Max Inertial Load: 29 WR²

FAN PERFORMANCE:

RPM: 1694
BHP: 1.32
Efficiency: 59.8%
In/Out Velocity: / FPM
Plenum Out Velocity: 32 FPM

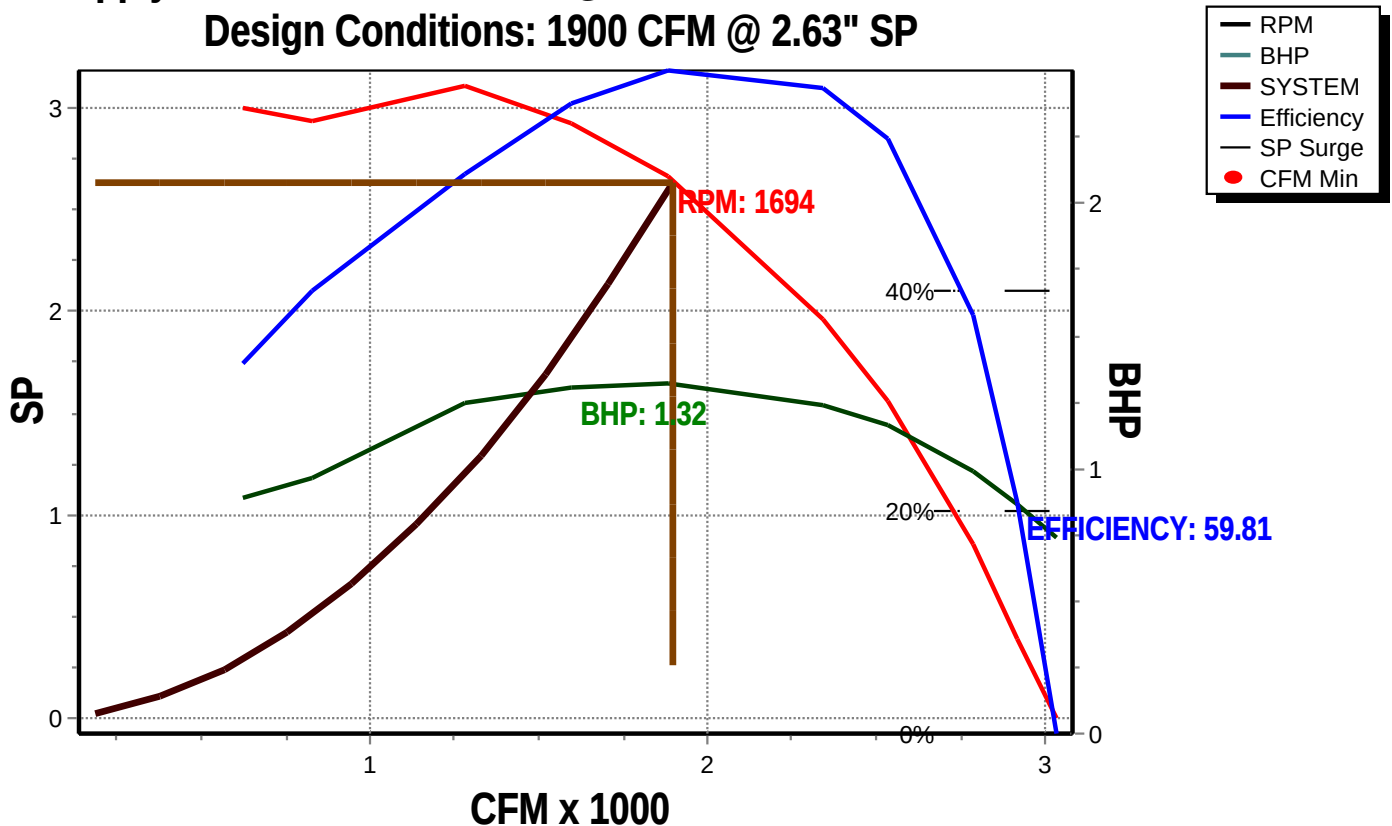
FAN SOUND POWER (Inlet/Outlet):

Octave Band:	1	2	3	4	5	6	7	8
(Re 10 ⁻¹² watts)	83	81	85	82	75	74	71	65
	83	81	85	82	75	74	71	65

SOUND POWER A-Weighted: 85 / 85 dB

Max Duct SP with Blocked Airway: 3.1 in. Wg. @ 1694 rpm

Supply Fan Model: RN185D70 @ 1694 RPM and 99% Width Design Conditions: 1900 CFM @ 2.63" SP





Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-013-3-0-HB09-13A:M000-U0B-DHE-AFC-0DKAWBF-00-00A0000VB
Tag: DOAS-2

Job Name:
Job Number:

AVAIO-Pittsburg CA
Selections 11/9/23

Unit Submittal For:
Unit Submittal Date:

November 09, 2023

	Base Option	Description
R	Series	Roof Top Unit
N	Generation	Ninth Generation
013	Unit Size	Thirteen
3	Voltage	460V/3Ø/60Hz
0	Interior Protection	Standard
H	Refrigerant Style	R-410A Variable Capacity Scroll Compressor + Two-Step Compressor - High Efficiency
B	Unit Configuration	Air-Cooled Cond. + 6 Row Evap. Coil
0	Coil Coating	Standard
9	Cooling/Heat Pump Staging	Modulating - 1 VCC + 1 Staged Comp.
1	Heating Type	Electric Heat
3	Heating Designation	Heat 3 - 30 kW
A	Heating Staging	Modulating/SCR Electric - 0-10V Control Signal

	Feature Option	Description
M	1A. RA/OA Section	Motorized 100% Outside Air Dampers - No RA Opening
0	1B. RA/EA Blower Configuration	Standard - None
0	1C. RA/EA Blower	Standard - None
0	1D. RA/EA Blower Motor	Standard - None
U	2. OA Control	2 Position Actuator
0	3. Heat Options	Standard
B	4. Maintenance Options	115V Convenience Outlet - Factory Wired
D	5A. SA Blower Configuration	1 Blower + Premium Efficiency Motor + 1 VFD
H	5B. SA Blower	18.5" Direct Drive Backward Curved Plenum - 70% Width
E	5C. SA Motor	3.0 hp - 1760 rpm
A	6A. Pre Filter Type	2" Pleated Pre Filter - 30% Eff
F	6B. Unit Filter Type	4" Pleated - 65% Eff - MERV 11
C	6C. Filter Options	Clogged Filter Switch + Magnehelic Gauge
0	7. Refrigeration Control	Standard - Adj Comp. Cooling Lock Out Through Unit Controls
D	8. Refrigeration Options	Modulating Hot Gas Reheat
K	9. Refrigeration Accessories	ECM Condenser Fan - Head Pressure Control + Sight Glass
A	10. Power Options	Non-fused Disconnect Power Switch - 100 Amps
W	11. Safety Options	Remote Safety Shutdown Terminals + High Condensate Level Switch
B	12. Controls	Phase & Brown Out Protection
F	13. Special Controls	Make Up Air Unit Controller - CV Cool + CV Heat
0	14A. Outside Air Configuration	Standard - None
0	14B. Preheat Sizing	Standard - None
0	15. Glycol Percent	Water or No WSHP
0	16. Interior Cabinet Options	Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan
A	17. Exterior Cabinet Options	Base Insulation
0	18. Electrical Rating	Standard - 5 KAIC
0	19. Code Options	Standard - ETL U.S.A. Listing
0	20. Crating	Standard
0	21. Water-Cooled Cond.	Standard - None
V	22. Control Vendors	VCC-X Controls + Integrated BACnet MSTP
B	23. Type	Standard - Includes AAON Gray Paint



VCCX Components

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN - 013 - 3 - 0 - HB09 - 13A : M000 - U0B - DHE - AFC - 0DKAWBF - 00 - 00A0000VB

Tag: DOAS-2

Job Name:

AVAIO-Pittsburg CA

VCCX For:

Job Number:

Selections 11/9/23

VCCX Date:

November 09, 2023

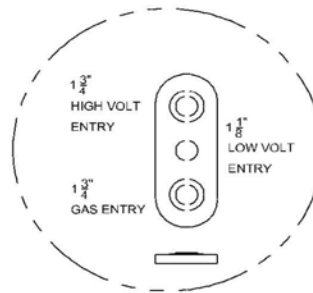
Hardware Included For VCCX Controller

Part #	Included Parts	Assigned Channel	BACnet Point
ASM01698	VCCX2 CONTROLLER		
ASM01692	OSA Temp/Hum Sensor	EBUS2 communicating sensor	AI:16,AI:17,AI:18,AI:19
R82890	Supply Temp Sensor - Field Installed	VCCX control point AI 3	AI:9
	Supply Fan Control Signal 0-10VDC	VCCX control point AO 1	AI:22
	Economizer	VCCX control point AO 2	AI:30
	Modulated Heating (0-10VDC)	VCCX control point AO 3	AI:35
R62330	Proof of Air Flow	VCCX control point BI 1	BI:6, BI:24
R64580	Dirty Filter Sensor	VCCX control point BI 2	BI:25
	Safety Shut Down	VCCX control point BI 8	BI:26
	Supply Fan	Configured Relay Point	BI:47
	Heat 1	Configured Relay Point	BI:48
ASM02201	DIGITAL REFRIGERATION MODULE		
R57800	Comp Discharge Temp A	RSMD point TEMP1	AI:66
V38391	Suction Pressure Sensor A	RSMD point SP-1	AI:48
V38410	Discharge Pressure Sensor A	RSMD point HP-1	AI:50
V38391	Suction Pressure Sensor B	RSMD point SP-2	AI:73
V38410	Discharge Pressure Sensor B	RSMD point HP-2	AI:75
	Modulated Condenser Signal B	RSMD point AO2	AI:47
	Modulated Condenser Signal A	RSMD point AO1	AI:46
	Comp Status Input A	RSMD point BIN1	BI:77
	Comp Status Input B	RSMD point BIN2	BI:78
	Emergency Shutdown	RSMD point BIN4	BI:83
	Comp Part Load Signal B	RSMD point T2	AI:45
	Comp Unload Signal A	RSMD point T1	AI:44
	Comp Enable A	RSMD Fixed Relay point	BI:84
	Comp Enable B	RSMD Fixed Relay point	BI:85
ASM01670	MODULATING HOT GAS REHEAT MODULE		
	Reheat HGR Valve	MHGRV-X	AI:42

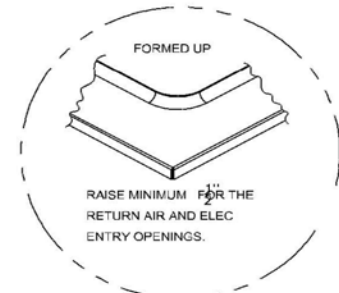
RNB 9-15 TON STANDARD

AAON®

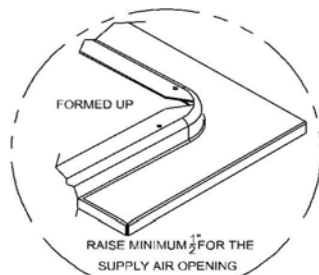
CLEARANCES	
LOCATION	• UNIT SIZE • 9 - 15 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE (FRONT)	48
LEFT SIDE	6
RIGHT SIDE	48
TOP	UNOBSTRUCTED



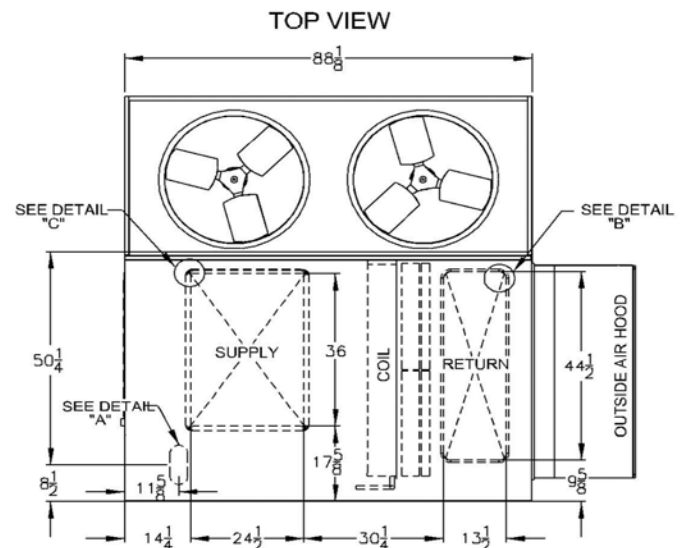
DETAIL A



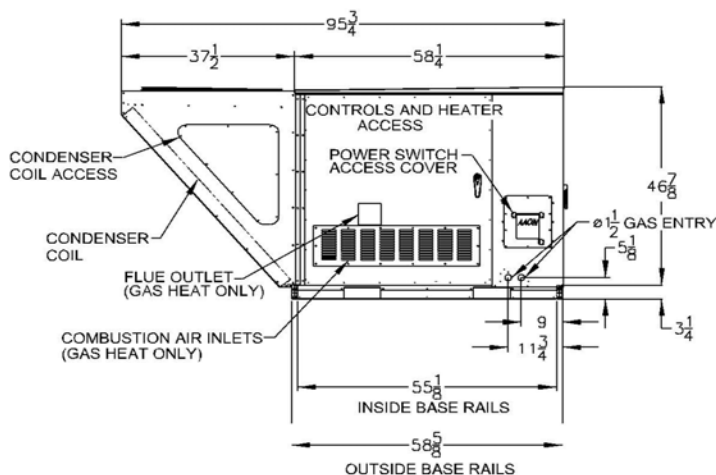
DETAIL B



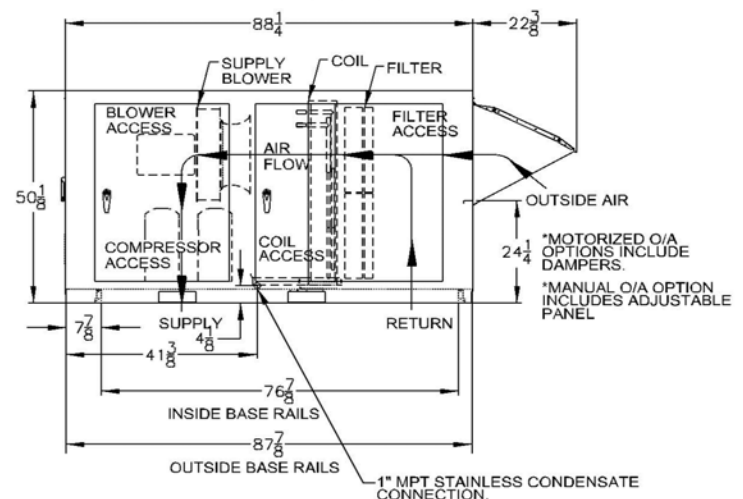
DETAIL C



FRONT VIEW



RIGHT SIDE VIEW

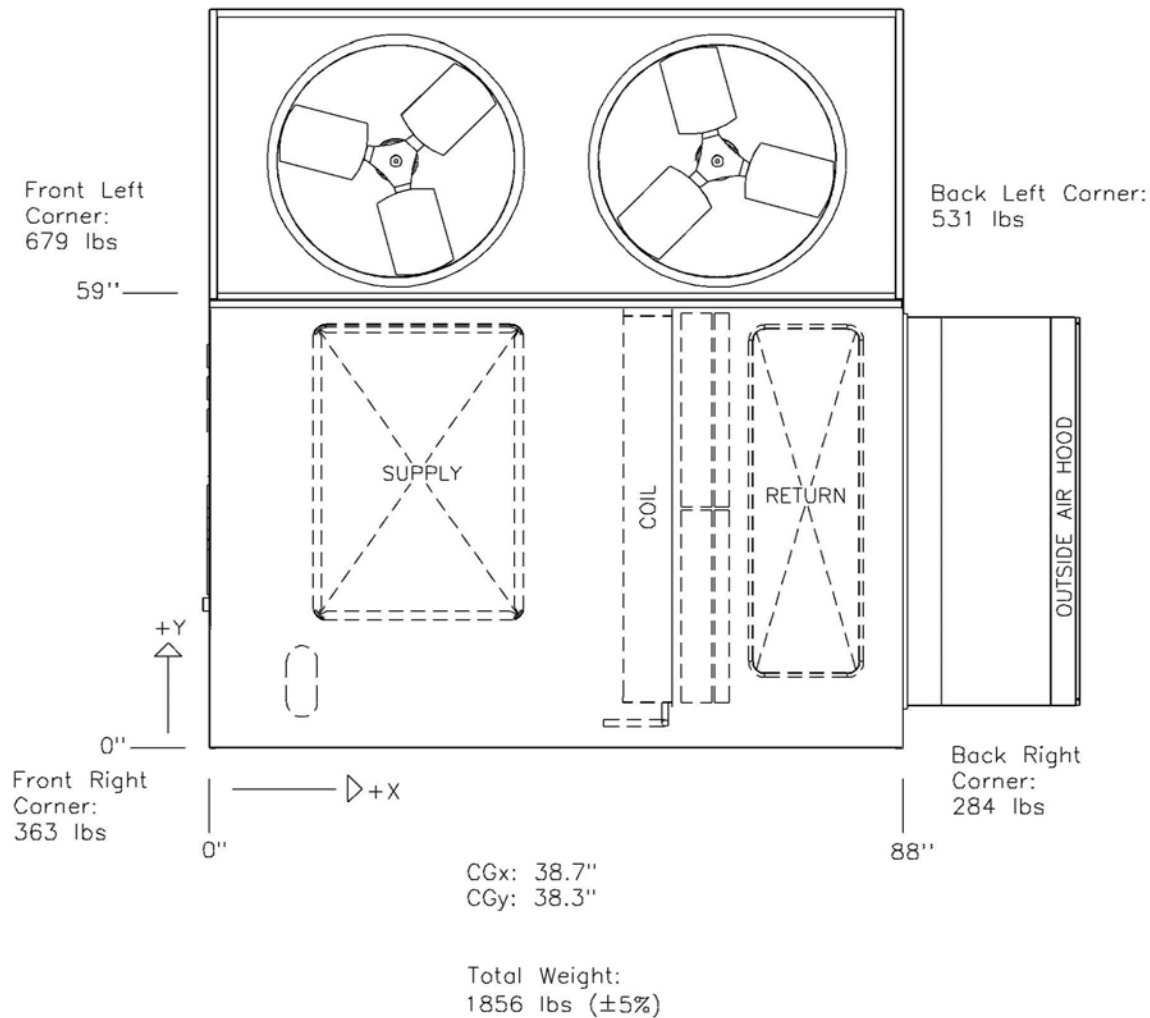


RNB-00001 REV:D 06/17/20 CAR
RNB-00001 REV:C 08/19/14 MLW
NOTE: ALL DIMENSIONS ARE IN INCHES

RNB CABINET AIR COOLED CONDENSING UNIT



RN-013-3-0-HB09-13A:M000-U0B-DHE-AFC-ODKAWBF-00-00A0000VB



Disclaimer:
This weight estimate does not account for any SPAs.



Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-030-3-0-EB09-16A:M000-U0B-DPF-AFC-0DKAWBF-00-00A0000VB

Tag: DOAS-3

Job Information

Job Name: AVAIO-Pittsburg CA
Job Number: Selections 11/9/23
Site Altitude: 0 ft
Refrigerant: R-410A

Static Pressure

External: 2.00 in. wg.
Evaporator: 0.15 in. wg.
Filters Clean: 0.12 in. wg.
Dirt Allowance: 0.35 in. wg.

Cooling Section

	Gross	Net
Total Capacity:	287.64	281.05 MBH
Sensible Capacity:	223.52	216.93 MBH
Latent Capacity:	64.13 MBH	
Mixed Air Temp:	112.70 °F DB	76.90 °F WB
Entering Air Temp:	112.70 °F DB	76.90 °F WB
Lv Air Temp (Coil):	50.39 °F DB	50.28 °F WB
Lv Air Temp (Unit)	52.08 °F DB	51.02 °F WB
Digital Comp. Capacity Ratio:	100%	
Supply Air Fan:	1 x 245D60 @ 2.32 BHP	
SA Fan RPM / Width:	1307 / 3.257"	
Evaporator Coil:	19.9 ft ² / 6 Rows / 12 FPI	
Evaporator Face Velocity:	181.3 fpm	

Rating Information

Listing Model: RN-030-3-0-BABY-V0-21-000-A

Cooling Capacity (MBH): 308.0
Cooling EER: 10.8
Cooling IEER: 13.2
Rated in accordance with AHRI 340/360

Application EER @ Op. Conditions: 8.1

Electrical Data

Rating: 460/3/60
Unit FLA: 80
SCCR: 5 KAIC

Minimum Circuit Amp: 82
Maximum Overcurrent: 90

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		460	3			23.1
Compressor 2:	1		460	3			23.1
Condenser Fans:	3	1.00	460	1	1110	3.6	
Supply Fan:	1	5.00	460	3	1760	7.6	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW(dB):	90	89	92	95	92	90	84	78
Return LW(dB):	80	78	77	71	69	62	50	39

*Sound power levels are given for informational purposes only. The sound levels are not guaranteed.

Unit Information

Approx. Op./Ship Weights: 2711 / 2711 lbs. (±5%)
Supply CFM/ESP: 3600 / 2 in. wg.
Pre-Filter FV / Qty: 172.80 fpm / 6
Final Filter FV / Qty: 172.80 fpm / 6
Outside CFM: 3600
Ambient Temperature: 112.7 °F DB / 76.9 °F WB

Economizer: 0.00 in. wg.
Heating: 0.05 in. wg.
Cabinet: 0.10 in. wg.
Re-Heat Coil: 0.02 in. wg.
Total: 2.79 in. wg.

Heating Section

PreHeat Type: Std (No Preheat)
Heating Type: Electric Heat
Heating CFM: 3600
Total Capacity: 204.8 MBH
OA Temp: 24.4 °F DB / 21.7 °F WB
RA Temp: 75.0 °F DB / 62.0 °F WB
Entering Air Temp: 24.4 °F DB / 21.7 °F WB
Leaving Air Temp: 77.1 °F DB / 50.4 °F WB
Input: 60.0 kW
Heater Qty: 6
Electric Heat FLA: 72.2

Re-Heat Coil:

Capacity: 76 MBH
LA DB / WB: 70.00 °F / 58.27 °F
RH: 49%



24.5" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

JOB INFORMATION:

Job Name: AVAIO-Pittsburg CA
Job Tag: DOAS-3
Rep Firm: 791
Date: 11/09/2023

WHEEL SPECIFICATION:

Max RPM: 1,800
Diameter x Qty: 24.5 in. x 1
Width%: 99
Tip Speed: 8,383 FPM
Inertia: 10 WR²

OPERATING CONDITIONS:

Air Flow: 3,600 CFM
Static Pressure: 2.79 in. Wg.
Plenum DP: 0.00 in. Wg.
Inlet Grill DP: 0.00 in. Wg.
TSP: 2.79 in. Wg.
Site Altitude: 0.00 Ft
TSP @ Sea Level: 2.79 in. Wg.

