

SECTION 5

FUTURE CONDITION: YEAR 2028 NOISE EXPOSURE

5.1 INTRODUCTION

The evaluation of the future year 2028 airport noise environment at the Key West International Airport (EYW) was completed using the methods and standards developed by the Federal Aviation Administration (FAA) and published in Title 14 CFR part 150 (Part 150). The regulation requires that the cumulative noise energy exposure of individuals to noise resulting from aviation activities be established in terms of yearly day - night average sound level (DNL) as the FAA's primary metric. All detailed noise analyses must be performed using the most current version of the FAA's Aviation Environmental Design Tool (AEDT). For this NEM, AEDT Version 3d was used to model aircraft noise exposure, as described in more detail in **Section 4.1**.

The noise analysis described in this section was conducted to reflect future (i.e., forecast) conditions. This analysis includes maps to depict land uses within the DNL contours. The inclusion of flight tracks is helpful in illustrating where aircraft normally fly.

The following information will be disclosed for the future (i.e., forecast) conditions:

- The number of people living or residences within each noise contour above DNL 65 for the Future Condition Noise Exposure Map (NEM).
- The location and number of noise sensitive uses (e.g., schools, churches, hospitals, parks, recreation areas) exposed to DNL 65 or greater for the Future Condition NEM.
- Mitigation measures in effect or proposed and their relationship to the Future Condition NEM.

5.2 METHOD FOR DEVELOPING FLEET MIX AND NUMBER OF OPERATIONS

Most of the operational characteristics and assumptions used to develop the Existing Condition NEM were also used to generate the Future Condition NEM. Future operational characteristics including time of day, departure profiles and stage lengths, runway utilization, standing takeoff operations, flight tracks, and flight track utilization are not expected to vary significantly from current operational characteristics by 2028. The only operational characteristics that are expected to change are number of operations, air carrier / air taxi jet fleet mix, and back taxi operations. These assumptions were confirmed through consultation with airport staff and airport users.

5.2.1 Data Sources

5.2.1.1 FAA Terminal Area Forecast

The Terminal Area Forecast (TAF) is the official FAA forecast of aviation activity for U.S. airports. It contains active airports in the National Plan of Integrated Airport Systems (NPIAS) including FAA-towered airports, Federal contract-towered airports, non-federal towered airports, and non-towered airports. Forecasts are prepared for major users of the National Airspace System including air carrier, air taxi/commuter, general

aviation, and military. The forecasts are prepared to meet the budget and planning needs of the FAA and provide information for use by state and local authorities, the aviation industry, and the public.

Published annually, the TAF remains constant until its next publication, with the only exceptions being significant traffic shifts by major airlines or a significant data error.

The TAF assumes a demand driven forecast for aviation services based upon local and national economic conditions as well as conditions within the aviation industry. In FFY 2020 there was a major decrease in passenger enplanements and commercial operations as a result of the COVID-19 pandemic. Total enplanements reported at FAA-towered airports and Federal contract-towered airports decreased 44.4 percent as a result of the COVID-19 pandemic. Total operations at these airports decreased 16.7 percent, commercial operations decreased 26.5 percent, and non-commercial operations decreased 9.1 percent based on OPSNET data. In FFY 2021 there was a modest recovery with these parameters increasing at above historical average growth rates. There is uncertainty associated with the forecasts because of the uncertainty regarding the pandemic and its economic impacts.

The development of the TAF begins with an update of the latest historical enplanement, operation, and based aircraft statistics using information derived from several sources. FAA's National Flight Data Center provides general airport information such as the airport name, location, and location identifier. Airport operations and Terminal Radar Approach Control (TRACON) radar-assisted operations data for airports with FAA and Federal contract air traffic control services are reported by FAA air traffic and Federal contract tower staff.

Table 5.1 presents the TAF operations for 2028 used in this NEM Update.

**TABLE 5.1
FAA'S TERMINAL AREA FORECAST FOR EYW FOR 2028**

	ITINERANT				LOCAL		TOTAL
	AIR CARRIER	COMMUTER/ AIR TAXI	GENERAL AVIATION	MILITARY	CIVIL	MILITARY	
2028 TAF	26,553	8,635	31,131	350	2,435	92	69,196

Source: FAA TAF, May 2021
Prepared by: Deborah Murphy Lagos & Associates

5.2.1.2 EYW Landing Reports

Key West International Airport tracks aircraft landings for passenger and cargo airlines for the purpose of collecting landing fees and statistical data. The airlines submit monthly reports to the airport that detail the number of each aircraft type that landed at EYW during the month. Landing fees are collected from: Delta Airlines, American Airlines (including Envoy Air Inc.), Allegiant Air, United Airlines, JetBlue Airways, Silver Airways, Skyway (formerly known as Ameriflight), and Mountain Air Cargo.