MOTOR SELECTION:

Rated HP / Bypass: 5 / No
Frame Size: 184T
Nominal RPM: 1760
VAC/PH/HZ: 460/3/60
Efficiency: Premium / 0.895
Enclosure Type: ODP
Max Inertial Load: 52 WR²

FAN PERFORMANCE:

RPM: 1307
BHP: 2.32
Efficiency: 68.3%
In/Out Velocity: 1101/1212 FPM
Plenum Out Velocity: 60 FPM

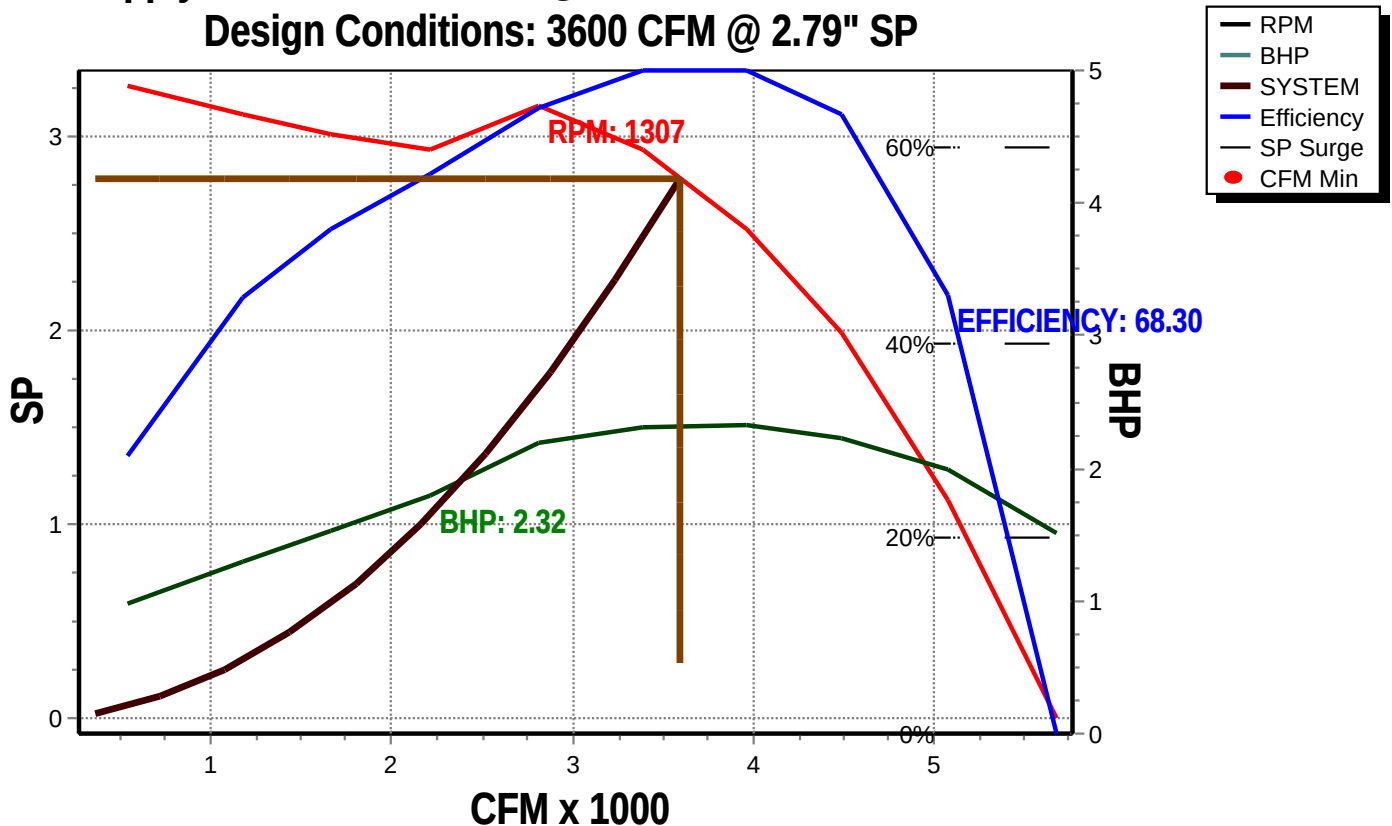
FAN SOUND POWER (Inlet/Outlet):

Octave Band:	1	2	3	4	5	6	7	8
(Re 10 ⁻¹² watts)	90	88	88	87	84	82	80	76
	90	89	92	96	95	93	88	81

SOUND POWER A-Weighted: 92 / 98 dB

Max Duct SP with Blocked Airway: 3.2 in. Wg. @ 1307 rpm

Supply Fan Model: 245D60 @ 1307 RPM and 99% Width Design Conditions: 3600 CFM @ 2.79" SP





Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-030-3-0-EB09-16A:M000-U0B-DPF-AFC-0DKAWBF-00-00A0000VB
Tag: DOAS-3

Job Name:
Job Number:

AVAIO-Pittsburg CA
Selections 11/9/23

Unit Submittal For:
Unit Submittal Date:

November 09, 2023

	Base Option	Description
R	Series	Roof Top Unit
N	Generation	Ninth Generation
030	Unit Size	Thirty
3	Voltage	460V/3Ø/60Hz
0	Interior Protection	Standard
E	Refrigerant Style	R-410A Variable Capacity Scroll Compressor (VCC)
B	Unit Configuration	Air-Cooled Cond. + 6 Row Evap. Coil
0	Coil Coating	Standard
9	Cooling/Heat Pump Staging	Modulating - 1 VCC + 1 On/Off Comp.
1	Heating Type	Electric Heat
6	Heating Designation	Heat 6 - 60 kW
A	Heating Staging	Modulating/SCR Electric - 0-10V Control Signal

	Feature Option	Description
M	1A. RA/OA Section	Motorized 100% Outside Air Dampers - No RA Opening
0	1B. RA/EA Blower Configuration	Standard - None
0	1C. RA/EA Blower	Standard - None
0	1D. RA/EA Blower Motor	Standard - None
U	2. OA Control	2 Position Actuator
0	3. Heat Options	Standard
B	4. Maintenance Options	115V Convenience Outlet - Factory Wired
D	5A. SA Blower Configuration	1 Blower + Premium Efficiency Motor + 1 VFD
P	5B. SA Blower	24" Direct Drive Backward Curved Plenum - 60% Width
F	5C. SA Motor	5.0 hp - 1760 rpm
A	6A. Pre Filter Type	2" Pleated Pre Filter - 30% Eff
F	6B. Unit Filter Type	4" Pleated - 65% Eff - MERV 11
C	6C. Filter Options	Clogged Filter Switch + Magnehelic Gauge
0	7. Refrigeration Control	Standard - Adj Comp. Cooling Lock Out Through Unit Controls
D	8. Refrigeration Options	Modulating Hot Gas Reheat
K	9. Refrigeration Accessories	ECM Condenser Fan - Head Pressure Control + Sight Glass
A	10. Power Options	Non-fused Disconnect Power Switch - 100 Amps
W	11. Safety Options	Remote Safety Shutdown Terminals + High Condensate Level Switch
B	12. Controls	Phase & Brown Out Protection
F	13. Special Controls	Make Up Air Unit Controller - CV Cool + CV Heat
0	14A. Outside Air Configuration	Standard - None
0	14B. Preheat Sizing	Standard - None
0	15. Glycol Percent	Water or No WSHP
0	16. Interior Cabinet Options	Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan
A	17. Exterior Cabinet Options	Base Insulation
0	18. Electrical Rating	Standard - 5 KAIC
0	19. Code Options	Standard - ETL U.S.A. Listing
0	20. Crating	Standard
0	21. Water-Cooled Cond.	Standard - None
V	22. Control Vendors	VCC-X Controls + Integrated BACnet MSTP
B	23. Type	Standard - Includes AAON Gray Paint



VCCX Components

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.341 (SN: 6202416-5H5HVUH8)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-030-3-0-EB09-16A:M000-U0B-DPF-AFC-0DKAWBF-00-00A0000VB

Tag: DOAS-3

Job Name:

AVAIO-Pittsburg CA

VCCX For:

Job Number:

Selections 11/9/23

VCCX Date:

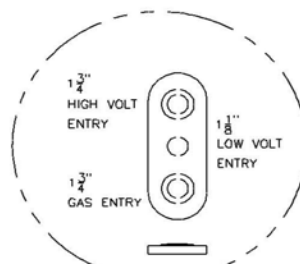
November 09, 2023

Hardware Included For VCCX Controller

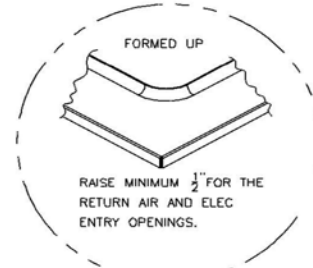
Part #	Included Parts	Assigned Channel	BACnet Point
ASM01698	VCCX2 CONTROLLER		
ASM01692	OSA Temp/Hum Sensor	EBUS2 communicating sensor	AI:16, AI:17, AI:18, AI:19
R82890	Supply Temp Sensor - Field Installed	VCCX control point AI 3	AI:9
	Supply Fan Control Signal 0-10VDC	VCCX control point AO 1	AI:22
	Economizer	VCCX control point AO 2	AI:30
	Modulated Heating (0-10VDC)	VCCX control point AO 3	AI:35
R62330	Proof of Air Flow	VCCX control point BI 1	BI:6, BI:24
R64580	Dirty Filter Sensor	VCCX control point BI 2	BI:25
	Safety Shut Down	VCCX control point BI 8	BI:26
	Supply Fan	Configured Relay Point	BI:47
	Heat 1	Configured Relay Point	BI:48
	Heat 2	Configured Relay Point	BI:49
ASM02201	DIGITAL REFRIGERATION MODULE		
R42680	Comp Discharge Temp A	RSMD point TEMP1	AI:66
V38391	Suction Pressure Sensor A	RSMD point SP-1	AI:48
V38410	Discharge Pressure Sensor A	RSMD point HP-1	AI:50
V38410	Discharge Pressure Sensor B	RSMD point HP-2	AI:75
	Modulated Condenser Signal AB	RSMD point AO1	AI:46
	Comp Status Input A	RSMD point BIN1	BI:77
	Comp Status Input B	RSMD point BIN2	BI:78
	Emergency Shutdown	RSMD point BIN4	BI:83
	Comp Unload Signal A	RSMD point T1	AI:44
	Comp Enable A	RSMD Fixed Relay point	BI:84
	Comp Enable B	RSMD Fixed Relay point	BI:85
ASM01670	MODULATING HOT GAS REHEAT MODULE		
	Reheat HGR Valve	MHGRV-X	AI:42

RN SERIES C - CABINET STANDARD ~ 16-30 TON

CLEARANCES	
LOCATION	• UNIT SIZE • 16 - 30 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE (FRONT)	48
LEFT SIDE	6
RIGHT SIDE	60
TOP	UNOBSTRUCTED



DETAIL A

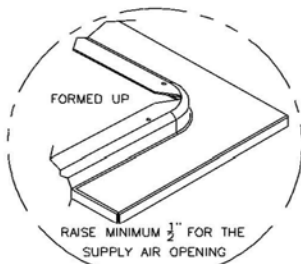


DETAIL B

NUMBER OF CONDENSER FANS

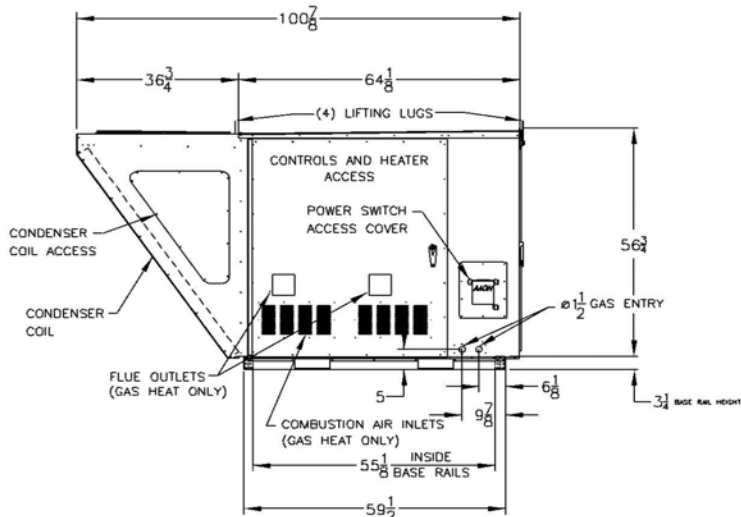
16, 18 & 20 TON - 2 FANS

25 & 30 TON - 3 FANS



DETAIL C

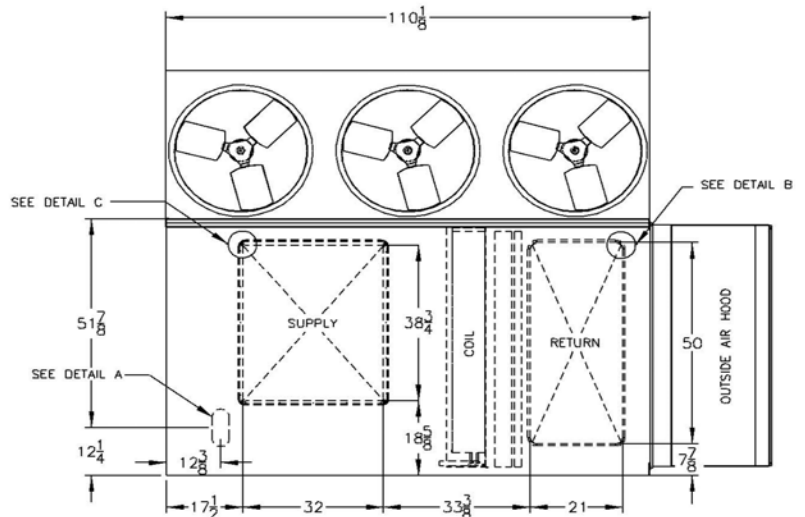
FRONT VIEW



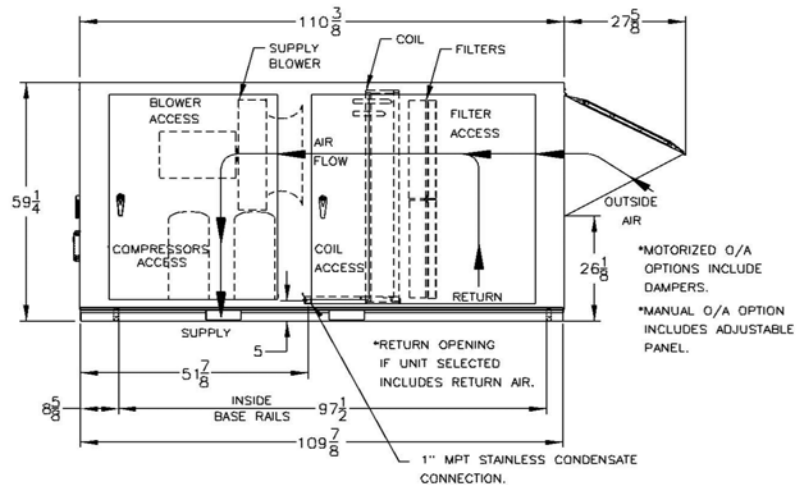
RNC-00001 REV:E 08/20/14 MLW

NOTE: ALL DIMENSIONS ARE IN INCHES

TOP VIEW



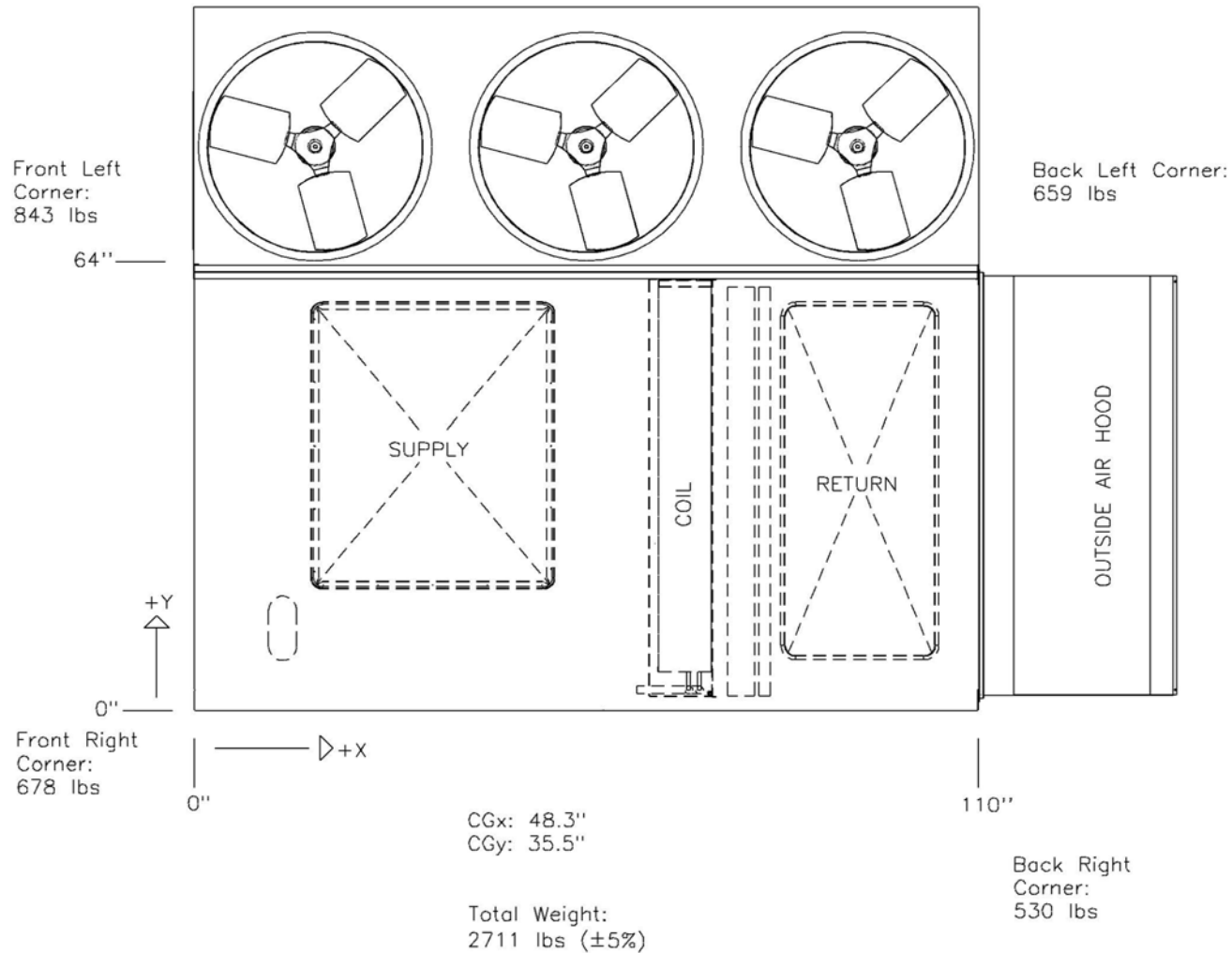
RIGHT SIDE VIEW



RNC CABINET AIR COOLED CONDENSING UNIT



RN-030-3-0-EB09-16A:M000-U0B-DPF-AFC-ODKAWBF-00-00A0000VB



Disclaimer:
This weight estimate does not account for any SPAs.



Exhaust Emission Data Sheet

C3000 D6e

60 Hz Diesel Generator Set

EPA Tier 2

Engine Information:

Model:	Cummins Inc. QSK95-G9	Bore:	7.48 in. (190 mm)
Type:	4 Cycle, VEE, 16 cylinder diesel	Stroke:	8.27 in. (210 mm)
Aspiration:	Turbocharged and Aftercooled	Displacement:	5816 cu. in. (95.3 liters)
Compression Ratio:	15.5:1		
Emission Control Device:	Turbocharged and Aftercooled		
Emission Level:	Stationary Emergency		

	<u>1/4</u>	<u>1/2</u>	<u>3/4</u>	<u>Full</u>	<u>Full</u>	<u>Full</u>
<u>Performance Data</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Prime</u>	<u>Continuous</u>
Engine BHP @ 1800 RPM (60 Hz)	1077	2155	3232	4309	3963	3616
Fuel Consumption L/Hr (US Gal/Hr)	246 (65)	435 (115)	598 (158)	776 (205)	719 (190)	663 (175)
Exhaust Gas Flow m³/min (CFM)	280 (9901)	442 (15626)	548 (19336)	649 (22925)	618 (21829)	587 (20735)
Exhaust Gas Temperature °C (°F)	338 (641)	364 (687)	383 (721)	442 (828)	422 (792)	404 (759)
<u>Exhaust Emission Data</u>						
HC (Total Unburned Hydrocarbons)	0.30 (109)	0.20 (85)	0.11 (50)	0.07 (33)	0.08 (37)	0.09 (42)
NOx (Oxides of Nitrogen as NO ₂)	3.20 (1162)	3.16 (1307)	4.10 (1840)	5.21 (2438)	4.81 (2228)	4.34 (1986)
CO (Carbon Monoxide)	0.58 (212)	0.28 (116)	0.17 (75)	0.21 (99)	0.19 (87)	0.18 (82)
PM (Particulate Matter)	0.19 (61)	0.10 (37)	0.05 (21)	0.03 (13)	0.04 (15)	0.05 (19)
SO ₂ (Sulfur Dioxide)	0.006 (1.8)	0.005 (1.8)	0.005 (1.8)	0.004 (1.8)	0.004 (1.8)	0.005 (1.8)
Smoke (FSN)	0.84	0.63	0.45	0.34	0.37	0.42

All values (except smoke) are cited: g/BHP-hr (mg/Nm³ @ 5% O₂)

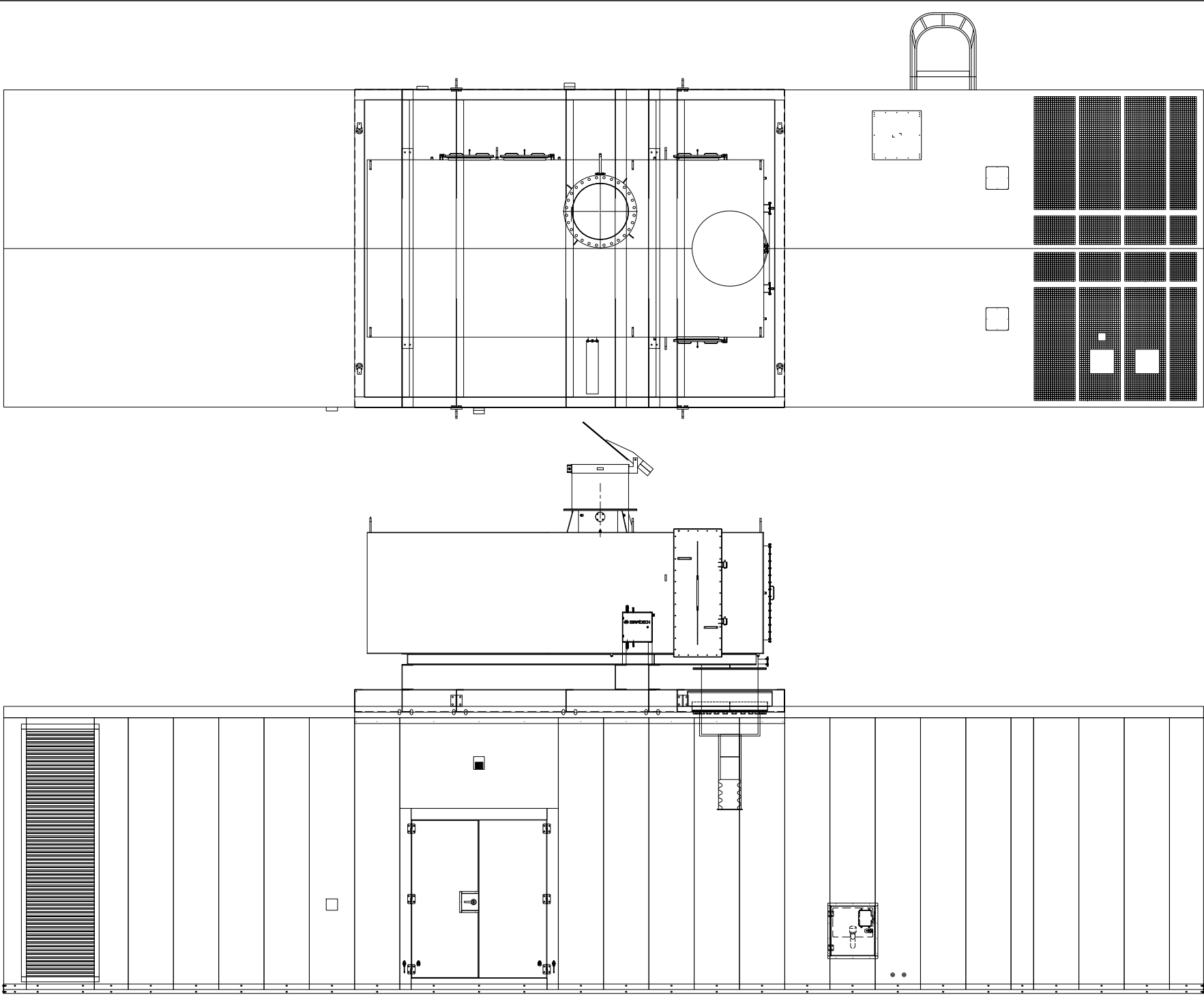
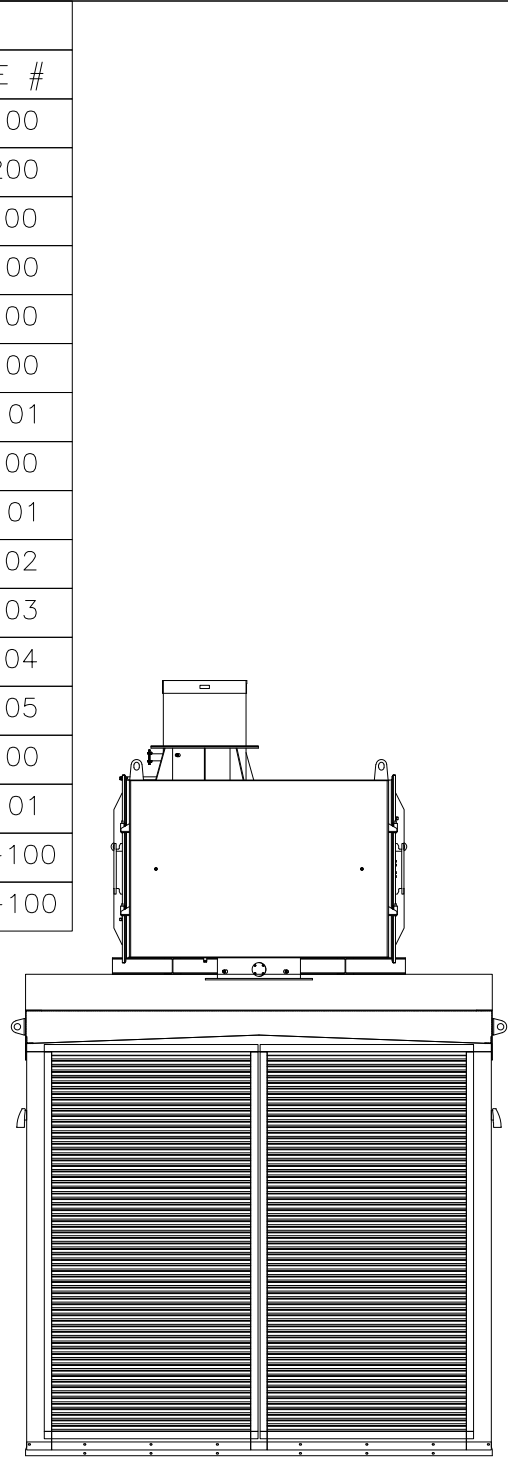
Test Conditions

Steady-state emissions recorded per ISO8178-1 during operation at rated engine speed (+/-2%) and stated constant load (+/-2%) with engine temperatures, pressures and emission rates stabilized.

Fuel Specification:	40-48 Cetane Number, 0.0015 Wt.% Sulfur; Reference ISO8178-5, 40 CFR 86, 1313—98 Type 2-D and ASTM D975 No. 2-D. Fuel Density at 0.85 Kg/L (7.1 lbs/US Gal)
Air Inlet Temperature	25 °C (77 °F)
Fuel Inlet Temperature:	40 °C (104 °F)
Barometric Pressure:	100 kPa (29.53 in Hg)
Humidity:	NOx measurement corrected to 10.7 g/kg (75 grains H ₂ O/lb) of dry air
Intake Restriction:	Set to 18 in of H ₂ O as measured from compressor inlet
Exhaust Back Pressure:	Set to 1.5 in Hg
Note:	mg/m³ values are measured dry, corrected to 5% O ₂ and normalized to standard temperature and pressure (0°C, 101.325 kPa)

The NOx, HC, CO and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

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OCCUPANCY GROUP U, ACCESSORY STRUCTURE
RISK CATEGORY II STRUCTURE
AISC 16TH EDITION ASD

WIND LOAD RATING = 115 MPH
ROOF LOAD RATING = 50 P.S.F.
FLOOR LOAD RATING = 200 P.S.F.

UNIT IS DESIGNED TO THESE CODES:

- IBC 2018
- 2017 NATIONAL ELECTRICAL CODE
- NFPA30, NFPA37, NFPA110
- UL142

DESIGN CRITERIA
STEEL: STRUCTURAL ASTM A-36min Fy=36kSI min
STEEL: TUBE ASTM A-500 GR. B Fy=46kSI min
STEEL: MISC ASTM A-36 Fy=36kSI min
ALUM: BLDG ALLOY 3003-H32

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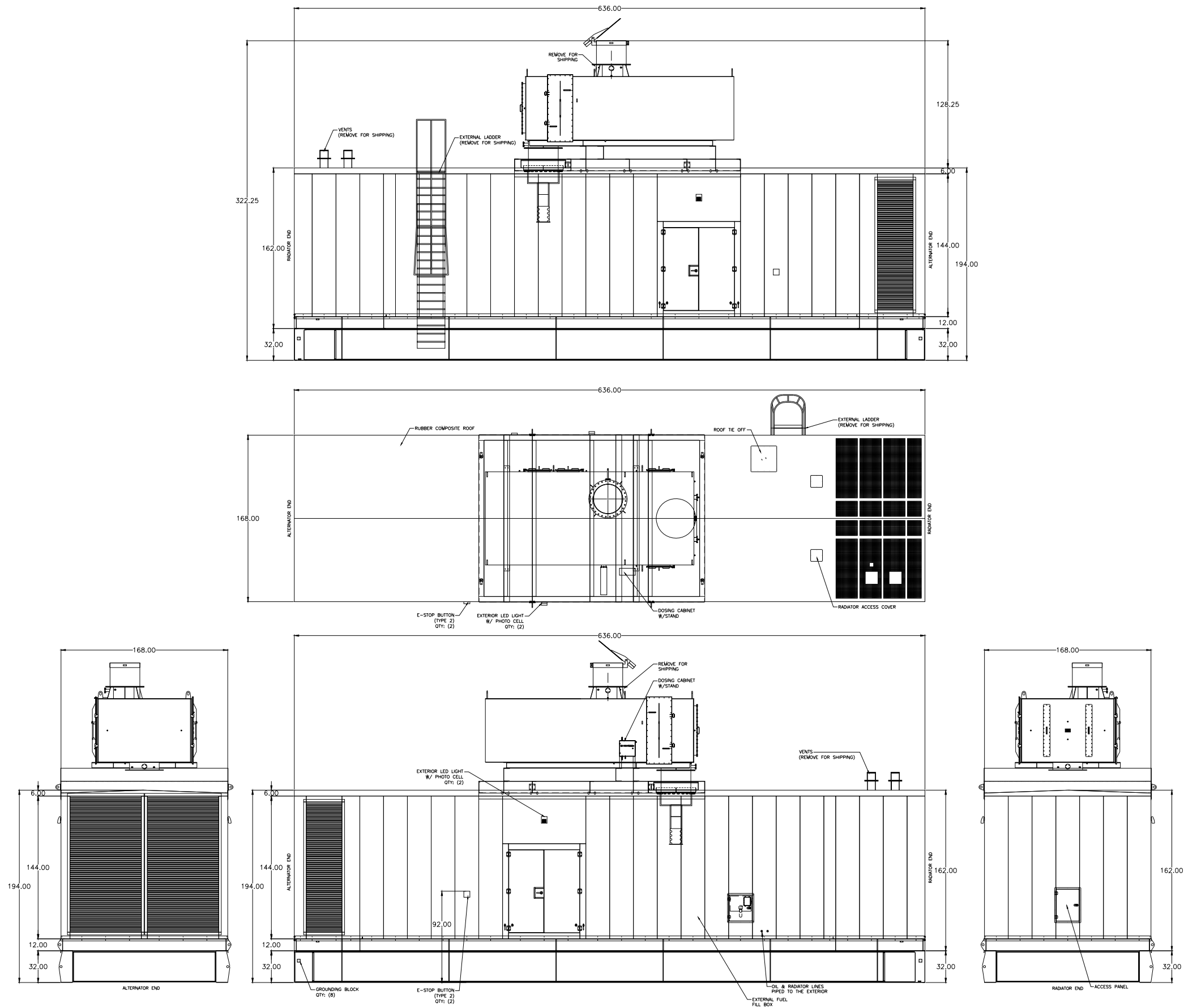
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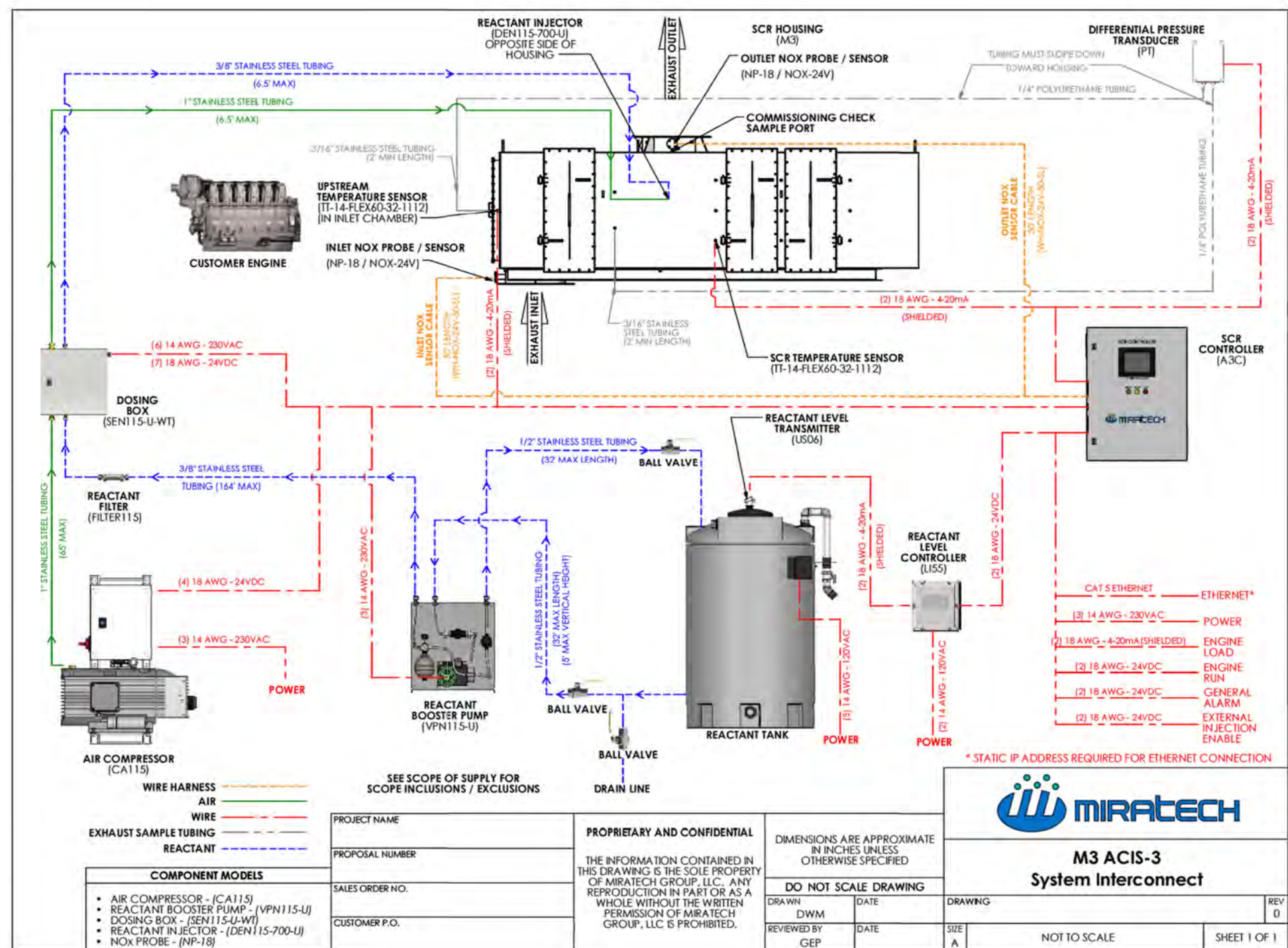


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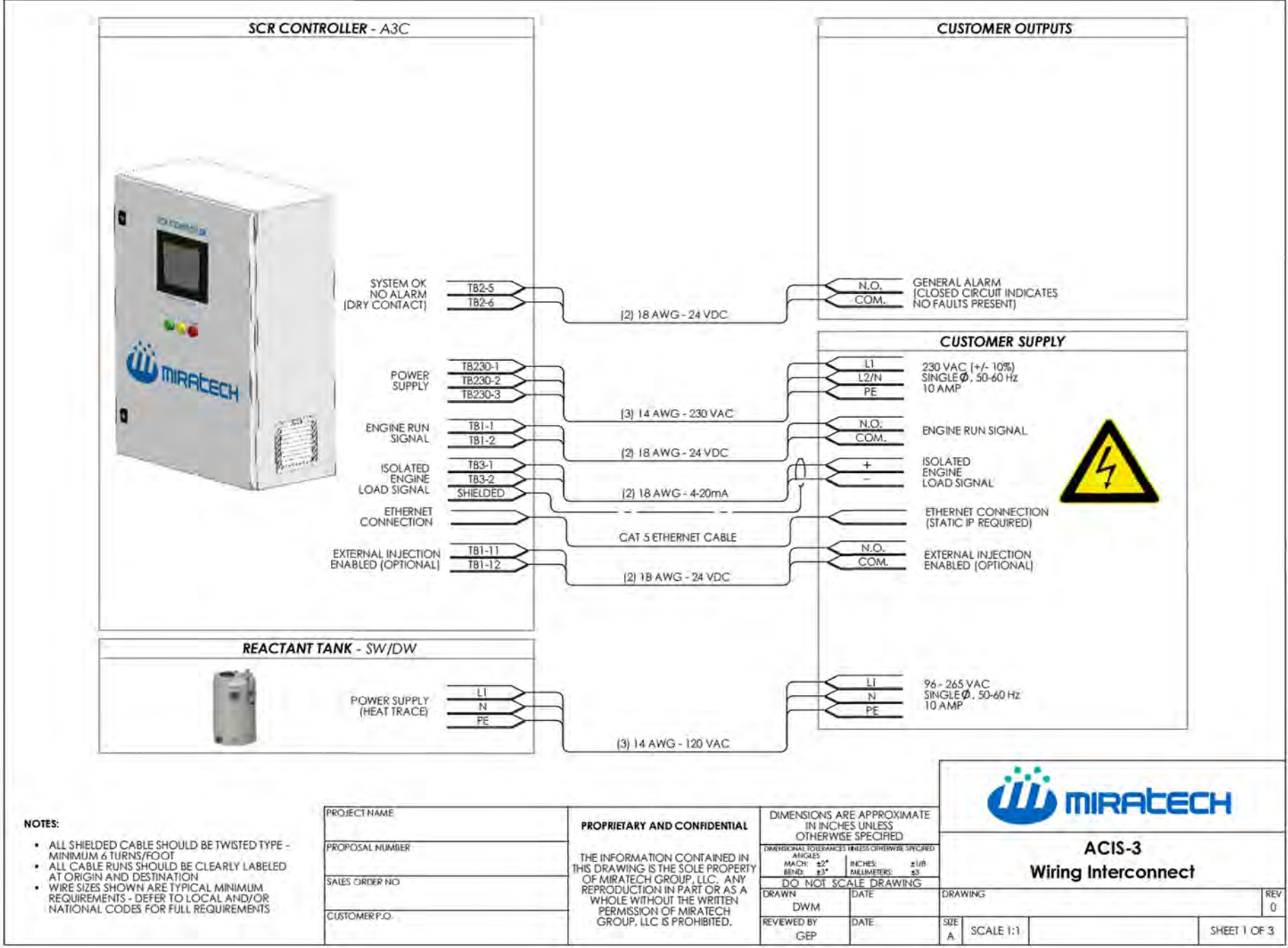
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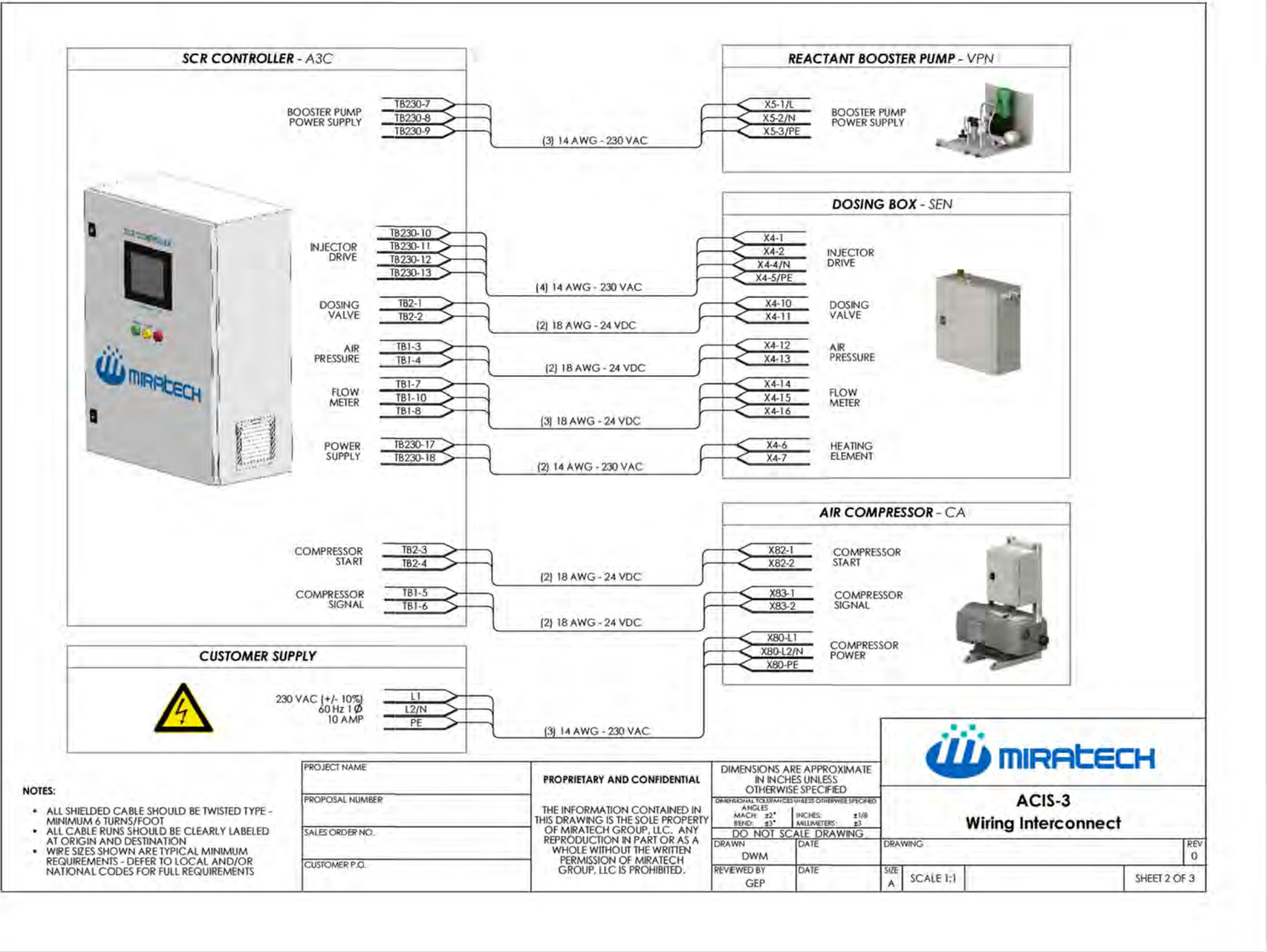
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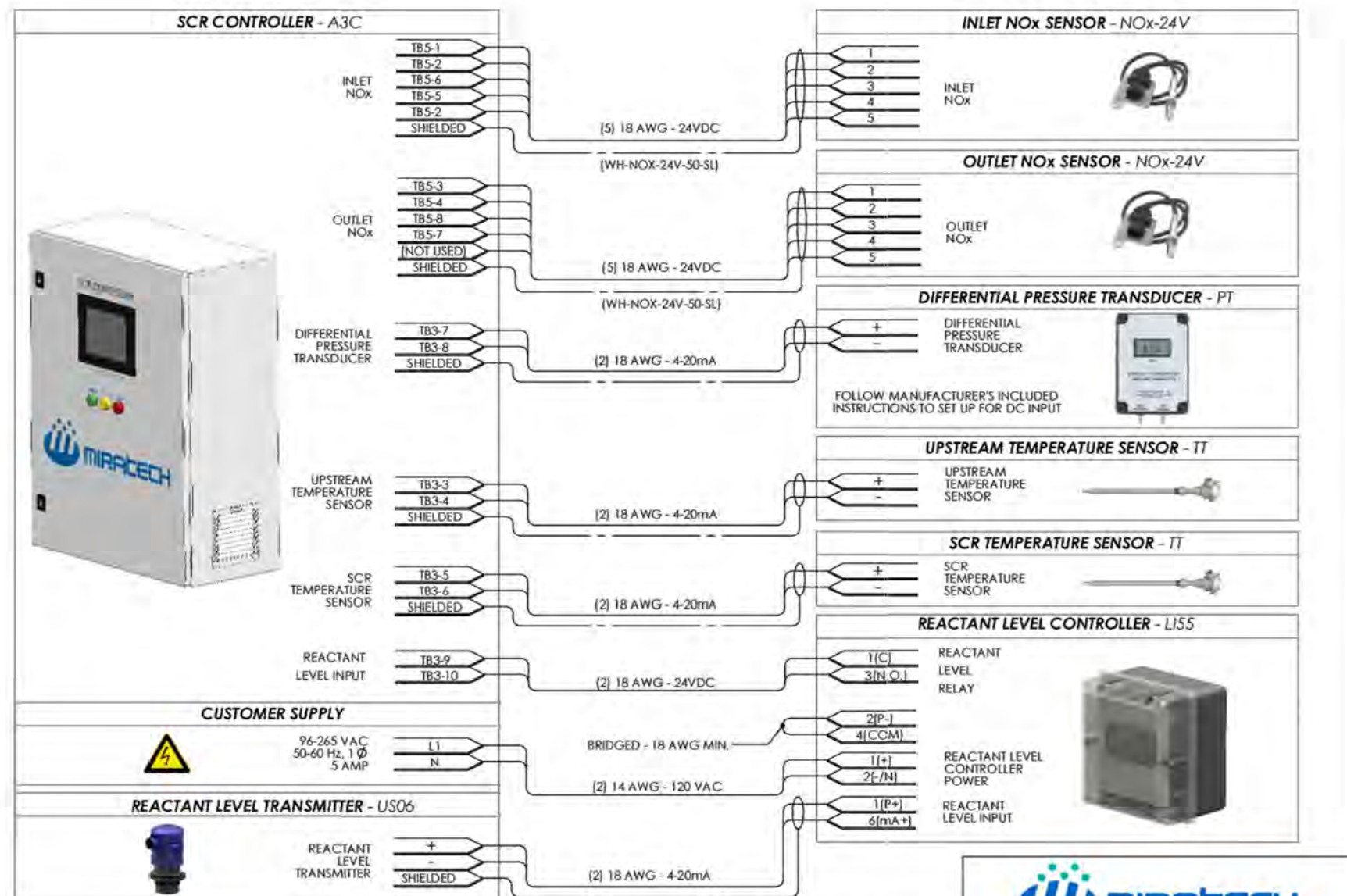
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- ALL CABLE RUNS SHOULD BE CLEARLY LABELED AT ORIGIN AND DESTINATION
- WIRE SIZES SHOWN ARE TYPICAL MINIMUM REQUIREMENTS - DEFER TO LOCAL AND/OR NATIONAL CODES FOR FULL REQUIREMENTS

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ACIS-3
Wiring Interconnect

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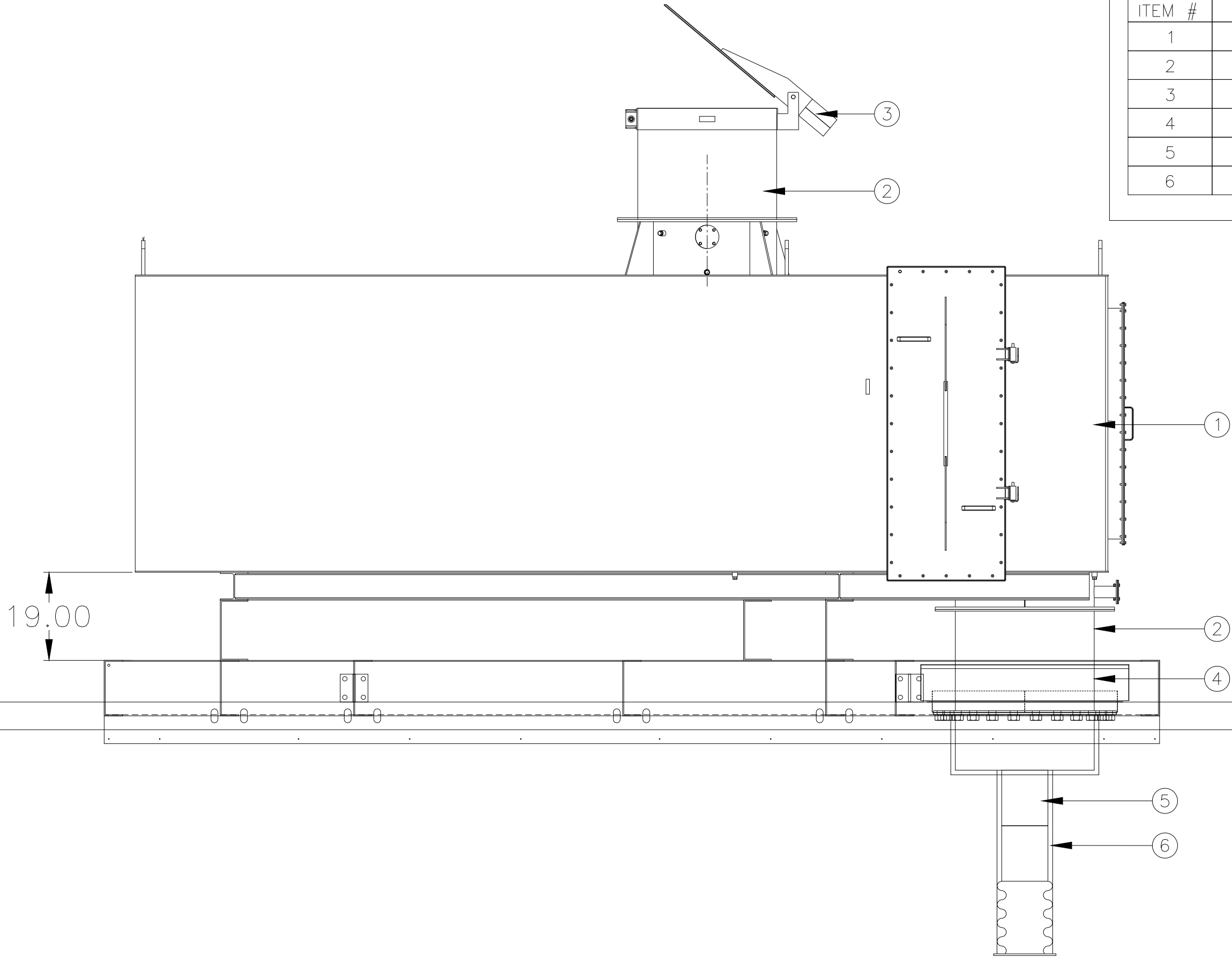
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1	TIER 4 EQUIPMENT	CUMMINS	1
2	30" DIA. PIPE	ROBINSON	2
3	RAIN CAP	ROBINSON	1
4	RAIN GUARD	ROBINSON	1
5	WYE CONNECTION	ROBINSON	1
6	WYE WRAP	ROBINSON	1