Table 5.2 summarizes the EYW Landing Reports for the period October 1, 2020, through September 30, 2021.

**TABLE 5.2
SUMMARY OF EYW LANDING REPORTS**

AIRCRAFT TYPE	AIRLINE	NUMBER OF OPS BY AIRLINE BY AC TYPE	PERCENT OF OPS BY AIRLINE BY AC TYPE
EMB175	Envoy Air (aka AAL)	3470	73%
	Delta Airlines	830	17%
	United Airlines	459	10%
A319	Envoy Air (aka AAL)	1637	51%
	Delta Airlines	1492	46%
	Allegiant Air	112	3%
ATR42 (DHC8)	Silver Airways	1480	100%
EMB170	United Airlines	1267	100%
CNA208	Mountain Air Cargo	453	100%
SW3/SW4 (DHC6)	Ameriflight / Skyway	439	100%
EMB190	JetBlue Airways	415	100%
SF340	Silver Airways	69	100%
EMB145	Envoy Air (aka AAL)	46	100%
ATR76 (DHC830)	Silver Airways	22	100%

Source: EYW Landing Reports, October 2020 – September 2021.
Prepared by: Deborah Murphy Lagos & Associates

5.2.2 Future Condition Fleet Mix

The fleet mix for the Future Condition was developed from the Existing Condition fleet mix shown in **Table 4.2**, EYW Landing Reports for the period October 1, 2020, through September 30, 2021, shown in **Table 5.2**, and information provided by airport staff regarding anticipated changes to aircraft types used by Delta Airlines and JetBlue Airways.

5.2.2.1 Air Carrier / Air Taxi Jet

Current air carrier / air taxi jet (AC/AT JET) operators include Delta Airlines, American Airlines, American Eagle, Allegiant Air, United Express, and JetBlue Airways. It is not anticipated that any new air carrier / air taxi passenger or cargo airlines will initiate service to EYW using jet aircraft by 2028. However, prior to 2028, Delta Airlines plans to replace their A-319 aircraft with A220-100 aircraft at EYW, and JetBlue Airways

plans to replace their EMB190 aircraft with A220-300 aircraft at EYW. (R. Strickland, personal communication, April 7, 2021. E. D'Leon, personal communication, September 24, 2021, March 1, 2022) In AEDT, the 737700 is the official substitution for the A220.

5.2.2.2 Air Carrier / Air Taxi Prop

Current air carrier / air taxi prop (AC/AT PROP) operators include, but are not limited to, Silver Airways, Ameriflight/Skyway, and Mountain Air Cargo. It is not anticipated that any new air carrier / air taxi passenger or cargo airlines will initiate service to EYW using prop aircraft by 2028. Additionally, it is anticipated that the current operators will continue to use the same aircraft through 2028.

5.2.2.3 General Aviation Jet

General aviation jet (GA JET) aircraft operations consist of private- and corporate-owned based and itinerant turbojet aircraft. Common GA jet aircraft operations at EYW include Bombardier Challenger, Cessna Citation, Dassault Falcon, Gulfstreams, and Learjets. No changes are anticipated.

5.2.2.4 General Aviation Prop

General aviation prop (GA PROP) aircraft operations consist of private- and corporate-owned based and itinerant aircraft, including lightweight single- and multi-engine (piston), and turboprop aircraft. Common GA prop aircraft operations at EYW include Beech, Cessna, Cirrus, Mooney, Partenavia, and Piper. No changes are anticipated.

5.2.2.5 Military

Military (MIL) aircraft operations consist of fixed-wing aircraft and helicopters that are operated by any armed service or the federal government. Military aircraft can be either combat or non-combat. Common fixed-wing military aircraft operations at EYW include Beechcraft C-12 Huron, Boeing 737, Boeing P8 Poseidon, EADS CASA HC-144 Ocean Sentry, Cessna Citation UH35A, Lockheed-Martin C130 Hercules, and Northrop T-38 Falcon. Common military helicopter operations at EYW include Bell TH-57 Sea Ranger, Eurocopter UH-72A Lakota, Hughes MH-6 Little Bird, Sikorsky UH-60 Blackhawk, Sikorsky SH-60 Seahawk, and Sikorsky CH-53 Sea Stallion. No changes are anticipated.

5.2.2.6 Helicopters

Helicopter (HELO) aircraft operations consist of local government-, private- and corporate-owned based and itinerant rotorcraft. Helicopters at EYW do not takeoff or land on the airport's runways, but rather from the nonmovement area of the Fixed Base Operator. Common helicopter aircraft operations at EYW include Aérospatiale, Eurocopter, Bell, Hughes, Robinson, and Sikorsky. No changes are anticipated.