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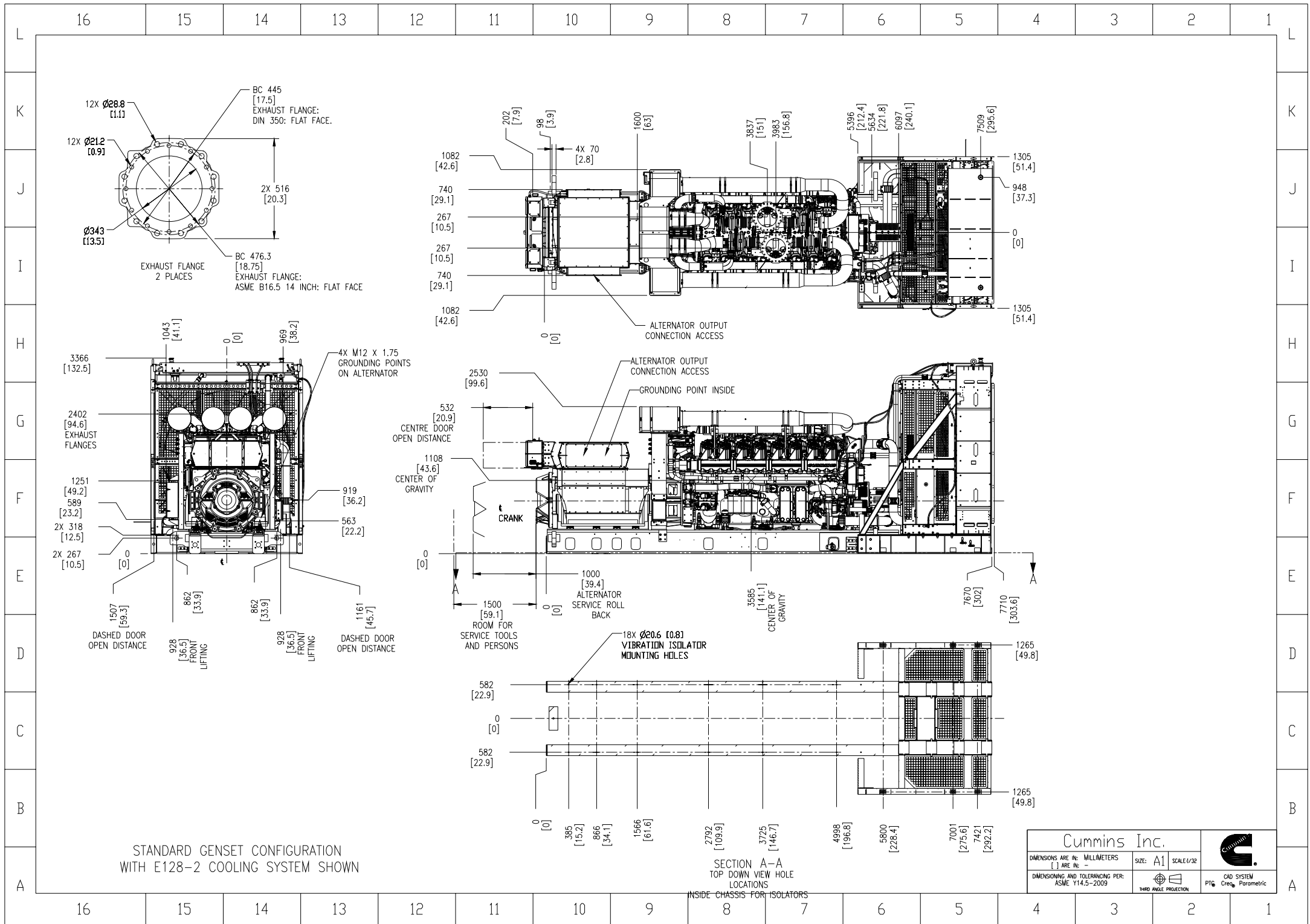
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APPENDIX H

Transportation Evaluation Technical Report



Prepared by

FEHR PEERS

100 Pringle Avenue
Suite 600
Walnut Creek, CA 94596

February 2024

Draft

Transportation Impact Analysis

Pittsburg Data Center

Prepared for:
WSP USA
AVAIO Digital Partners

DRAFT

Pittsburg Data Center

Transportation Impact Assessment

Prepared for:

WSP USA and
AVAIO Digital Partners

February 2024

WC23-4031

FEHR  PEERS

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1. Introduction

This report presents the analysis and findings of the Draft Transportation Impact Assessment (TIA) prepared for the Pittsburg Data Center project proposed in the City of Pittsburg, California. This chapter discusses the TIA's purpose, study locations and analysis scenarios, analysis methods, criteria used to identify significant impacts, and report organization.

Study Purpose and Project Description

The study's purpose is to evaluate the potential transportation impacts of the proposed project, located in Pittsburg, California just south of the West Leland Avenue/Golf Club Road intersection, as illustrated in **Figure 1**. The proposed project would develop a data center facility totaling 347,740 square feet in size. The project's proposed site plan is shown on **Figure 2**. Vehicle, pedestrian, and bicycle access to the project site would be provided via a southerly extension of Golf Club Road.

The California Environmental Quality Act (CEQA) Guidelines were updated in 2020 per Senate Bill 743 (SB 743) to require the use of vehicle miles traveled (VMT) to evaluate a project's environmental effect on the transportation system. The passage of SB 743 includes the elimination of automobile delay, level of service (LOS), and other similar measures of vehicular capacity or traffic congestion as a basis for determining a project's significant impacts to the transportation system. However, lead agencies may elect to utilize LOS for informational purposes or non-CEQA analysis. This report summarizes the project's effect on VMT for CEQA purposes and intersection LOS analysis for informational/non-CEQA analysis to ensure consistency with the goals of City of Pittsburg's currently adopted General Plan (*Pittsburg 2020*, November 16, 2001, with Amendments).

The study has been prepared in accordance with the City of Pittsburg's *Draft Traffic Impact Analysis Guidelines* (May 2023) and follows industry standard approaches and methodologies. The study is also consistent with the requirements and guidelines of the Contra Costa Transportation Authority (CCTA) and the California Energy Commission (CEC). CEQA's Appendix G checklist questions for transportation impacts are answered including VMT, impacts to bicycle/pedestrian facilities, transit facilities and services, emergency vehicle access, and roadway safety-related impacts including nonstandard design features.

Study Locations and Analysis Scenarios

Potential project violations of the city's established level of service policies on study area roadway facilities were determined by measuring the effect project traffic would have on intersections in the vicinity of the Project site during the weekday morning (7:00 to 9:00 AM) and afternoon (4:00 to 6:00 PM) peak periods.



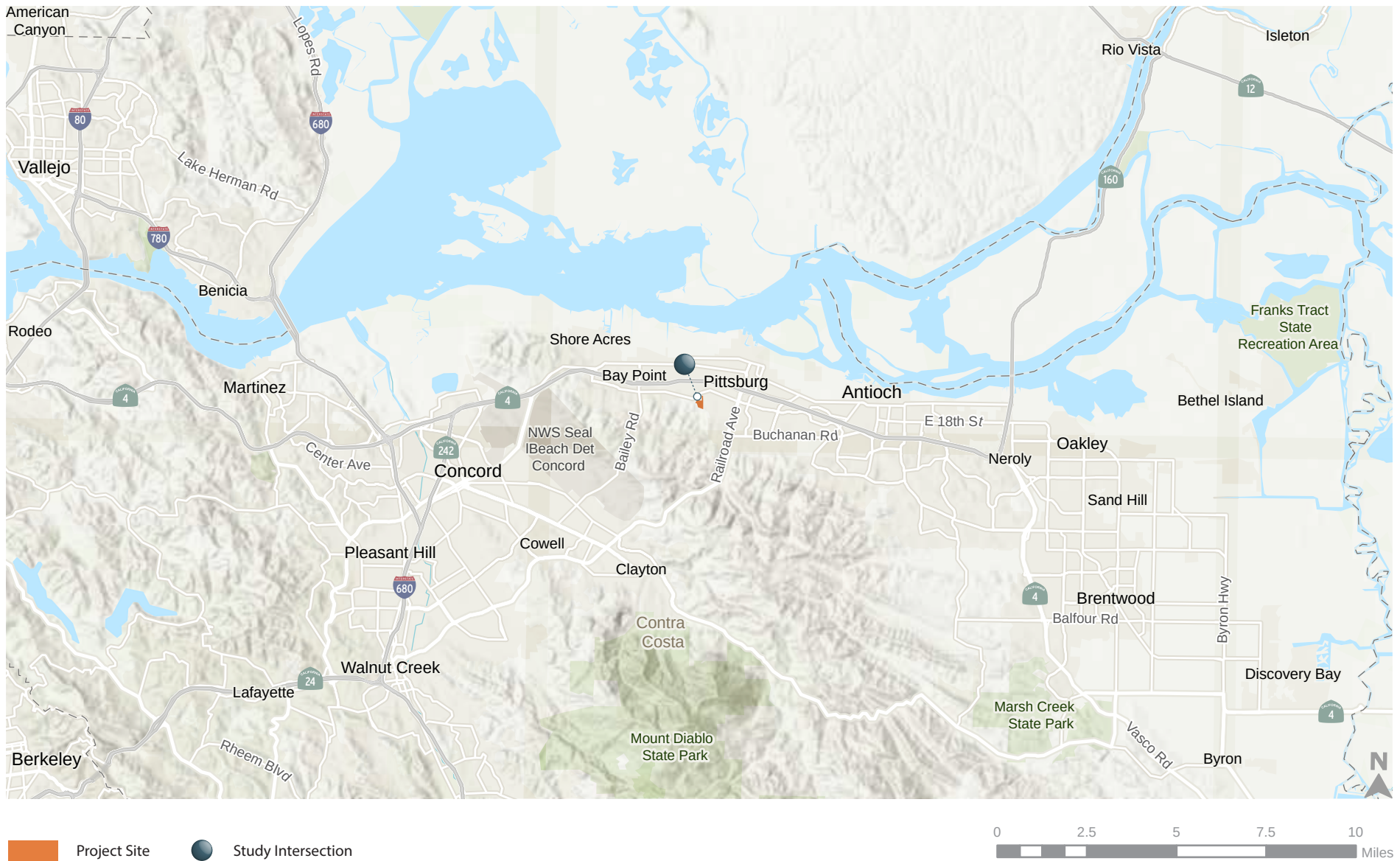
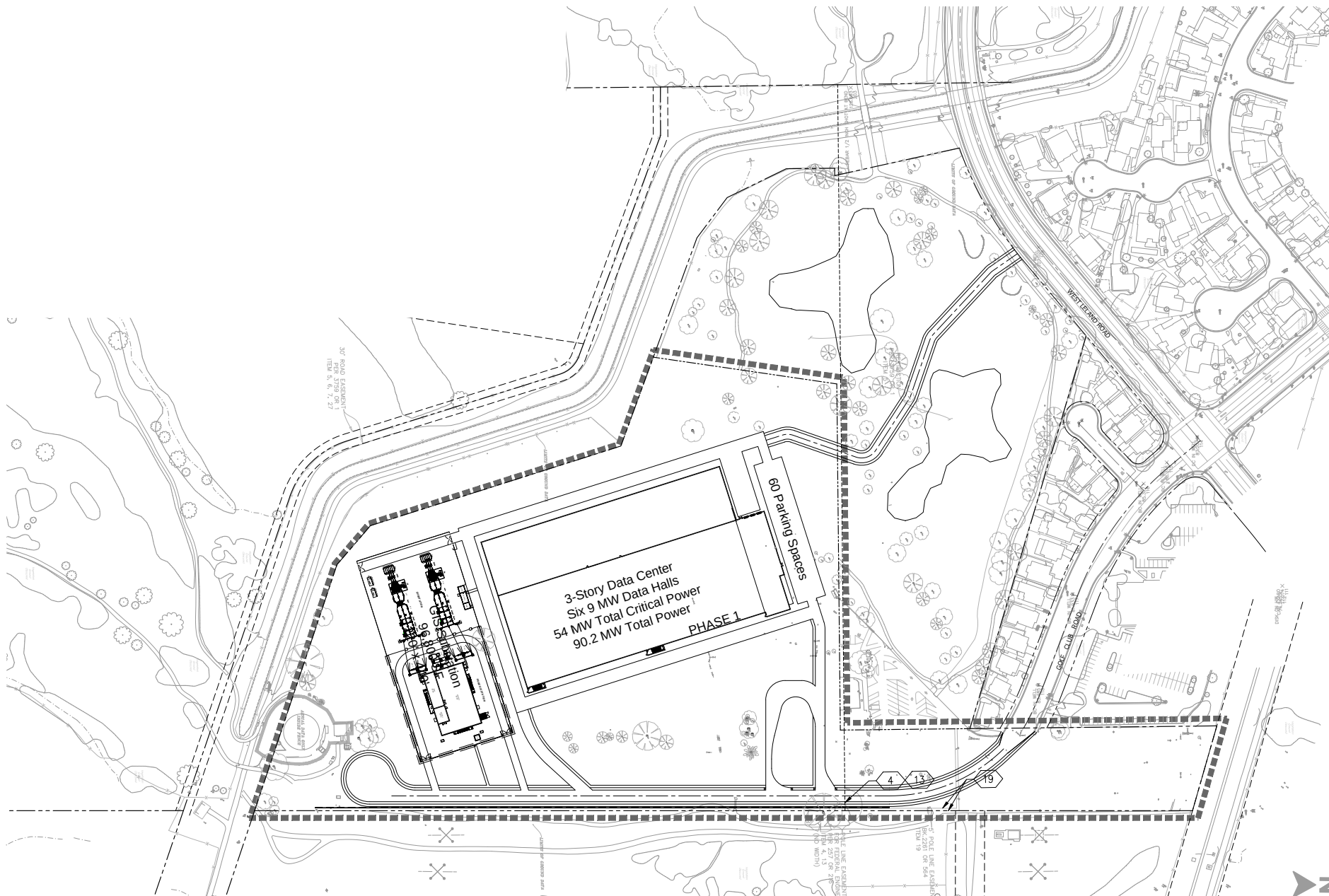


Figure 1

Project Site Vicinity and Study Locations



Site Plan Source: Kimley-Horn, November 10, 2023

Figure 2

Conceptual Project Site Plan

The following intersections were selected based on a review of the project location, estimates of the added traffic from the project, and locations of planned roadways in the area:

- Golf Club Road/West Leland Road

The following scenarios were evaluated:

- **Existing** – Existing (2023) conditions based on recent traffic counts.
- **Existing with Project** – Existing (2023) conditions with project-related traffic.
- **Cumulative without Project** – Based on traffic growth trends as described in the Pittsburg General Plan EIR and supplemented by a check of traffic forecasts for the study area in the 2040 Contra Costa Countywide travel demand model.
- **Cumulative with Project** – Future (2040) forecast conditions with project-related traffic.

Analysis Methods

Vehicle Miles Traveled

On September 27, 2013, Senate Bill 743 was signed into law. The California state legislature found that with the adoption of the Sustainable Communities and Climate Protection Act of 2008 (SB 375), the State had signaled its commitment to encourage land use and transportation planning decisions and investments that reduce vehicle miles traveled and thereby contribute to the reduction of greenhouse gas emissions, as required by the California Global Warming Solutions Act of 2006 (Assembly Bill 32). In December 2018, the Governor's Office of Planning and Research (OPR) finalized new CEQA guidelines (CEQA Guidelines section 15064.3), that identify vehicle-miles traveled as the most appropriate criteria to evaluate a project's transportation impacts.

The implementation of SB 743 eliminated the use of criteria such as auto delay, level of service, and similar measures of vehicle capacity of traffic congestion as the basis for determining significant impacts as part of CEQA compliance. The SB 743 VMT criteria promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.

In November 2017, OPR released a technical advisory containing recommendations regarding the assessment of VMT, proposed thresholds of significance, and potential mitigation measures for lead agencies to use while implementing the required changes contained in Senate Bill 743. Also in November 2017, OPR released the proposed text for Section 15064.3, "Determining the Significance of Transportation Impacts," which summarized the criteria for analyzing transportation impacts for land use projects and transportation projects and directs lead agencies to "choose the most appropriate



methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure." OPR recommends that for most instances a per service population threshold should be adopted and that a fifteen percent reduction below that of existing development would be a reasonable threshold.

On July 15, 2020, the Contra Costa Transportation Authority adopted criteria, standards, and thresholds for the assessment of VMT (CCTA, *Approval of the Vehicle Miles Traveled Analysis Methodology for Land Use Projects in the Growth Management Program*, July 15, 2020). The methods and thresholds adopted by CCTA follow the guidance and recommendations of OPR pertaining to the implementation of SB 743.

The City of Pittsburg's *Draft Traffic Impact Analysis Guidelines* (May 2023) outline guidelines, thresholds, and criteria for the assessment of project VMT impacts. Those guidelines, which are consistent with OPR guidance, are used in this study. Project generated VMT (daily home based VMT per worker) is calculated using the CCTA's regional travel demand model and compared to the relevant threshold (85 percent of the baseline countywide average).

Level of Service

The operations of roadway facilities are described with the term "level of service" (LOS). LOS is a qualitative description of traffic flow from a vehicle driver's perspective based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined, ranging from LOS A (free-flow conditions) to LOS F (over capacity conditions). LOS E corresponds to operations "at capacity." When volumes exceed capacity, stop-and-go conditions result, and operations are designated LOS F.

Signalized Intersections

Traffic conditions at signalized intersections were evaluated using methods developed by the Transportation Research Board (TRB), as documented in the *Highway Capacity Manual, 6th Edition* (HCM 6th Edition) for vehicles using the analysis software Synchro 11.0. The HCM method calculates control delay at an intersection based on inputs such as traffic volumes, lane geometry, signal phasing and timing, pedestrian crossing times, and peak hour factors. Control delay is defined as the delay directly associated with the traffic control device (i.e., a stop sign or a traffic signal) and specifically includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The relationship between LOS and control delay is summarized in **Table 1**.

Unsignalized Intersections

For unsignalized (all-way stop controlled and side-street stop controlled) intersections, the HCM 6th Edition method for unsignalized intersections was used. With this method, operations are defined by the average control delay per vehicle (measured in seconds). The control delay incorporates delay associated



with deceleration, acceleration, stopping, and moving up in queue. **Table 2** summarizes the relationship between LOS and delay for unsignalized intersections. At side-street stop-controlled intersections, the delay is calculated for each stop-controlled movement, the left turn movement from the major street, as well as the intersection average. The intersection average delay and highest movement/approach delay are reported for side-street stop-controlled intersections.

Table 1: Signalized Intersection LOS Criteria

Level of Service	Description	Delay in Seconds
A	Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	≤ 10.0
B	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10.1 to 20.0
C	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.	> 20.1 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35.1 to 55.0
E	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.1 to 80.0
F	This level is considered unacceptable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.	> 80.0

Source: *Highway Capacity Manual, 6th Edition*, Transportation Research Board, 2017.

Table 2: Unsignalized Intersection LOS Criteria

Level of Service	Description	Delay in Seconds
A	Little or no delays	≤ 10.0
B	Short traffic delays	> 10.1 to 15.0
C	Average traffic delays	> 15.1 to 25.0
D	Long traffic delays	> 25.1 to 35.0
E	Very long traffic delays	> 35.1 to 50.0
F	Extreme traffic, delays where intersection capacity exceeded	> 50.0

Source: *Highway Capacity Manual, 6th Edition*, Transportation Research Board, 2017.



Regulatory Setting and Significance Criteria

Thresholds of Significance for VMT

As discussed above, in response to SB 743, the Office of Planning and Research has updated the California Environmental Quality Act guidelines to include new transportation-related evaluation metrics, specifically VMT. In December 2018, the California Natural Resources Agency certified and adopted the CEQA Guidelines update package along with an updated Technical Advisory related to Evaluating Transportation Impacts in CEQA (December 2018). Full compliance with the guidelines is now required, and vehicle-delay based level of service calculations cannot be used to evaluate the environmental impacts of projects on the transportation system.

The City of Pittsburg's *Draft Traffic Impact Analysis Guidelines* (May 2023) outline guidelines, thresholds, and criteria for the assessment of project VMT impacts. The methods and thresholds of the city follow the guidance and recommendations of OPR pertaining to the implementation of SB 743, as described below:

- Residential Projects should use the home-based VMT per capita metric to evaluate their project generated VMT. The project generated home-based VMT per resident constitutes a significant impact if it is higher than 85% of the home-based VMT per resident 85% of the existing county-wide average home-based VMT per resident.
- Employment-Generating Projects should use the home-work VMT per worker metric for their project generated VMT estimates. The project generated home-work VMT per worker constitutes a significant impact if it is higher than 85% of the home-work VMT per worker of the existing countywide average.

The City's guidelines define the following criteria that can be used to screen projects out of conducting project-level VMT analysis:

- CEQA exemption – Any project exempt from CEQA is not required to conduct a VMT analysis.
- Small projects – Small projects generate or attract fewer than 110 trips per day. Based on research for small project triggers, this may equate to non-residential projects of 10,000 square feet or less and single-family residential projects of 10 units or less, or otherwise generating less than 836 VMT per day.
- Small scale, local-serving retail – Local-serving retail projects are defined as projects of less than 50,000 square feet in size on the basis that they attract trips that would otherwise travel longer distances. Local-serving retail generally improves the convenience of shopping and other activities close to home and has the effect of reducing vehicle travel.



- Small and active transportation projects – Screened transportation projects are transit projects, bicycle and pedestrian projects, and roadway projects that do not result in an increase in vehicle capacity.
- Public services – Police stations, fire stations, public utilities, and parks do not generally generate VMT. Instead, these land uses are often built in response to development from other land uses (e.g., office and residential). Therefore, these land uses can be presumed to have less-than-significant impacts on VMT. However, this presumption would not apply if the project is sited in a location that would require employees or visitors to travel substantial distances and the project is not located within one half-mile of a major transit stop or does not meet the small project screening criterion.
- Projects located in transit priority areas (TPAs) – Projects located within a TPA can be presumed to have a less-than-significant impact absent substantial evidence to the contrary.
- Projects located in low VMT areas – Residential and employment-generating projects located within a low VMT-generating area can be presumed to have a less-than-significant impact absent substantial evidence to the contrary. A Low VMT area is defined as follows:
 - For residential projects: TAZs (Traffic Analysis Zones within the CCTA regional travel demand model) that have baseline home-based VMT per capita that is 85% or less of the existing countywide average.
 - For employment-generating projects: TAZs that have baseline home-work VMT per worker that is 85% or less of the existing countywide average.

Additional CEQA Thresholds

The following thresholds of significance were developed based on City of Pittsburgh and East Contra Costa County Action Plan policies, as well as the CEQA Checklist criteria.

Would the project:

- A. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including roadway, transit, bicycle, and pedestrian facilities?

Transit System – The project would create a significant impact related to transit service if the following criteria is met:

1. The project interferes with existing transit facilities or precludes the construction of planned transit facilities.

Bicycle System – The project would create a significant impact related to the bicycle system if any of the following criteria are met:



1. Disrupt existing bicycle facilities; or
2. Interfere with planned bicycle facilities; or
3. Create inconsistencies with adopted bicycle system plans, guidelines, policies, or standards.

Pedestrian System – The project would create a significant impact related to the pedestrian system if any of the following criteria are met:

1. Disrupt existing pedestrian facilities; or
 2. Interfere with planned pedestrian facilities; or
 3. Create inconsistencies with adopted pedestrian system plans, guidelines, policies, or standards.
- B. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?¹
- C. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
- D. Result in inadequate emergency access?

Non-CEQA Evaluation Criteria

Although not a CEQA metric, intersection levels of service are evaluated in this study for General Plan compliance and to identify potential transportation improvements that could be implemented as part of the project to improve the overall operations of the transportation system for all travel modes. The City of Pittsburgh generally strives to maintain LOS D for motor vehicle traffic as the minimum acceptable service standard for all signalized and stop controlled intersections during peak periods. In the designated Downtown core, LOS E is considered an acceptable service standard to account for the more urban, pedestrian-oriented character of the area. None of the project's study facilities are in the City's Downtown core.

Report Organization

This report is divided into 8 chapters as described below:

- **Chapter 1 – Introduction** discusses the purpose and organization of the report. The applicable regulations and methodologies used for the VMT, LOS and other analyses are also described.

¹ This section of the CEQA Guidelines relates to the evaluation of vehicle miles of travel (VMT).



- **Chapter 2 – Existing Conditions** describes the transportation system in the project's vicinity, including the surrounding roadway network, morning and evening peak period intersection turning movement volumes, existing bicycle, pedestrian, and transit facilities, and intersection operations.
- **Chapter 3 – Project Characteristics** presents relevant project information, such as the project components and project trip generation, distribution, and assignment.
- **Chapter 4 – Existing with Project Traffic Conditions** addresses the existing conditions with the addition of the project and discusses project vehicular effects.
- **Chapter 5 – Cumulative Traffic Conditions** addresses the long-term future conditions, both without and with the project, and discusses project vehicular effects.
- **Chapter 6 – Site Plan Review** describes project access and circulation for all travel modes.
- **Chapter 7 – Vehicle Miles Traveled Assessment** presents the results of the VMT evaluation conducted for the project.
- **Chapter 8 – Summary of Findings** provides a summary of the report's findings and recommendations.



2. Existing Conditions

This chapter describes transportation facilities in the study area, including the surrounding roadway network as well as transit, pedestrian, and bicycle facilities in the project site vicinity. Existing intersection operations are also described.

Roadway System

The project site is surrounded by existing residential, school, industrial, and open space uses. Currently vacant, the site was formerly occupied by the Delta View Golf Course. Pittsburg is in eastern Contra Costa County, adjacent to the cities of Bay Point, Antioch, and Concord located west, southeast, and southwest respectively.

Regional access to the site is provided by State Route 4, Bailey Road, and Railroad Avenue; West Leland Road and Range Road/Golf Club Road provide local access. The following roadways would provide access to the site and are most likely to experience direct traffic effects, if any, from the proposed project:

Regional Access

Bailey Road is designated as a Route of Regional Significance in CCTA's *East County Action Plan for Routes of Regional Significance*. It is designated as a major arterial with two travel lanes in each direction and left turning median lanes north of West Leland Road. South of West Leland Road the facility narrows to one lane in each direction. The posted speed limit is 30 mph in the study area. Bailey Road is a designated truck route and approximately three percent of daily traffic is trucks. The roadway carries roughly 2,100 vehicles in the peak hour of travel and 21,000 vehicles per day.

Railroad Avenue is designated as a Route of Regional Significance in CCTA's *East County Action Plan for Routes of Regional Significance*. It is a north-south major arterial with two travel lanes in each direction and left turning median lanes. The posted speed limit is 35 mph. Railroad Avenue is a designated truck route and approximately four percent of daily traffic is trucks. The roadway carries roughly 2,300 vehicles in the peak hour of travel and 23,000 vehicles per day.

State Route 4 (SR-4) is designated as a Route of Regional Significance in CCTA's *East County Action Plan for Routes of Regional Significance*. It is an east-west freeway that extends from Hercules in the west to Stockton and beyond in the east. The facility is an eight-lane freeway within the study area, with interchanges at Railroad Avenue and Bailey Road. Intersection ramp terminals are signalized and operated by the California Department of Transportation (Caltrans). State Route 4 currently serves approximately



159,000 daily vehicles with 11,400 vehicles using the facility during the peak hour (measured at the Railroad Avenue interchange). Approximately 4.6 percent of daily traffic on SR 4 is trucks.

Local Access

West Leland Road is designated as a Route of Regional Significance in CCTA's *East County Action Plan for Routes of Regional Significance*. It is an east-west major arterial with two travel lanes in each direction and a center left turn lane. Sidewalks with no buffers and Class II bicycle lanes are provided on both sides of West Leland Road. The posted speed limit is generally 40 mph. However, Rancho Medanos Junior High School is located just north of the project site and the posted speed limit on West Leland Road east of the Golf Club Road/West Leland Road intersection is 25 mph when children are present. West Leland Road serves residential communities and commercial and industrial businesses located in the area. West Leland Road is a designated truck route and approximately two percent of daily traffic is trucks. The roadway carries roughly 1,800 vehicles in the peak hour of travel and 18,000 vehicles per day.

Golf Club Road/Range Road is a north-south local road with two travel lanes in each direction north of West Leland Road and one lane in each direction to the south. Golf Club Road transitions into Range Road north of West Leland. The posted speed limit is 25 mph on Golf Club Road and 35 mph on Range Road. Rancho Medanos Junior High School is located east of Range Road (north of West Leland Road), and the posted speed limit is 25 mph when children are present. Sidewalks with no buffers are provided on both sides of the road and Class II bicycle lanes are provided along Range Road. Golf Club Road/Range Road primarily serves residential communities. Range Road north of West Leland Road carries approximately 4,000 vehicles per day and 400 vehicles in the peak hour of travel.

Existing Pedestrian and Bicycle Facilities

Pedestrian facilities in the study area include sidewalks, crosswalks, pedestrian signals, and multi-use trails. Five to eight-foot sidewalks are provided along both sides of West Leland Road and Golf Club Road. Crosswalks are provided at signalized intersections. Pedestrian push-button actuated signals are provided at signalized intersections in the study area.

Bicycle facilities in Pittsburg include the following:

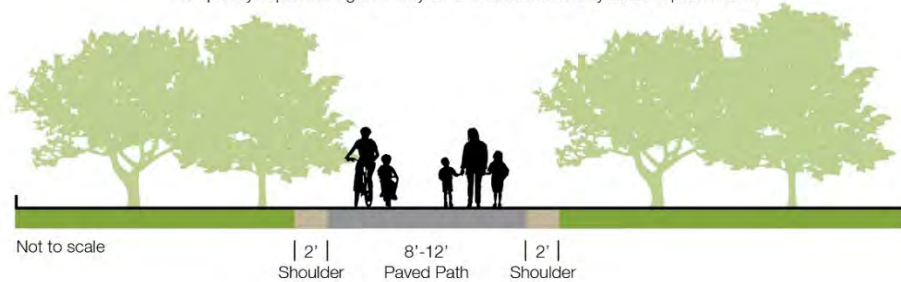
- **Bike paths (Class I)** – Bike paths provide a completely separate right-of-way and are designated for the exclusive use of people riding bicycles and walking with minimal cross-flow traffic. Such paths can be well situated along creeks, canals, and rail lines. Class I Bikeways can also offer opportunities not provided by the road system by serving as both recreational areas and/or



desirable commuter routes.

SHARED-USE PATH (CLASS I)

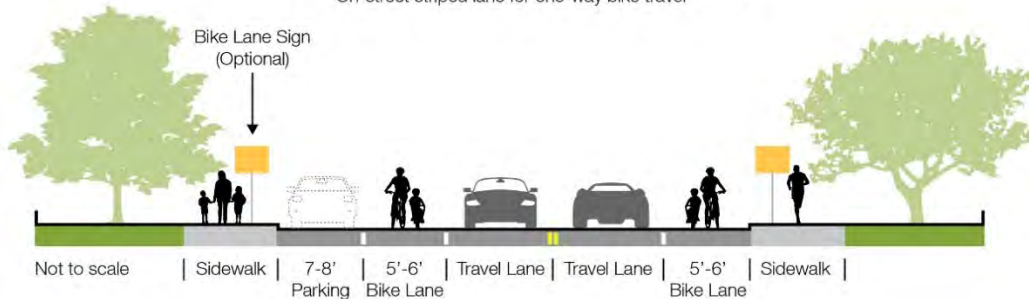
Completely separated right-of-way for exclusive use of bicycles and pedestrians



- **Bike lanes (Class II)** – Bike lanes provide designated street space for bicyclists, typically adjacent to the outer vehicle travel lanes. Bike lanes include special lane markings, pavement legends, and signage. Bike lanes may be enhanced with painted buffers between vehicle lanes and/or parking, and green paint at conflict zones (such as driveways or intersections).

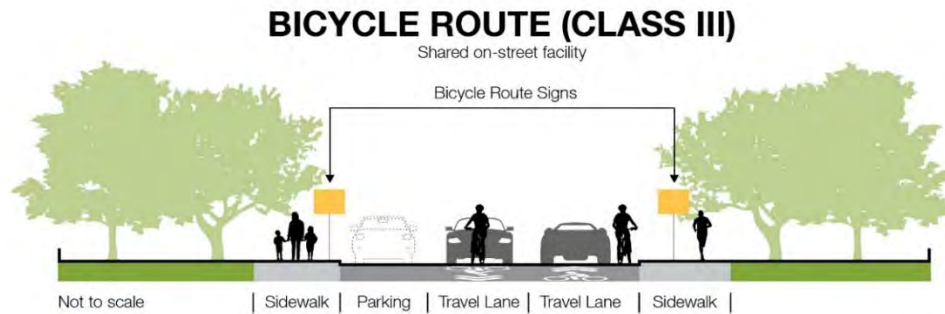
BICYCLE LANE (CLASS II)

On-street striped lane for one-way bike travel



- **Bike routes (Class III)** – Bike routes provide enhanced mixed-traffic conditions for bicyclists through signage, striping, and/or traffic calming treatments, and to provide continuity to a bikeway network. Bike routes are typically designated along gaps between bike trails or bike lanes, or along low-volume, low-speed streets. Bicycle boulevards provide further enhancements to bike routes to encourage slow speeds and discourage non-local vehicle traffic via traffic diverters, chicanes, traffic circles, and/or speed tables. Bicycle boulevards can also feature special

wayfinding signage to nearby destinations or other bikeways.



Within the project's vicinity, there are currently Class II bicycle facilities along West Leland Road and Range Road. The City of Pittsburg's Active Transportation Plan (*Pittsburg Moves*, December 2020) calls for the installation of a Class I bicycle facility along the Contra Costa Canal in the study area. These and other existing and proposed bicycle facilities in the study area are displayed on **Figure 3**.

Existing Transit Service

The Eastern Contra Costa Transit Authority (Tri Delta Transit) provides transit service in eastern Contra Costa County, serving the communities of Brentwood, Antioch, Oakley, Concord, Discovery Bay, Bay Point and Pittsburg. The following routes operate in the vicinity of the project site:

- Route 388 – Pittsburg-Bay Point BART/Kaiser Antioch Medical Center (Weekdays only)
- Route 390 – Antioch BART/Pittsburg-Bay Point BART (Weekdays only/Commute hours)

Routes 388 and 390 operate along West Leland Road and serve existing bus stops at Golf Club Road. The routes provide connections to other Tri Delta routes at the Pittsburg Transit Center, Pittsburg/Bay Point BART Station, and Antioch BART station. In addition to the regular transit service in the study area, dial-a-ride door-to-door service within Eastern Contra Costa County is provided by Tri Delta Transit for disabled people of all ages and senior citizens.

Bay Area Rapid Transit (BART) provides fixed rail transit in eastern Contra Costa County. The Antioch-SFO/Millbrae line provides access to two stations located in Pittsburg. The Pittsburg/Bay Point station is approximately two miles west of the project site. The Pittsburg Center station is approximately one and one-half miles northeast of the project site. Weekday service is provided on approximately 15-minute headways and weekend service is provided on approximately 20-minute headways. The Antioch-SFO/Millbrae Line connects to key regional employment centers including Concord, Pleasant Hill, Walnut Creek, Oakland, and San Francisco. Transfers to other lines can be made in Oakland. The existing transit routes and stops in the study area are shown on **Figure 4**.



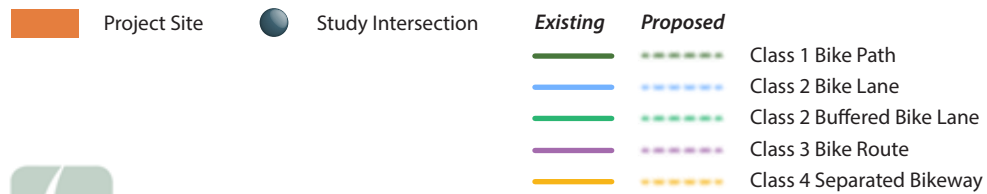
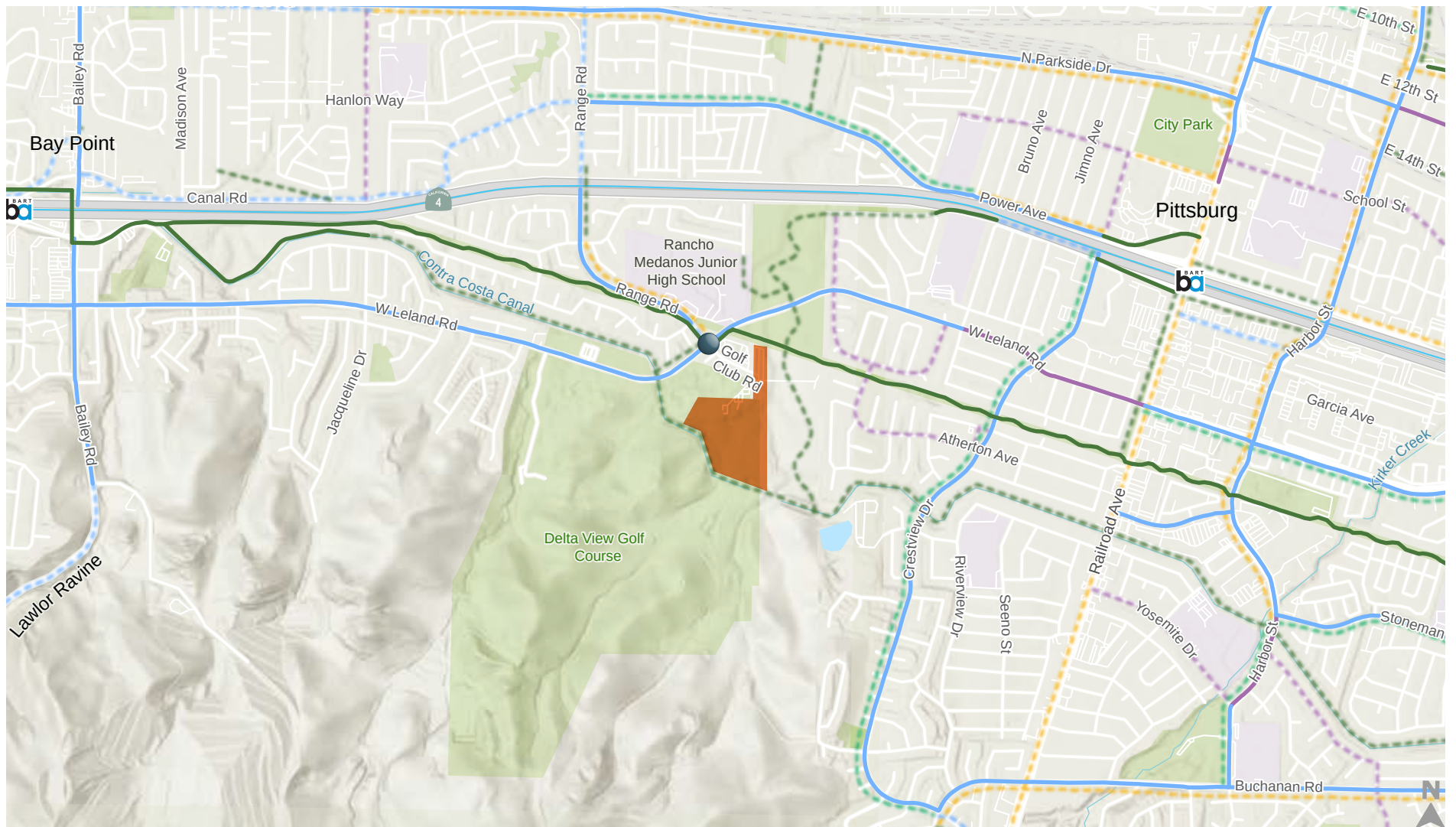


Figure 3

Existing and Planned Bicycle Facilities



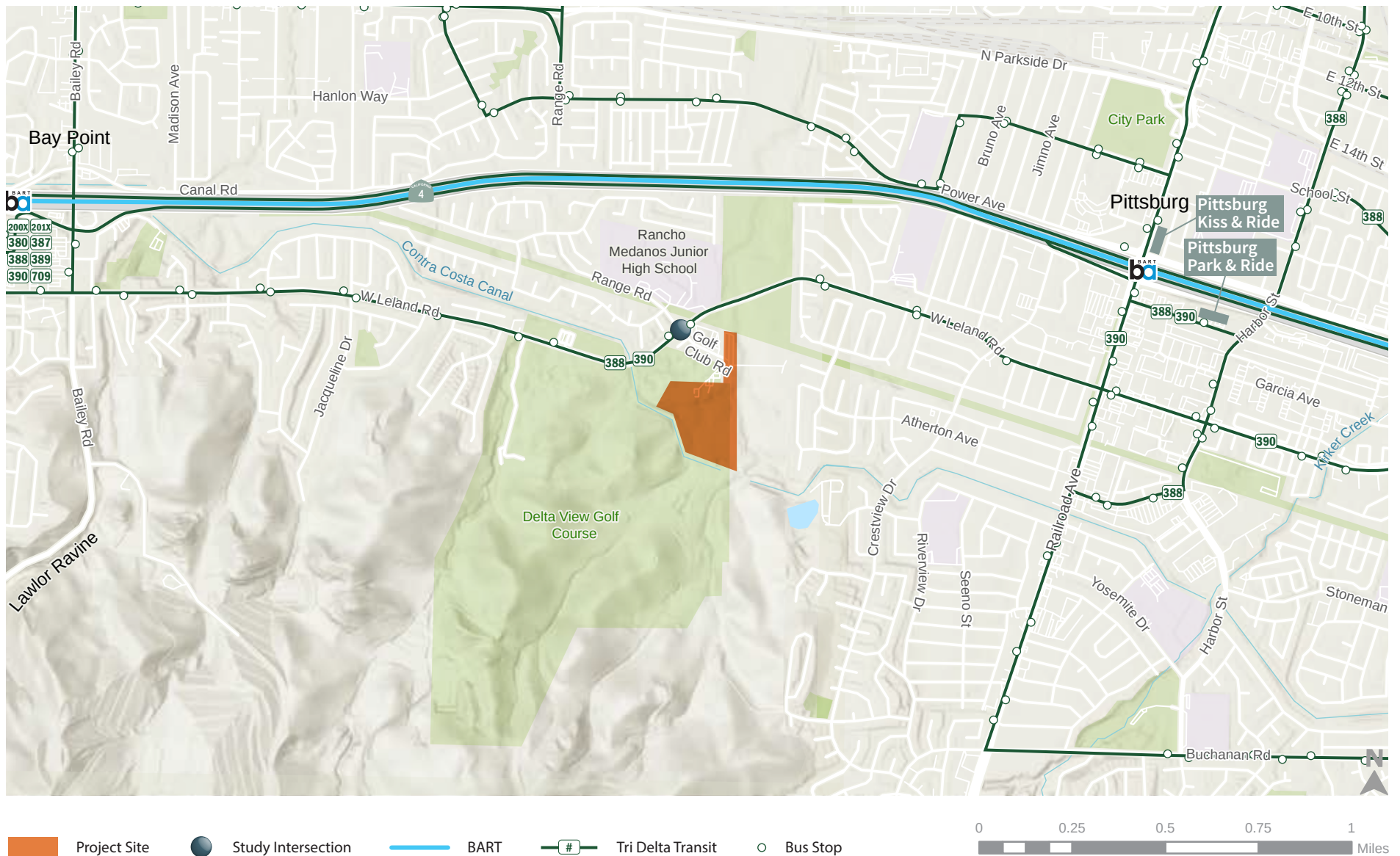


Figure 4

Existing Transit Routes



Existing Traffic Counts

Weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak period intersection turning movement counts were collected at the study intersection in September 2023. Counts were collected on a clear midweek day when area schools were in normal session. Peak hour intersection vehicle volumes are summarized in **Figure 5** along with existing lane configurations and traffic controls. The traffic counts for existing conditions are provided in **Appendix A**.

Existing Intersection Levels of Service

Existing intersection lane configurations, signal timings, and peak hour turning movement volumes were used to calculate the level of service at the study intersection during each peak hour. The Synchro 11.0 software program was used for the analysis. The existing levels of service are presented in **Table 3**. Observed peak hour factors² were used at all intersections for the existing analysis. Detailed intersection LOS calculation worksheets are presented in **Appendix B**.

Table 3: Existing Conditions Peak Hour Weekday Intersection LOS Summary

Intersection	Control ¹	Peak Hour ²	LOS Standard	Delay ³	LOS
1. Golf Club Road/Leland Road	Signal	AM PM	LOS D	45.8 26.3	D C

Notes:
1. Traffic control type (Signal = Signalized)
2. AM = Weekday morning peak hour, PM = Weekday evening peak hour
3. Whole intersection average delay reported for signalized intersections. Delay calculated per HCM 6th methodologies.
Source: Fehr & Peers, 2024.

As illustrated in Table 3, the Golf Club Road/Leland Road/Range Road intersection currently operates at LOS D in the AM peak hour and LOS C in the PM peak hour, which is within the city’s established standards. Observations of peak hour conditions during these periods confirm the results of the LOS calculations.

² The peak hour factor is the relationship between the peak 15-minute flow rate and the full hourly volume: $PHF = \text{Hourly volume} / (4 \times (\text{volume during the peak 15 minutes of flow}))$. The analysis level of served is based on peak rates of flow occurring within the peak hour because substantial short term fluctuations typically occurring during an hour.



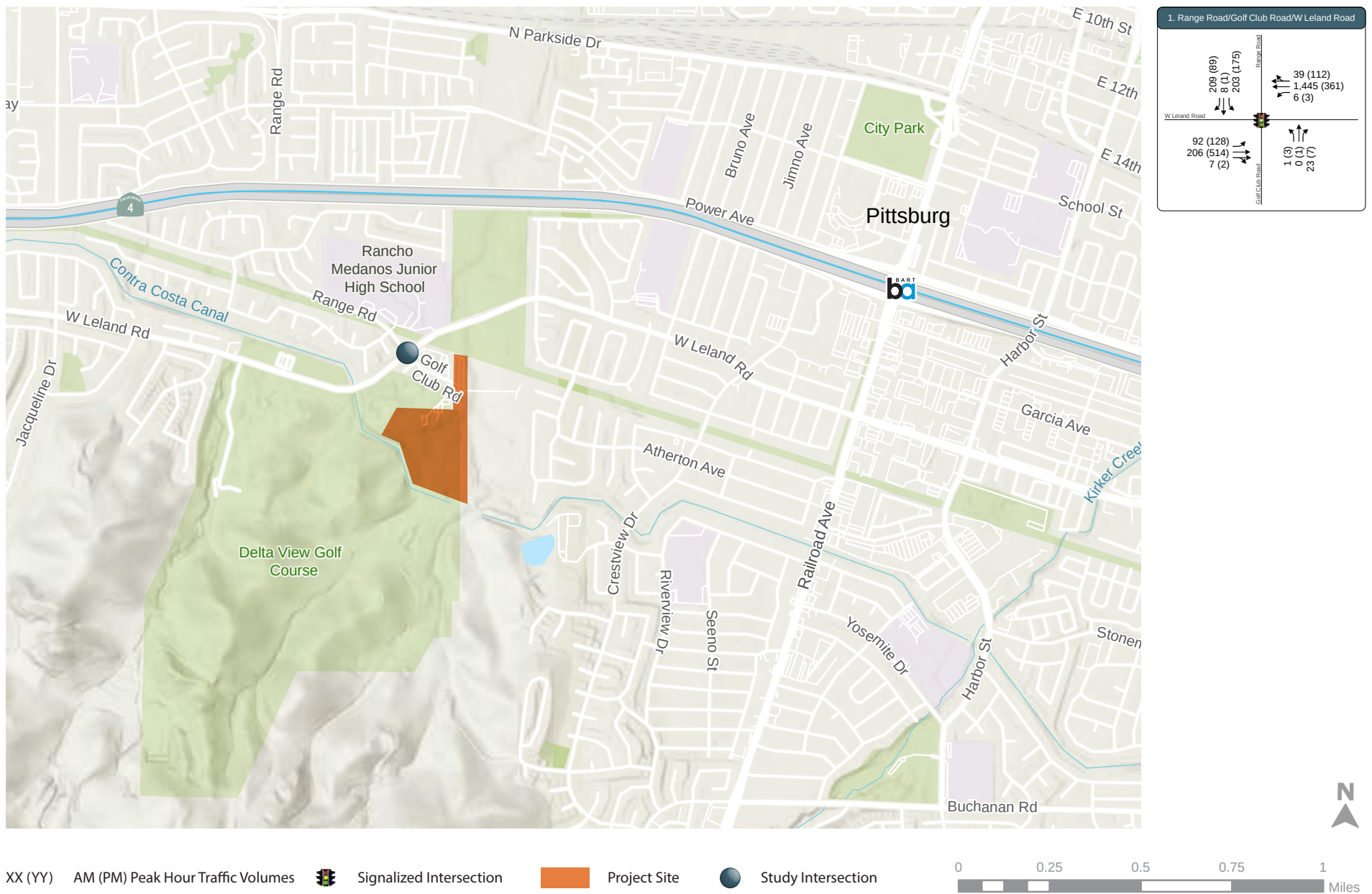


Figure 5

Existing Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls



3. Project Characteristics

This chapter provides an overview of the proposed project components and addresses the proposed project trip generation, distribution, and assignment characteristics, allowing for an evaluation of project impacts on the surrounding roadway network. The amount of traffic associated with the project was estimated using a three-step process:

1. **Trip Generation** – The *amount* of vehicle traffic entering/exiting the project site was estimated.
2. **Trip Distribution** – The *direction* trips would use to approach and depart the site was projected.
3. **Trip Assignment** – Trips were then *assigned* to specific roadway segments and intersection turning movements.

Project Description

The project site is in Pittsburgh, just south of the West Leland Avenue/Golf Club Road intersection, as illustrated in Figure 1. Formerly the location of the Delta View Golf Course, the site is currently unoccupied. The proposed project would develop a new data center facility totaling approximately 347,740 square feet in size. On a typical weekday, approximately 20 to 30 employees and 12-15 visitors would be expected to visit the site based on use patterns at other similar facilities. The project's proposed site plan is shown on Figure 2. Sixty vehicular parking spaces would be provided in a new at-grade parking lot on the facility's northern side. Vehicle, pedestrian, and bicycle access to the project site would be provided via a southerly two-lane extension of Golf Club Road.

Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Estimates are created for the daily condition and for the peak one-hour period during the morning and evening commute when traffic volumes on the adjacent streets are typically the highest. Project trip generation was estimated using rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (11th Edition). The amount of traffic that would be generated by the employees and visitors expected to be present on the site was estimated using rates from the manual's Land Use Code 160, Data Center.



Using this data, trip generation estimates were developed for the proposed project and are presented in **Table 4**. The project is expected to generate approximately 344 weekday daily vehicle trips, including approximately 40 morning peak hour trips and approximately 33 evening peak hour trips.

Table 4: Trip Generation Summary

Land Use	ITE Code	Size ¹	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Data Center ²	160	347.74	344	22	18	40	10	23	33

1. Quantity in 1,000 square feet

2. ITE land use category 160 – Data Center (Adj Streets, 7-9A, 4-6P):

Daily: $T = 0.99(X)$

AM Peak Hour: $T = 0.13(X) - 5.63$; Enter = 55%; Exit = 45%

PM Peak Hour: $T = 0.11(X) - 5.65$; Enter = 30%; Exit = 70%

Source: *Trip Generation Manual* (11th Edition), ITE, 2017; Fehr & Peers, 2024.

Project Trip Distribution and Assignment

Project trip distribution refers to the directions of approach and departure that vehicles would take to access and leave the site. Estimates of regional project trip distribution were developed based on existing travel patterns in the area, a select zone analysis using the Contra Costa Transportation Authority (CCTA) travel demand model, and the location of complementary land uses. The resulting trip distribution percentages are shown on **Figure 6**. Project trips were then assigned to the roadway network, as shown on **Figure 7**.



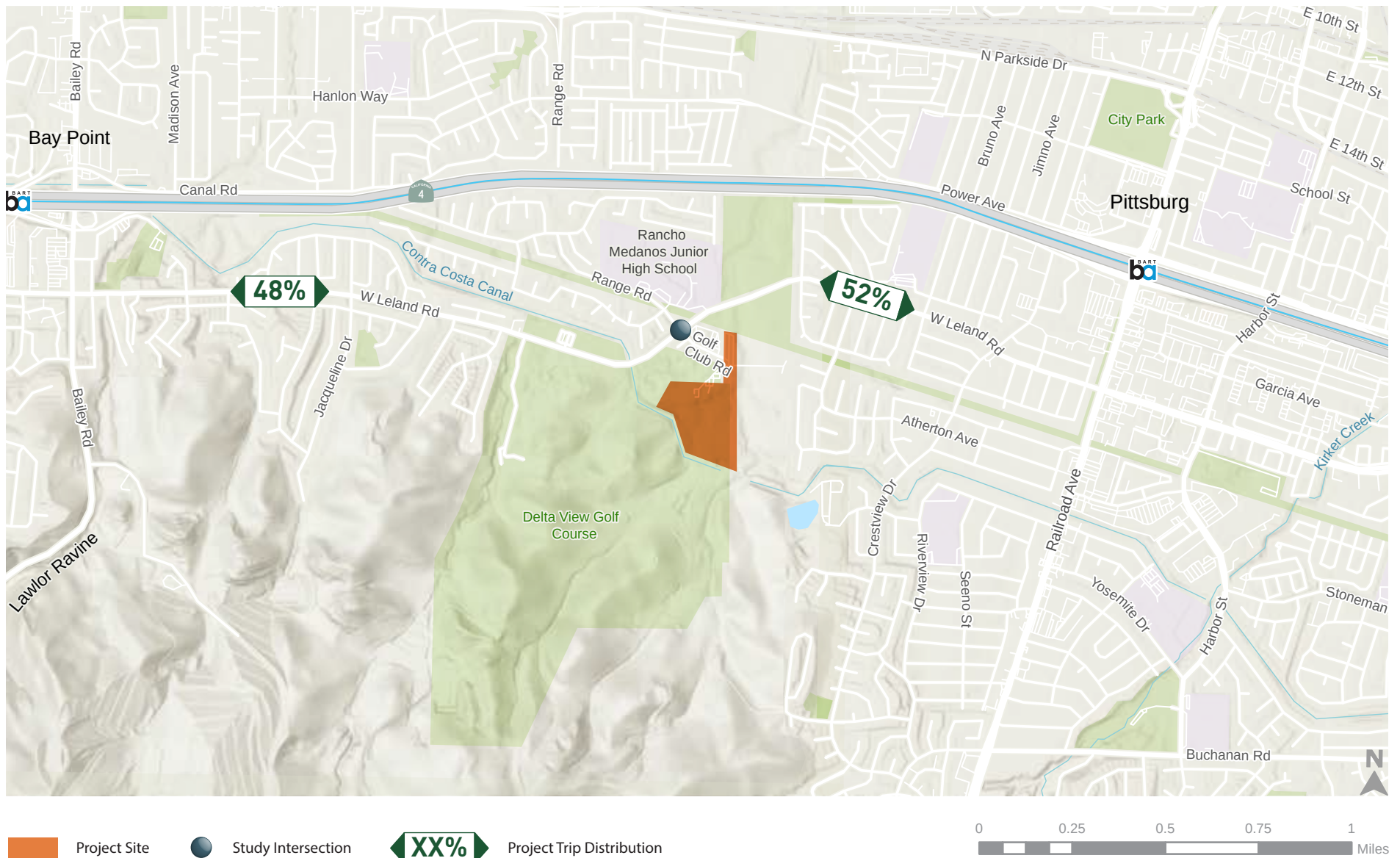


Figure 6

Project Trip Distribution



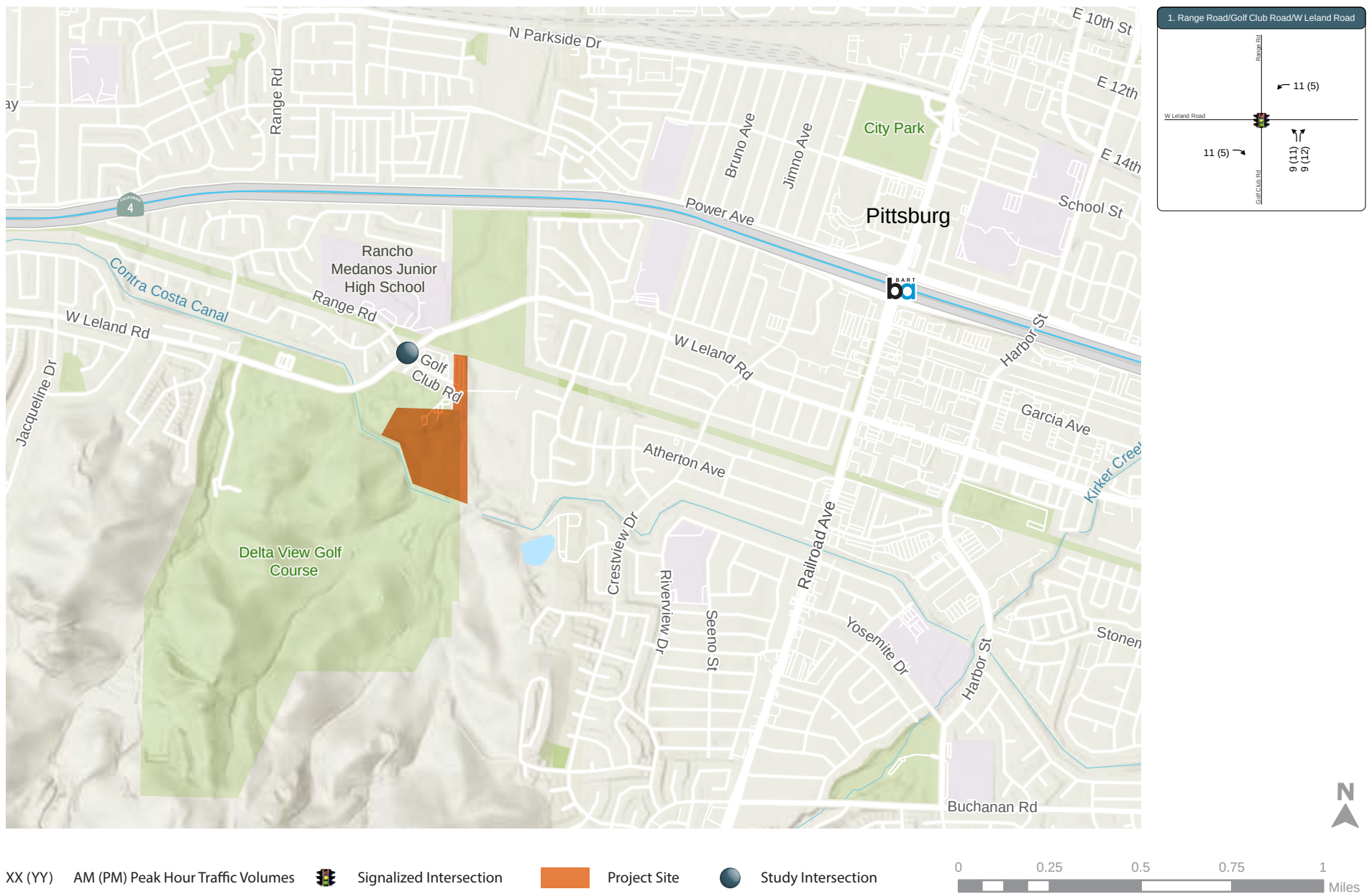


Figure 7

Project Trip Assignment



4. Existing With Project Traffic Conditions

This chapter provides an evaluation of the project’s potential off-site effects on intersection levels of service under Existing with Project conditions.

Existing with Project Traffic Volumes

The project traffic volumes on Figure 7 were added to the existing traffic volumes from Figure 5 to generate the Existing with Project scenario’s traffic volumes, as shown on **Figure 8**.

Analysis of Existing with Project Conditions

Intersection Operations

Existing with Project intersections were evaluated using the methods described in Chapter 1. The Existing with Project analysis results are based on the traffic volumes and intersection configurations presented in Figure 8. A comparison of Existing and Existing with Project operations results is presented in **Table 5**.

Table 5: Existing with Project Conditions Peak Hour Intersection LOS Summary

Intersection	Control ¹	Peak Hour ²	LOS Standard	Existing		Existing with Project	
				Delay ³	LOS	Delay ³	LOS
1. Golf Club Road/West Leland Road	Signal	AM PM	LOS D	45.8 26.3	D C	46.1 27.3	D C

Notes:
1. Traffic control type (Signal = Signalized)
2. AM = Weekday morning peak hour, PM = Weekday evening peak hour
3. Whole intersection average delay reported for signalized intersections. Delay calculated per HCM 6th methodologies.
Source: Fehr & Peers, 2024.

Existing Conditions Policy Violations

Traffic associated with the project would result in a minor increase in vehicular delays at the Golf Club Road/West Leland Road intersection. The intersection would continue to function within the city’s adopted standards related to levels of service.



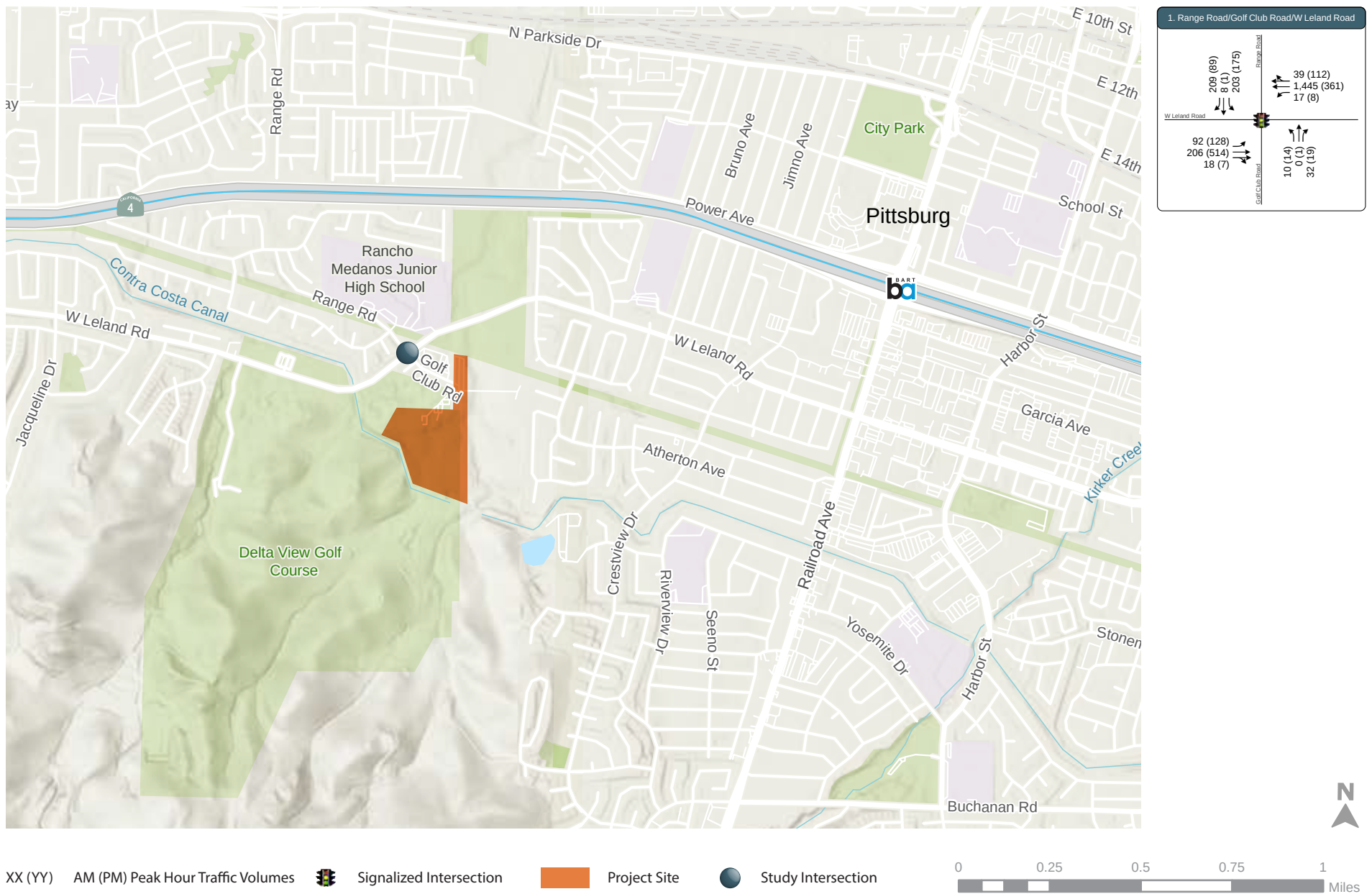


Figure 8

Existing with Project Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls

5. Cumulative Traffic Conditions

This chapter discusses Cumulative traffic conditions both without and with traffic expected to be generated by the proposed project. The future conditions analysis considers development within the City of Pittsburg as described in the General Plan.

Cumulative Traffic Forecasts

To assess future growth with planned development in the City of Pittsburg, several sources of data were reviewed, including the Contra Costa County Travel Demand Model (CCTA Model), and the traffic growth trends as described in the Pittsburg General Plan EIR. Traffic forecasts within the immediate study area were reviewed to ensure that known developments were adequately reflected in the forecasts. The resulting Cumulative without Project forecasts are presented in **Figure 9**, which are representative of conditions over the next 20 years. The Project volumes from Figure 7 were added to the Cumulative without Project traffic volumes to represent Cumulative with Project conditions, as presented on **Figure 10**.



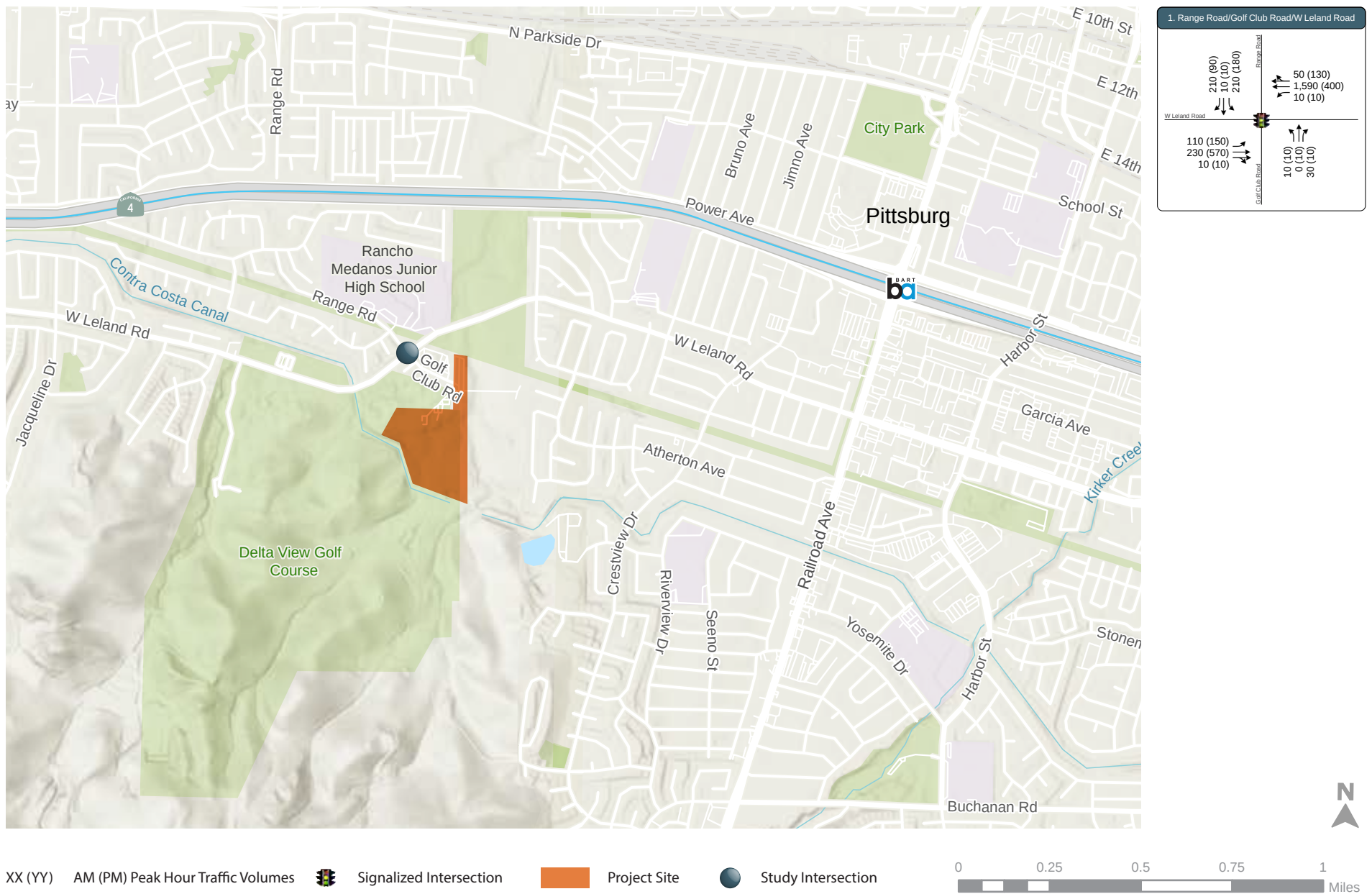


Figure 9

Cumulative without Project Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls

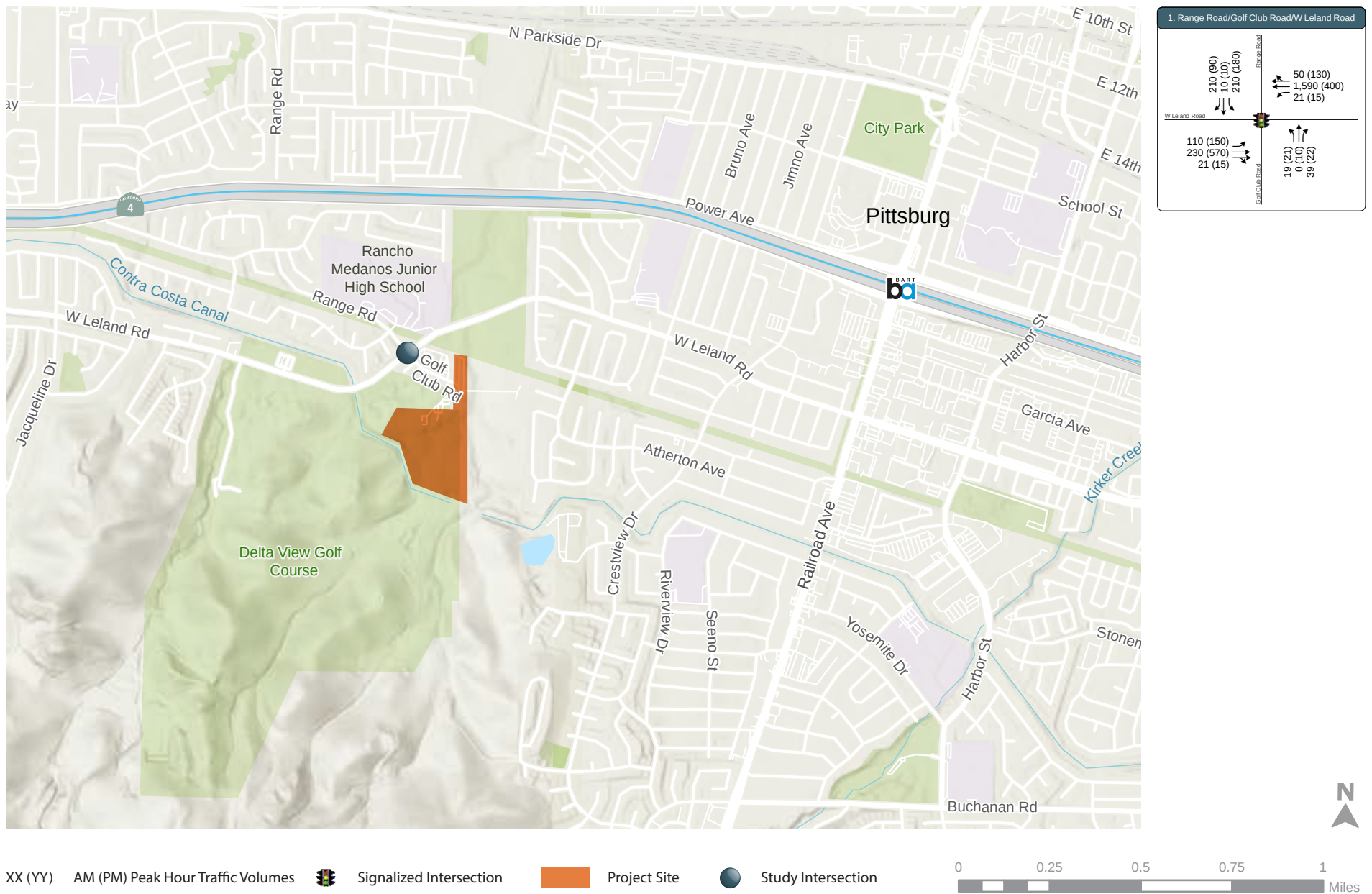


Figure 10

Cumulative with Project Peak Hour Intersection Volumes, Lane Configurations and Traffic Controls

Analysis of Cumulative Conditions

Intersection Operations

Cumulative without and with Project conditions were evaluated using the methods described in Chapter 1. The analysis results are presented in **Table 6**, based on traffic volumes presented on Figure 9 and 10.

Table 6: Cumulative Conditions Peak Hour Intersection LOS Summary

Intersection	Control ¹	Peak Hour ²	LOS Standard	Cumulative		Cumulative with Project	
				Delay ³	LOS	Delay ³	LOS
1. Golf Club Road/West Leland Road	Signal	AM PM	LOS D	52.5 29.2	D C	52.7 29.8	D C

Notes:

1. Traffic control type (Signal = Signalized)

2. AM = Weekday morning peak hour, PM = Weekday evening peak hour

3. Whole intersection average delay reported for signalized intersections. Delay calculated per HCM 6th methodologies.

Source: Fehr & Peers, 2024.

Cumulative Conditions Policy Violations

Traffic associated with the project would result in a minor increase in vehicular delays at the Golf Club Road/West Leland Road intersection. The intersection would continue to function within the city's adopted standards related to levels of service under Cumulative and Cumulative with Project conditions.



6. Site Plan Review

This chapter presents the evaluation of site access and internal circulation for vehicles, pedestrians, transit, bicycles, and emergency vehicles based on the site plan presented previously on Figure 2.

Vehicular Site Access and Circulation

Vehicular access to the project site would be provided via a southerly extension of Golf Club Road into the project site. A second “emergency vehicle only” access roadway would be provided via a new access road on the northwestern side of the site leading to West Leland Road, west of the Golf Club Road/West Leland Road intersection, as illustrated on Figure 2.

The posted speed limit on West Leland Road is 40 mph. Table 201.1 of the Caltrans *Highway Design Manual* (HDM) states that the stopping sight distance standard for a design speed of 40 mph is 300 feet (360 feet for a design speed of 45 miles per hour). Adequate sight distance appears to be provided at the new emergency vehicle access driveway location proposed by the project on West Leland Road. However, as the project’s design is finalized, these distances should be checked, and the project should propose no features (signs, landscaping, etc.) that would compromise driveway sight distance.

Site Recommendation 1: The final site plan for the project should be analyzed by the project’s Civil Engineer to ensure that adequate sight distance is maintained at all driveways and internal intersections. No objects (landscaping, monument signs, etc.) greater than three feet in height should be allowed within the sight distance triangles at these locations. Review available speed survey information from the City and adjust required sight distance if necessary.

The project’s proposed parking would be provided in a new 60 space at-grade parking lot located on the north side of the facility, as illustrated on Figure 2. The current conceptual site plan illustrates a network of roadways and internal intersections throughout the project site. Internal roadway widths and intersection configurations are not yet known.

Site Recommendation 2: The final site plan for the project should illustrate truck turning templates at project driveways and internal roadways showing that applicable routes of travel provide sufficient space for emergency vehicles, trucks, and automobiles.

Emergency Vehicle Access

Several factors determine whether a project has sufficient access for emergency vehicles, including the following:

1. Number of access points (both public and emergency access only)



2. Width of access points
3. Width of internal roadways

The project's primary access point on Golf Club Road and a second emergency vehicle only connection to West Leland Road in the site's northwest corner would provide emergency vehicle access to the site. The internal roadway widths and intersection configurations/sizing are not yet known.

Site Recommendation 3: In accordance with City and Contra Costa County Fire District requirements and design standards, provide even surface pavement, appropriate signage, delineation, and other features at all emergency access points and internal roadways to accommodate emergency vehicles. As part of the project's final design and permitting process, seek and obtain approval of the Contra Costa County Fire District. All internal roadways and intersections should be of adequate width to meet Fire District standards and accommodate the design fire vehicle's turning radius.

Pedestrian Access and Circulation

The project would create a significant impact related to the pedestrian system if any of the following criteria are met:

- Disrupt existing pedestrian facilities; or
- Interfere with planned pedestrian facilities; or
- Create inconsistencies with adopted pedestrian system plans, guidelines, policies, or standards.

Pedestrian access to the site would be provided via the southerly extension of Golf Club Road into the project site. This extension would provide city standard sidewalks along both sides of the roadway. Additional pedestrian facilities are not illustrated on the current site plan at its current conceptual level (Figure 2).

Site Recommendation 4: As the site plan is finalized, safe and adequate pedestrian facilities should be provided throughout the site in accordance with City standards and ADA standards. ADA-compliant connections from the Golf Club Road sidewalks to all building entrances shall be provided. At all internal intersections, ADA compliant ramps shall be provided. Pedestrian paths should be identified and marked crosswalks installed at key uncontrolled pedestrian crossing locations.

Bike Access and Circulation

The project would create a significant impact related to the bicycle system if any of the following criteria are met:



- Disrupt existing bicycle facilities; or
- Interfere with planned bicycle facilities; or
- Create inconsistencies with adopted bicycle system plans, guidelines, policies, or standards.

While the project does not propose any designated bicycle facilities (lanes, routes, or paths), bicycles would be permitted on all internal roadways. The project proposes no features that would be hazardous to bicycle travel and does not conflict with any bicycle facilities plans or programs. The project site plan does not currently illustrate bicycle parking.

Site Recommendation 5: As the site plan is finalized, bicycle parking facilities should be provided in accordance with City of Pittsburgh Municipal Code Section 18.78.045 (Bicycle Parking and Storage Facilities). As the project proposes 60 off-street vehicle parking spaces, a minimum of eight off-street bicycle parking spaces shall be provided. Bicycle parking can be provided in either racks or lockers.

Transit Access

The project would create a significant impact related to transit service if the following criteria are met:

- The project interferes with existing transit facilities or precludes the construction of planned transit facilities.

The project proposes no features which conflict with existing or planned transit services. The project is not expected to result in increases in ridership on local or regional transit facilities that would exceed their capacity. Significant adverse project impacts related to transit were not identified.

Parking

The City of Pittsburgh's Municipal Code does not have a parking requirement for a data center or similar land use. The City's Municipal Code Section 18.78.040 states the following:

Uses Not Specified. If a use permit is required to establish a use, and the use classification is not included in Schedule A, the planning commission or zoning administrator, as appropriate, shall determine the required number of parking or loading spaces for the use in conjunction with the commission's or zoning administrator's review of the use permit.

The project's estimated peak parking demand was evaluated using data and rates from the *Parking Generation Manual*, 5th Edition (2019), published by the Institute of Transportation Engineers (ITE). Like the City's Municipal Code, the ITE manual does not provide data for the data center land use. Estimates of parking demand were calculated using rates and data for two similar land use types that would be



expected to have similar parking demand characteristics. **Table 7** presents a computation of the ITE peak parking demand for the proposed project.

Table 7: ITE Automobile Parking Demand

Land Use	ITE Code	Size ¹	Total Peak Parking Demand
Warehousing	150	60	47
General Light Industrial	110	60	33

1. Quantity in total maximum number of employees.

Source: *Parking Generation Manual* (5th Edition), ITE, 2019; Fehr & Peers, 2024.

Based on ITE data, project parking demand is expected to generally range between 30 and 50 off-street parking spaces. The proposed supply of 60 spaces is expected to be adequate to serve the anticipated demand.

Construction Traffic and Parking

Project construction is anticipated to last 13 to 18 months and would occur in five phases. Phase 1 includes site preparation and clearing with approximately 18 worker trips occurring per day and 147 hauling trips per day (one-way trips). Phase 2 would begin following completion of Phase 1 and include grading work, with 20 worker trips occurring per day and 105 hauling trips per day. Phase 3 would include building construction, with 198 worker trips occurring per day and 79 vendor trips per day. Phase 4 would include the paving work, with 15 worker trips occurring per day. Phase 5 would include architectural coating and finishes, with 40 worker trips occurring per day.

Construction worker trip lengths are projected to average 11.7 miles (one-way), with vendor trips averaging 8.4 miles and truck hauling trips averaging 20.0 miles.

All construction laydown and staging are anticipated to be completed within the project site. All construction vehicle access to the site, for both trucks and worker vehicles, would occur via Golf Club Road.

Site Recommendation 6: A Construction Traffic Management Plan shall be developed and implemented to minimize impacts to the transportation system. The Construction Traffic Management Plan shall detail the project's construction schedule, vehicle type time-of-day plans, route planning, advanced public notices of partial or full street closures or traffic diversion, and other strategies to reduce potential conflicts during construction. The plan shall include, but not be limited to, the following:

- Identification of the traffic controls and methods proposed during each phase of project construction. Provision of safe and adequate access for vehicles, transit, bicycles, and



pedestrians. Traffic controls and methods employed during construction shall be in accordance with City of Pittsburgh standards and the requirements of the Manual of Uniform Traffic Control Devices (FHWA, 2009 MUTCD with Revisions 1, 2 and 3, July 2022).

- Provision of notice to relevant emergency services, thereby avoiding interference with adopted emergency plans, emergency vehicle access, or emergency evacuation plans.
- Preservation of emergency vehicle access.
- Identification of approved truck routes in communication with City of Pittsburgh.
- Location of staging areas and the location of construction worker parking.
- Identification of the means and locations of the separation (i.e., fencing) of construction areas and adjacent active uses.
- The provision of flaggers at all on-site locations where construction trucks and construction worker vehicles conflict with vehicle, bicycle, transit, or pedestrian traffic.
- Provision of a point of contact for residents to obtain construction information, have questions answered and convey complaints.



7. Vehicle Miles Traveled

This section describes the evaluation of the project's potential impacts relative to VMT using the thresholds and criteria described in Chapter 1. The City of Pittsburgh's *Draft Traffic Impact Analysis Guidelines* (May 2023) outline the guidelines, thresholds, and criteria used for the assessment of project VMT impacts. The project was not found to satisfy any of the VMT screening criteria outlined in the City of Pittsburgh or CCTA guidelines. Thus, a detailed assessment of project VMT is required.

Project generated VMT (daily home based VMT per worker) was calculated using the CCTA's regional travel demand model and compared to the relevant threshold (85 percent of the baseline countywide average). Using the current CCTA travel demand model, VMT calculations were prepared for the following scenarios:

- **Baseline No Project:** VMT was calculated using the year 2023.
- **Baseline Plus Project:** VMT was calculated using the year 2023 CCTA Model with the Project land use added into transportation analysis zone (TAZ) 30038.³

Cumulative (2040) No Project and Cumulative (2040) with Project scenarios were also evaluated. The CCTA model was used to assess weekday daily home-based work VMT per employee for each of the analysis scenarios. The CCTA model assigns all predicted trips within, across, or to or from the nine-county San Francisco Bay Area region onto the roadway network and the transit system by mode (single-driver and carpool vehicle, biking, walking, or transit) and transit carrier (bus, rail) for a particular scenario.

CCTA Model Project Land Use Changes

The VMT analysis uses the latest CCTA model land use and network input files. Model land use files for baseline (2023) and cumulative (2040) scenarios were updated based on the project description. **Table 8** summarizes the land use changes made within the project's Traffic Analysis Zone (TAZ) in the CCTA travel demand model as part of the project assessment.

³ The CCTA Model area is divided into geographic sub-areas called TAZs. TAZs are used in the CCTA Model to connect the land uses to the roadway network. Each TAZ includes land use information for that geographic sub-area within the model. The Project is located in TAZ 30648.



Table 8: TAZ Employment Land Use Assumptions – CCTA Model

Scenario	TAZ	Project Employment	No Project Land Use (Total Employment)	With Project Land Use (Total Employment)
Baseline (2023)	30038	60	30	90
Cumulative (2040)			90	150

Source: Fehr & Peers, CCTA travel demand model, 2024.

VMT Analysis Results

Using the land use changes described above, the CCTA travel demand model was used to estimate average daily vehicle miles of travel for the project. Per the City’s Guidelines, weekday daily home-based work VMT per worker was assessed. The weekday daily average home-based work VMT per employee for the project as compared to the relevant significance threshold (85 percent of the baseline countywide average) are presented in **Table 9**.

Table 9: VMT Analysis Summary

Scenario	Baseline Threshold ¹	Project TAZ (Home-work VMT per worker)	Difference from Threshold (% Difference)
		With Project	
Baseline (2023)	12.77	13.47	0.71 (5.5%)
Cumulative (2040)		13.81	1.04 (8.2%)

Notes:

1. Based on the City of Pittsburgh’s guidelines the applicable threshold is 85% of the countywide average home-based work VMT per worker (15.0).

Source: Fehr & Peers, 2024, CCTA travel demand model.

Based on the established significance threshold for VMT, the project is expected to result in a significant adverse impact relative to VMT in both the baseline and cumulative conditions. The project’s daily home-based work VMT per worker of 13.47 in the baseline year, and 13.81 in the cumulative scenario, are greater than the 12.8 home-work VMT per worker threshold.

Transportation Impact 1: Home-based Work Project VMT per Worker: The results of the VMT analysis indicate that the project would have a home-based VMT per worker greater than 85 percent of the countywide average. This is a **significant adverse impact**.

VMT Mitigation Measure

Mitigation Measure Trans-1: Prepare and Implement Travel Demand Management (TDM Plan) - Prior to issuance of building permits, the project applicant shall develop a TDM Plan for the proposed project, including any anticipated phasing, and shall submit the TDM Plan to the



City for review and approval. The TDM Plan shall identify trip reduction strategies as well as mechanisms for funding and overseeing the delivery of trip reduction programs and strategies. The TDM recommendations listed below in **Table 10** identify a set of strategies to achieve the 5.5 percent home-work VMT per worker reduction needed for the baseline year and the 8.2 percent home-work VMT per worker reduction needed for the cumulative year. The strategies are based on recommendations provided in the *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (California Air Pollution Control Officers Association (CAPCOA), December 2021). Table 10 also illustrates the anticipated range of VMT reduction from the available data.

Table 10: Recommended TDM Strategies

TDM Strategy	Range of Potential VMT Reduction ¹	Total Estimated VMT Reduction	
A. Implement Mandatory 4-40 Work Schedule	5-9%	A. Implement Commute Trip Reduction Marketing	1-2%
B. Implement Commute Trip Reduction Marketing	1-2%	C. Provide New Hire Packets on Transportation Options	1-2%
C. Provide New Hire Packets on Transportation Options	1-2%	D. Provide Ridesharing Program	1-4%
D. Provide Ridesharing Program	1-4%	E. Implement Subsidized or Discounted Transit Program – Work Trips Only	0-1%
E. Implement Subsidized or Discounted Transit Program – Work Trips Only	0-1%	F. Provide End-of-Trip Bicycle Facilities	0.5-3%
F. Provide End-of-Trip Bicycle Facilities	0.5-3%	6-15% ²	

Notes:

1. The focus of the CAPCOA document is reductions to VMT but the research used to generate the reductions also indicates vehicle trip reductions (VTR) are applicable as well. For the purposes of this analysis, the VTR is assumed to equal the VMT reduction.
2. Because many strategies are complementary, the estimates totals are dampened to account for overlap in their impacts. Detailed Guidance for combining the VMT reduction effects of TDM strategies is provided in Chapter 3 of the CAPCOA Handbook (December 2021)

Source: Fehr & Peers, 2024.

Operational TDM strategies provide ongoing incentives and support for the use of non-auto transportation modes. TDM strategies are most effective for persons that commute to and from a site on a regular basis, especially during weekday peak commute periods when transit service peaks and runs most frequently. Thus, the recommended strategies are generally targeted at site employees to reduce single-occupancy vehicular travel.



These TDM measures include ongoing operational strategies and have monthly or annual costs and will require on-going management. A more detailed description of the recommended TDM measures is provided below:

- A. *Implement Mandatory 4-40 Work Schedule*: The project should implement a mandatory 4 days a week 10 hours a day work schedule for all employees. Implementation of this measure would reduce the number of trips made to the site on a daily and weekly basis by employees.
- B. *Implement Commute Trip Reduction Marketing*: The project should provide information sharing and marketing to promote and educate employees about their travel choices to the employment location beyond driving such as carpooling, riding transit, walking, and biking.
- C. *Provide New Hire Packets on Transportation Options*: The project should provide standardized materials, including information on transit routes and schedules, bike pathways, available commuter facilities, and any other available commuter programs, during the orientation process for new hires.
- D. *Provide Ridesharing Program*: The project should implement a ridesharing program. Ridesharing encourages carpooled vehicle trips and reduces single-occupancy vehicle trips. The building tenant should offer priority parking for rideshare participants and offer flexible work schedules to ride share participants, if feasible. The tenant should also provide subsidies for shared trips provided by a transportation network company (TNC).
- E. *Implement Subsidized or Discounted Transit Program – Work Trips Only*: The project should implement a subsidized or discounted transit program. A pre-tax commuter benefit can reduce the out-of-pocket cost for choosing transit, which improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. Note that employee benefits for the building tenant may be subject to union contract negotiations.
- F. *Provide End-of-Trip Bicycle Facilities*: The project should install and maintain end-of-trip facilities. End-of-trip bicycle facilities can include amenities like secure, monitored bike parking, showers, personal lockers, and basic bicycle maintenance equipment. In addition, the project shall monitor the use of short-term and long-term bicycle parking and provide additional bicycle parking, if necessary. Adequate bicycle facilities encourage commuting by bicycle instead of vehicle.

Monitoring, Evaluation, and Enforcement

To ensure the TDM Plan achieves the required VMT reduction, the plan shall include monitoring, evaluation, and enforcement mechanisms. These components include the following requirements:



1. Site management should regularly evaluate the implementation of the TDM Plan to assess its effectiveness.
2. Site management should conduct annual employee surveys to measure mode share and the commute trip reduction program use (e.g., the number of employees participating in a ridesharing program) for the first two years following project occupancy.
3. Site management should conduct driveway traffic counts for the first two years following project occupancy.
4. Site management should submit an annual report for the first two years following completion of the project for review and approval by the City. The annual report shall document the status of the TDM monitoring program, including the summary of travel mode surveys.

If deemed necessary, the city may elect to have a peer review consultant, paid for by site management, review the annual report.

Noncompliance and Enforcement

If timely reports are not submitted and/or the annual reports indicate the project has failed to implement the TDM Plan, the project will be considered in violation of its Conditions of Approval and the City may initiate enforcement action.

If the City deems the first two annual reports to be satisfactory, annual monitoring and surveys shall be suspended.

If the project's TDM goals are not satisfied in two successive years site management shall prepare and submit a Corrective Action Plan for City approval. The Corrective Action Plan shall detail the additional TDM measures to be implemented onsite and their expected travel/mode split reduction. Additional annual travel surveys and driveway mode share (percentages of people arriving and departing via automobile, shuttle, walk and bike) and vehicle trip counts should be conducted for the two years following the implementation of the Corrective Action Plan to determine if the project is meeting the goals identified in the Corrective Action Plan.

Level of Significance after Mitigation – Less than Significant – Implementation of the TDM Plan as outlined is expected to reduce the amount of employee VMT associated with the project by the required amount. The required monitoring, evaluation, and enforcement mechanisms would ensure the necessary reductions are achieved.



8. Summary of Findings

The proposed project was not found to result in violations of the City of Pittsburg's standards related to roadway levels of service, and adequate vehicular access to the site is provided to support the proposed use. No significant adverse impacts related to pedestrians, bicycles, emergency vehicle access, hazards or transit were identified. An adequate number of parking spaces would be provided to satisfy the anticipated parking demand. The following recommendations are provided to ensure that the project operates in an efficient manner and satisfy applicable standards and requirements related to transportation:

Site Recommendation 1: The final site plan for the project should be analyzed by the project's Civil Engineer to ensure that adequate sight distance is maintained at all driveways and internal intersections. No objects (landscaping, monument signs, etc.) greater than three feet in height should be allowed within the sight distance triangles at these locations. Review available speed survey information from the City and adjust required sight distance if necessary.

Site Recommendation 2: The final site plan for the project should illustrate truck turning templates at project driveways and internal roadways showing that applicable routes of travel provide sufficient space for emergency vehicles, trucks, and automobiles.

Site Recommendation 3: In accordance with City and Contra Costa County Fire District requirements and design standards, provide even surface pavement, appropriate signage, delineation, and other features at all emergency access points and internal roadways to accommodate emergency vehicles. As part of the project's final design and permitting process, seek and obtain approval of the Contra Costa County Fire District. All internal roadways and intersections should be of adequate width to meet Fire District standards and accommodate the design fire vehicle's turning radius.

Site Recommendation 4: As the site plan is finalized, safe and adequate pedestrian facilities should be provided throughout the site in accordance with City standards and ADA standards. ADA-compliant connections from the Golf Club Road sidewalks to all building entrances shall be provided. At all internal intersections, ADA compliant ramps shall be provided. Pedestrian paths should be identified and marked crosswalks installed at key uncontrolled pedestrian crossing locations.

Site Recommendation 5: As the site plan is finalized, bicycle parking facilities should be provided in accordance with City of Pittsburg Municipal Code Section 18.78.045 (Bicycle Parking and Storage Facilities). As the project proposes 60 off-street vehicle parking spaces, a minimum of eight off-street bicycle parking spaces shall be provided. Bicycle parking can be provided in either racks or lockers.

Site Recommendation 6: A Construction Traffic Management Plan shall be developed and implemented to minimize impacts to the transportation system. The Construction Traffic



Management Plan shall detail the project's construction schedule, vehicle type time-of-day plans, route planning, advanced public notices of partial or full street closures or traffic diversion, and other strategies to reduce potential conflicts during construction.

The project was found to have a significant adverse impact related to VMT. Project VMT was assessed using the CCTA regional travel demand model and compared to the relevant standard of significance. The project's identified daily home-based work VMT per worker of 13.47 in the baseline year, and 13.81 in the cumulative scenario, are greater than the 12.8 home-work VMT per worker threshold. A mitigation measure, consisting of the development and implementation of a TDM Plan, was developed and identified to mitigate the identified deficiency. With the implementation of the mitigation measure, the impact related to VMT would be mitigated to a less than significant level.



Appendix A: Counts

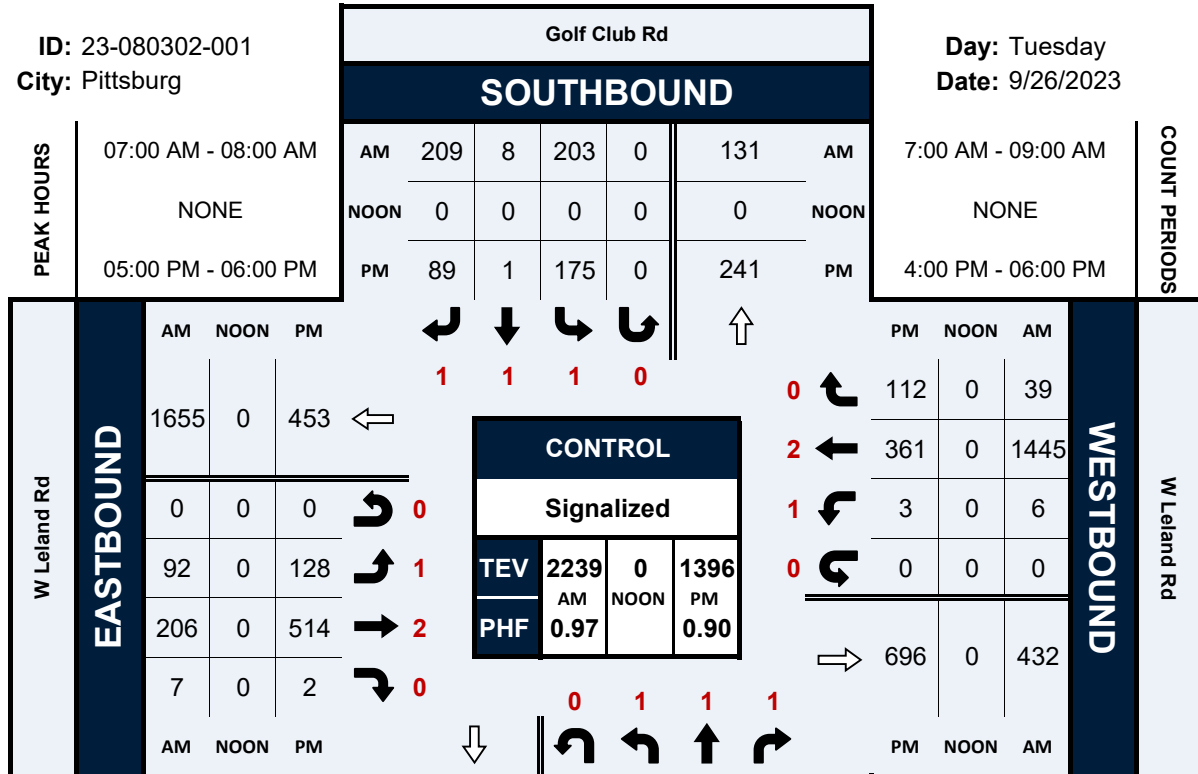


Golf Club Rd & W Leland Rd

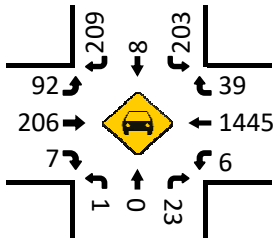
Peak Hour Turning Movement Count

ID: 23-080302-001
City: Pittsburg

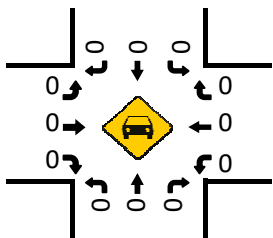
Day: Tuesday
Date: 9/26/2023



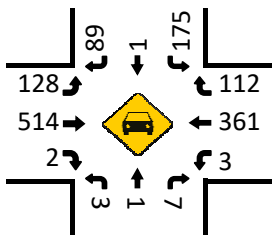
Total (AM)



Total (NOON)



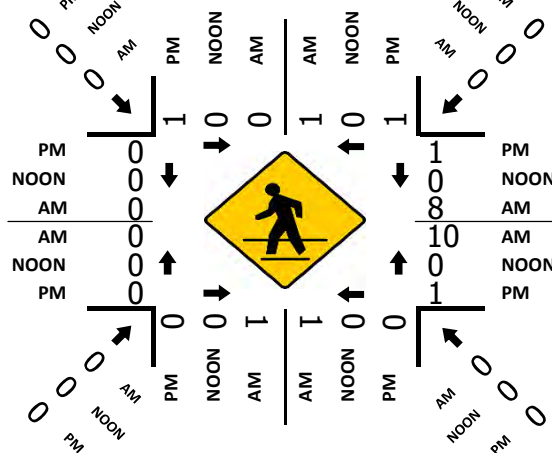
Total (PM)



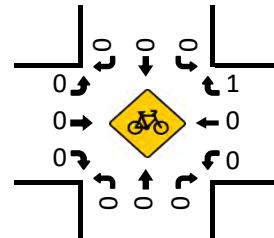
NORTHBOUND

Golf Club Rd

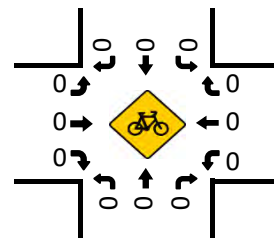
Pedestrians (Crosswalks)



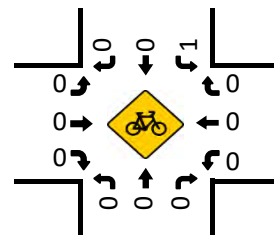
Total Bikes (AM)



Total Bikes (NOON)



Total Bikes (PM)



Appendix B: LOS

Calculation Worksheets



HCM 6th Signalized Intersection Summary

1: Golf Club Road/Range Road & W Leland Road

Pittsburg Data Center
Existing AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	206	7	6	1445	39	1	0	23	203	8	209
Future Volume (veh/h)	92	206	7	6	1445	39	1	0	23	203	8	209
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.95	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	95	212	6	6	1490	39	1	0	3	209	8	47
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	112	2138	60	19	1956	51	3	217	176	161	382	324
Arrive On Green	0.06	0.61	0.61	0.01	0.56	0.56	0.00	0.00	0.12	0.09	0.21	0.21
Sat Flow, veh/h	1767	3502	99	1767	3508	92	1767	1856	1500	1767	1856	1572
Grp Volume(v), veh/h	95	106	112	6	748	781	1	0	3	209	8	47
Grp Sat Flow(s),veh/h/ln	1767	1763	1838	1767	1763	1837	1767	1856	1500	1767	1856	1572
Q Serve(g_s), s	5.9	2.8	2.8	0.4	35.8	36.0	0.1	0.0	0.2	10.0	0.4	2.7
Cycle Q Clear(g_c), s	5.9	2.8	2.8	0.4	35.8	36.0	0.1	0.0	0.2	10.0	0.4	2.7
Prop In Lane	1.00		0.05	1.00		0.05	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	1076	1122	19	983	1024	3	217	176	161	382	324
V/C Ratio(X)	0.84	0.10	0.10	0.32	0.76	0.76	0.30	0.00	0.02	1.30	0.02	0.15
Avail Cap(c_a), veh/h	112	1076	1122	112	983	1024	112	547	442	161	589	499
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.0	8.9	8.9	54.0	18.7	18.7	54.8	0.0	43.0	50.0	34.8	35.7
Incr Delay (d2), s/veh	41.4	0.2	0.2	9.4	5.5	5.4	42.5	0.0	0.0	173.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	1.0	1.1	0.2	14.7	15.4	0.1	0.0	0.1	12.1	0.2	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.3	9.1	9.1	63.4	24.2	24.1	97.3	0.0	43.0	223.3	34.8	35.9
LnGrp LOS	F	A	A	E	C	C	F	A	D	F	C	D
Approach Vol, veh/h		313			1535			4			264	
Approach Delay, s/veh		34.3			24.3			56.6			184.2	
Approach LOS		C			C			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.2	72.9	4.2	27.8	11.0	67.0	14.0	18.0				
Change Period (Y+Rc), s	4.0	5.7	4.0	5.1	4.0	5.7	4.0	* 5.1				
Max Green Setting (Gmax), s	7.0	42.3	7.0	34.9	7.0	42.3	10.0	* 32				
Max Q Clear Time (g_c+I1), s	2.4	4.8	2.1	4.7	7.9	38.0	12.0	2.2				
Green Ext Time (p_c), s	0.0	1.2	0.0	0.1	0.0	3.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			45.8									
HCM 6th LOS			D									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

1: Golf Club Road/Range Road & W Leland Road

Pittsburg Data Center
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	514	2	3	361	112	3	1	7	175	1	89
Future Volume (veh/h)	128	514	2	3	361	112	3	1	7	175	1	89
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	142	571	2	3	401	104	3	1	1	194	1	21
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	170	2338	8	10	1550	398	10	90	76	223	314	266
Arrive On Green	0.10	0.65	0.65	0.01	0.56	0.56	0.01	0.05	0.05	0.13	0.17	0.17
Sat Flow, veh/h	1767	3603	13	1767	2776	713	1767	1856	1560	1767	1856	1572
Grp Volume(v), veh/h	142	279	294	3	253	252	3	1	1	194	1	21
Grp Sat Flow(s),veh/h/ln	1767	1763	1853	1767	1763	1726	1767	1856	1560	1767	1856	1572
Q Serve(g_s), s	8.7	7.3	7.3	0.2	8.1	8.3	0.2	0.1	0.1	11.9	0.0	1.2
Cycle Q Clear(g_c), s	8.7	7.3	7.3	0.2	8.1	8.3	0.2	0.1	0.1	11.9	0.0	1.2
Prop In Lane	1.00		0.01	1.00		0.41	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	170	1144	1202	10	984	964	10	90	76	223	314	266
V/C Ratio(X)	0.84	0.24	0.24	0.30	0.26	0.26	0.30	0.01	0.01	0.87	0.00	0.08
Avail Cap(c_a), veh/h	177	1144	1202	112	984	964	112	547	459	241	656	556
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	8.1	8.1	54.5	12.5	12.6	54.5	49.8	49.8	47.2	38.0	38.5
Incr Delay (d2), s/veh	27.4	0.5	0.5	16.4	0.6	0.7	16.4	0.0	0.1	26.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	2.6	2.7	0.1	3.2	3.2	0.1	0.0	0.0	6.8	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.3	8.6	8.5	70.9	13.2	13.2	70.9	49.9	49.9	73.2	38.0	38.6
LnGrp LOS	E	A	A	E	B	B	E	D	D	E	D	D
Approach Vol, veh/h		715			508			5			216	
Approach Delay, s/veh		22.0			13.5			62.5			69.7	
Approach LOS		C			B			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.6	77.1	4.6	23.7	14.6	67.1	17.9	10.4				
Change Period (Y+Rc), s	4.0	5.7	4.0	5.1	4.0	5.7	4.0	* 5.1				
Max Green Setting (Gmax), s	7.0	37.3	7.0	38.9	11.0	33.3	15.0	* 32				
Max Q Clear Time (g_c+I1), s	2.2	9.3	2.2	3.2	10.7	10.3	13.9	2.1				
Green Ext Time (p_c), s	0.0	3.3	0.0	0.0	0.0	2.9	0.1	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			26.3									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

1: Golf Club Road/Range Road & W Leland Road

Pittsburg Data Center
Existing with Project AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	206	18	17	1445	39	10	0	32	203	8	209
Future Volume (veh/h)	92	206	18	17	1445	39	10	0	32	203	8	209
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.95	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	95	212	15	18	1490	39	10	0	5	209	8	47
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	112	1977	139	48	1947	51	30	222	180	161	360	305
Arrive On Green	0.06	0.59	0.59	0.03	0.55	0.55	0.02	0.00	0.12	0.09	0.19	0.19
Sat Flow, veh/h	1767	3341	235	1767	3508	92	1767	1856	1502	1767	1856	1572
Grp Volume(v), veh/h	95	111	116	18	748	781	10	0	5	209	8	47
Grp Sat Flow(s),veh/h/ln	1767	1763	1813	1767	1763	1837	1767	1856	1502	1767	1856	1572
Q Serve(g_s), s	5.9	3.0	3.1	1.1	36.0	36.3	0.6	0.0	0.3	10.0	0.4	2.7
Cycle Q Clear(g_c), s	5.9	3.0	3.1	1.1	36.0	36.3	0.6	0.0	0.3	10.0	0.4	2.7
Prop In Lane	1.00		0.13	1.00		0.05	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	1043	1073	48	978	1019	30	222	180	161	360	305
V/C Ratio(X)	0.84	0.11	0.11	0.38	0.76	0.77	0.34	0.00	0.03	1.30	0.02	0.15
Avail Cap(c_a), veh/h	112	1043	1073	112	978	1019	112	547	442	161	589	499
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.0	9.8	9.8	52.6	18.9	19.0	53.5	0.0	42.8	50.0	35.9	36.9
Incr Delay (d2), s/veh	41.4	0.2	0.2	4.9	5.7	5.5	6.6	0.0	0.1	173.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	1.1	1.2	0.5	14.8	15.5	0.3	0.0	0.1	12.1	0.2	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.3	10.0	10.0	57.5	24.6	24.5	60.0	0.0	42.8	223.3	35.9	37.1
LnGrp LOS	F	A	B	E	C	C	E	A	D	F	D	D
Approach Vol, veh/h		322			1547			15			264	
Approach Delay, s/veh		34.3			24.9			54.3			184.5	
Approach LOS		C			C			D			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.0	70.8	5.8	26.4	11.0	66.7	14.0	18.3				
Change Period (Y+Rc), s	4.0	5.7	4.0	5.1	4.0	5.7	4.0	* 5.1				
Max Green Setting (Gmax), s	7.0	42.3	7.0	34.9	7.0	42.3	10.0	* 32				
Max Q Clear Time (g_c+l1), s	3.1	5.1	2.6	4.7	7.9	38.3	12.0	2.3				
Green Ext Time (p_c), s	0.0	1.2	0.0	0.1	0.0	3.1	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			46.1									
HCM 6th LOS			D									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

1: Golf Club Road/Range Road & W Leland Road

Pittsburg Data Center
Existing with Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	514	7	8	361	112	14	1	19	175	1	89
Future Volume (veh/h)	128	514	7	8	361	112	14	1	19	175	1	89
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	142	571	8	9	401	104	16	1	2	194	1	21
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	170	2237	31	27	1520	390	43	110	92	223	298	253
Arrive On Green	0.10	0.63	0.63	0.02	0.55	0.55	0.02	0.06	0.06	0.13	0.16	0.16
Sat Flow, veh/h	1767	3559	50	1767	2776	713	1767	1856	1560	1767	1856	1572
Grp Volume(v), veh/h	142	283	296	9	253	252	16	1	2	194	1	21
Grp Sat Flow(s),veh/h/ln	1767	1763	1847	1767	1763	1726	1767	1856	1560	1767	1856	1572
Q Serve(g_s), s	8.7	7.8	7.8	0.6	8.3	8.5	1.0	0.1	0.1	11.9	0.0	1.2
Cycle Q Clear(g_c), s	8.7	7.8	7.8	0.6	8.3	8.5	1.0	0.1	0.1	11.9	0.0	1.2
Prop In Lane	1.00		0.03	1.00		0.41	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	170	1108	1160	27	965	945	43	110	92	223	298	253
V/C Ratio(X)	0.84	0.26	0.26	0.33	0.26	0.27	0.37	0.01	0.02	0.87	0.00	0.08
Avail Cap(c_a), veh/h	177	1108	1160	112	965	945	112	547	459	241	656	556
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	9.0	9.0	53.6	13.1	13.2	52.8	48.7	48.7	47.2	38.8	39.3
Incr Delay (d2), s/veh	27.4	0.6	0.5	7.0	0.7	0.7	5.1	0.0	0.1	26.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	2.9	3.0	0.3	3.3	3.3	0.5	0.0	0.1	6.8	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.3	9.6	9.6	60.6	13.8	13.9	57.9	48.7	48.8	73.2	38.8	39.4
LnGrp LOS	E	A	A	E	B	B	E	D	D	E	D	D
Approach Vol, veh/h		721			514			19			216	
Approach Delay, s/veh		22.7			14.7			56.5			69.7	
Approach LOS		C			B			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.7	74.8	6.7	22.8	14.6	65.9	17.9	11.6				
Change Period (Y+Rc), s	4.0	5.7	4.0	5.1	4.0	5.7	4.0	* 5.1				
Max Green Setting (Gmax), s	7.0	37.3	7.0	38.9	11.0	33.3	15.0	* 32				
Max Q Clear Time (g_c+I1), s	2.6	9.8	3.0	3.2	10.7	10.5	13.9	2.1				
Green Ext Time (p_c), s	0.0	3.4	0.0	0.0	0.0	2.8	0.1	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				27.3								
HCM 6th LOS				C								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

1: Golf Club Road/Range Road & W Leland Road

Pittsburg Data Center
Cumulative AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	230	10	10	1590	50	10	0	30	210	10	210
Future Volume (veh/h)	110	230	10	10	1590	50	10	0	30	210	10	210
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.95	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	113	237	8	10	1639	50	10	0	4	216	10	47
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	112	2094	70	30	1936	59	30	222	180	161	360	305
Arrive On Green	0.06	0.60	0.60	0.02	0.55	0.55	0.02	0.00	0.12	0.09	0.19	0.19
Sat Flow, veh/h	1767	3480	117	1767	3490	106	1767	1856	1502	1767	1856	1572
Grp Volume(v), veh/h	113	120	125	10	825	864	10	0	4	216	10	47
Grp Sat Flow(s),veh/h/ln	1767	1763	1834	1767	1763	1834	1767	1856	1502	1767	1856	1572
Q Serve(g_s), s	7.0	3.2	3.2	0.6	43.1	43.6	0.6	0.0	0.3	10.0	0.5	2.7
Cycle Q Clear(g_c), s	7.0	3.2	3.2	0.6	43.1	43.6	0.6	0.0	0.3	10.0	0.5	2.7
Prop In Lane	1.00		0.06	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	1060	1103	30	978	1017	30	222	180	161	360	305
V/C Ratio(X)	1.00	0.11	0.11	0.34	0.84	0.85	0.34	0.00	0.02	1.34	0.03	0.15
Avail Cap(c_a), veh/h	112	1060	1103	112	978	1017	112	540	437	161	582	493
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	9.4	9.4	53.5	20.5	20.6	53.5	0.0	42.7	50.0	35.9	36.8
Incr Delay (d2), s/veh	86.2	0.2	0.2	6.6	8.8	8.8	6.6	0.0	0.0	190.6	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	1.2	1.3	0.3	18.3	19.3	0.3	0.0	0.1	12.9	0.2	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	137.7	9.6	9.6	60.0	29.3	29.4	60.0	0.0	42.8	240.6	36.0	37.1
LnGrp LOS	F	A	A	E	C	C	E	A	D	F	D	D
Approach Vol, veh/h		358			1699			14			273	
Approach Delay, s/veh		50.0			29.6			55.1			198.1	
Approach LOS		D			C			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.8	71.9	5.8	26.4	11.0	66.7	14.0	18.3				
Change Period (Y+Rc), s	4.0	5.7	4.0	5.1	4.0	5.7	4.0	* 5.1				
Max Green Setting (Gmax), s	7.0	42.7	7.0	34.5	7.0	42.7	10.0	* 32				
Max Q Clear Time (g_c+I1), s	2.6	5.2	2.6	4.7	9.0	45.6	12.0	2.3				
Green Ext Time (p_c), s	0.0	1.3	0.0	0.2	0.0	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			52.5									
HCM 6th LOS			D									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

1: Golf Club Road/Range Road & W Leland Road

Pittsburg Data Center
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	570	10	10	400	130	10	10	10	180	10	90
Future Volume (veh/h)	150	570	10	10	400	130	10	10	10	180	10	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	167	633	10	11	444	121	11	11	1	200	11	24
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	193	2189	35	32	1440	389	32	125	105	225	328	278
Arrive On Green	0.11	0.62	0.62	0.02	0.53	0.53	0.02	0.07	0.07	0.13	0.18	0.18
Sat Flow, veh/h	1767	3552	56	1767	2742	741	1767	1856	1560	1767	1856	1572
Grp Volume(v), veh/h	167	314	329	11	284	281	11	11	1	200	11	24
Grp Sat Flow(s),veh/h/ln	1767	1763	1845	1767	1763	1720	1767	1856	1560	1767	1856	1572
Q Serve(g_s), s	10.2	9.2	9.2	0.7	10.0	10.2	0.7	0.6	0.1	12.3	0.5	1.4
Cycle Q Clear(g_c), s	10.2	9.2	9.2	0.7	10.0	10.2	0.7	0.6	0.1	12.3	0.5	1.4
Prop In Lane	1.00		0.03	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	193	1086	1137	32	926	904	32	125	105	225	328	278
V/C Ratio(X)	0.87	0.29	0.29	0.34	0.31	0.31	0.34	0.09	0.01	0.89	0.03	0.09
Avail Cap(c_a), veh/h	193	1086	1137	112	926	904	112	540	454	225	649	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.2	9.9	9.9	53.4	14.8	14.8	53.4	48.1	47.9	47.2	37.5	37.9
Incr Delay (d2), s/veh	31.4	0.7	0.6	6.2	0.9	0.9	6.2	0.3	0.0	32.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	3.4	3.6	0.4	4.0	4.0	0.4	0.3	0.0	7.3	0.2	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.6	10.5	10.5	59.5	15.6	15.7	59.5	48.4	47.9	79.5	37.6	38.0
LnGrp LOS	E	B	B	E	B	B	E	D	D	E	D	D
Approach Vol, veh/h		810			576			23			235	
Approach Delay, s/veh		24.8			16.5			53.7			73.3	
Approach LOS		C			B			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.0	73.5	6.0	24.5	16.0	63.5	18.0	12.5				
Change Period (Y+Rc), s	4.0	5.7	4.0	5.1	4.0	5.7	4.0	* 5.1				
Max Green Setting (Gmax), s	7.0	38.7	7.0	38.5	12.0	33.7	14.0	* 32				
Max Q Clear Time (g_c+I1), s	2.7	11.2	2.7	3.4	12.2	12.2	14.3	2.6				
Green Ext Time (p_c), s	0.0	3.8	0.0	0.1	0.0	3.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			29.2									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

1: Golf Club Road/Range Road & W Leland Road

Pittsburg Data Center
Cumulative with Project AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	230	21	21	1590	50	19	0	39	210	10	210
Future Volume (veh/h)	110	230	21	21	1590	50	19	0	39	210	10	210
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.96	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	113	237	18	22	1639	50	20	0	6	216	10	48
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	112	1944	147	55	1929	59	51	226	183	161	341	289
Arrive On Green	0.06	0.59	0.59	0.03	0.55	0.55	0.03	0.00	0.12	0.09	0.18	0.18
Sat Flow, veh/h	1767	3322	251	1767	3490	106	1767	1856	1503	1767	1856	1572
Grp Volume(v), veh/h	113	125	130	22	825	864	20	0	6	216	10	48
Grp Sat Flow(s),veh/h/ln	1767	1763	1810	1767	1763	1834	1767	1856	1503	1767	1856	1572
Q Serve(g_s), s	7.0	3.5	3.5	1.3	43.3	43.8	1.2	0.0	0.4	10.0	0.5	2.8
Cycle Q Clear(g_c), s	7.0	3.5	3.5	1.3	43.3	43.8	1.2	0.0	0.4	10.0	0.5	2.8
Prop In Lane	1.00		0.14	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	1032	1059	55	974	1013	51	226	183	161	341	289
V/C Ratio(X)	1.00	0.12	0.12	0.40	0.85	0.85	0.39	0.00	0.03	1.34	0.03	0.17
Avail Cap(c_a), veh/h	112	1032	1059	112	974	1013	112	540	437	161	582	493
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	10.2	10.2	52.3	20.7	20.8	52.4	0.0	42.6	50.0	36.8	37.8
Incr Delay (d2), s/veh	86.2	0.2	0.2	4.6	9.0	9.0	4.7	0.0	0.1	190.6	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	1.3	1.4	0.7	18.5	19.5	0.6	0.0	0.1	12.9	0.2	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	137.7	10.4	10.4	56.9	29.7	29.8	57.2	0.0	42.7	240.6	36.9	38.1
LnGrp LOS	F	B	B	E	C	C	E	A	D	F	D	D
Approach Vol, veh/h		368			1711			26			274	
Approach Delay, s/veh		49.5			30.1			53.8			197.7	
Approach LOS		D			C			D			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.4	70.1	7.2	25.3	11.0	66.5	14.0	18.5				
Change Period (Y+Rc), s	4.0	5.7	4.0	5.1	4.0	5.7	4.0	* 5.1				
Max Green Setting (Gmax), s	7.0	42.7	7.0	34.5	7.0	42.7	10.0	* 32				
Max Q Clear Time (g_c+I1), s	3.3	5.5	3.2	4.8	9.0	45.8	12.0	2.4				
Green Ext Time (p_c), s	0.0	1.4	0.0	0.2	0.0	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				52.7								
HCM 6th LOS				D								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

1: Golf Club Road/Range Road & W Leland Road

Pittsburg Data Center
Cumulative with Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	570	15	15	400	130	21	10	22	180	10	90
Future Volume (veh/h)	150	570	15	15	400	130	21	10	22	180	10	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	167	633	16	17	444	121	23	11	2	200	11	22
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	193	2126	54	46	1431	387	57	131	111	225	308	261
Arrive On Green	0.11	0.61	0.61	0.03	0.52	0.52	0.03	0.07	0.07	0.13	0.17	0.17
Sat Flow, veh/h	1767	3514	89	1767	2742	741	1767	1856	1560	1767	1856	1572
Grp Volume(v), veh/h	167	317	332	17	284	281	23	11	2	200	11	22
Grp Sat Flow(s),veh/h/ln	1767	1763	1840	1767	1763	1720	1767	1856	1560	1767	1856	1572
Q Serve(g_s), s	10.2	9.5	9.5	1.0	10.1	10.3	1.4	0.6	0.1	12.3	0.5	1.3
Cycle Q Clear(g_c), s	10.2	9.5	9.5	1.0	10.1	10.3	1.4	0.6	0.1	12.3	0.5	1.3
Prop In Lane	1.00		0.05	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	193	1067	1113	46	920	898	57	131	111	225	308	261
V/C Ratio(X)	0.87	0.30	0.30	0.37	0.31	0.31	0.41	0.08	0.02	0.89	0.04	0.08
Avail Cap(c_a), veh/h	193	1067	1113	112	920	898	112	540	454	225	649	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.2	10.5	10.5	52.7	15.0	15.0	52.2	47.8	47.5	47.2	38.5	38.8
Incr Delay (d2), s/veh	31.4	0.7	0.7	5.0	0.9	0.9	4.6	0.3	0.1	32.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	3.6	3.7	0.5	4.0	4.0	0.7	0.3	0.1	7.3	0.3	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.6	11.2	11.1	57.7	15.9	15.9	56.8	48.0	47.6	79.5	38.5	38.9
LnGrp LOS	E	B	B	E	B	B	E	D	D	E	D	D
Approach Vol, veh/h	816			582			36			233		
Approach Delay, s/veh	25.2			17.1			53.6			73.7		
Approach LOS	C			B			D			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.8	72.3	7.5	23.4	16.0	63.1	18.0	12.9				
Change Period (Y+Rc), s	4.0	5.7	4.0	5.1	4.0	5.7	4.0	* 5.1				
Max Green Setting (Gmax), s	7.0	38.7	7.0	38.5	12.0	33.7	14.0	* 32				
Max Q Clear Time (g_c+I1), s	3.0	11.5	3.4	3.3	12.2	12.3	14.3	2.6				
Green Ext Time (p_c), s	0.0	3.9	0.0	0.1	0.0	3.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			29.8									
HCM 6th LOS			C									
Notes												

FEHR & PEERS

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APPENDIX I

Notice List

Provided Under Separate Cover