5.2.3 Future Condition Number of Operations

Forecast aircraft operations data were obtained from the FAA's APO Terminal Area Forecast (TAF) Summary Report issued in May 2021. [Table 5.1](#) presents the TAF operations for 2028 used in this NEM Update.

5.2.4 Future Condition Fleet Mix and Number of Operations

Using the number of operations shown for AC/AT Jets in **Table 4.2**, the percentage of operations by aircraft type was calculated. These percentages were then applied to the total number of air carrier operations shown in **Table 5.1**. The results are shown in **Table 5.3**.

The EYW Landing Reports air carrier / air taxi operations were broken down by airline and type of aircraft as shown in **Table 5.2**. Envoy Air (aka American Airlines), Delta Airlines, and Allegiant Air operated A319 aircraft between October 1, 2020, and September 30, 2021. Delta Airlines conducted 46 percent of all A319 operations during that period. Since Delta plans to replace their A319 aircraft with A220 aircraft, 46 percent of the A319 operations in **Table 5.3** were converted to A220 operations. JetBlue Airways conducted 100 percent of all EMB190 operations during that period. Since JetBlue plans to replace their EMB190 aircraft with A220 aircraft, all EMB190 operations were converted to A220 operations. The results are shown in **Table 5.4**.

**TABLE 5.3
INTERIM AC/AT JET FLEET MIX AND NUMBER OF OPERATIONS**

AIRCRAFT TYPE	EMB175	A319	A220	EMB170	EMB190	737700	EMB145	CRJ9-ER	TOTAL
% OF OPS	44.78%	33.58%	0%	15.77%	4.25%	1.10%	0.48%	0.03%	100%
# OF OPS	11,891	8,917	0	4,188	1,129	293	126	8	26,553

Sources: OPSNET, 2021, FlightRadar24, 2022, FAA TAF, May 2021
 Prepared by: Deborah Murphy Lagos & Associates

**TABLE 5.4
FINAL AC/AT JET FLEET MIX AND NUMBER OF OPERATIONS**

EMB175	A319	A220	EMB170	EMB190	737700	EMB145	CRJ9-ER	TOTAL
11,891	4,812	5,234	4,188	0	293	126	8	26,553

Sources: OPSNET, 2021, FlightRadar24, 2022, FAA TAF, May 2021
 Prepared by: Deborah Murphy Lagos & Associates

Table 5.5 is the resulting fleet mix and number of flight operations by AEDT aircraft type for the Future Condition.

**TABLE 5.5
FLEET MIX AND NUMBER OF ANNUAL FLIGHT OPERATIONS**

AEDT AIRCRAFT TYPE	AC/AT JET	AC/AT PROP	GENERAL AVIATION			MILITARY		GRAND TOTAL
			GA JET	GA PROP	GA HELO	MIL	MIL HELO	
EMB175	11,891							11,891
A319-131	4,812							4,812
73700 (A220)	5,234							5,234
EMB170	4,188							4,188
EMB190	0							0
737700	293							293
EMB145	126							126
CRJ9-ER	8							8
DHC8		4,056		1		2		4,059
DHC6		2,380		879		40		3,300
CNA208		1,701		1,178				2,879
SD330		264						264
SF340		186				35		220
DHC830		49		10				59
LEAR35			1,346			1		1,347
CNA510			1,241					1,241
CNA500			896					896
CNA560XL			865					865
CNA680			829					829
CL600			696					696
CNA560U			551					551
CNA55B			475					475
FAL900EX			475					475
CNA750			409					409
CNA560E			393					393
GV			267			2		269
GIV			241					241
IA1125			187					187
MU3001			173					173
ECLIPSE500			156					156
C525C			122					122
CIT3			97					97
CNA525C			96					96
BD-700-1A10			73					73
GIIB			10					10
LEAR25			2					2

TABLE 5.5 (CONTINUED)
FLEET MIX AND NUMBER OF ANNUAL FLIGHT OPERATIONS

AEDT AIRCRAFT TYPE	AC/AT JET	AC/AT PROP	GENERAL AVIATION			MILITARY		GRAND TOTAL
			GA JET	GA PROP	GA HELO	MIL	MIL HELO	
GASEPV				7,544		4		7,549
CNA182				6,329				6,329
BEC58P				2,444				2,444
PA30				1,178				1,178
CNA441				295				295
DHC-2FLT				225				225
CNA206				125				125
PA42				106				106
GASEPF				103				103
DO328				25				25
NONE				24				24
DC3				4		1		5
S76					1,667			1,667
R44					1,387			1,387
SA355F					176			176
B206					134			134
EC130					108			108
MD600N					13			13
B212					3		1	4
A109					3			3
B429					2			2
C130E						116		116
T-38A						70		70
F5E						27		27
C17						19		19
C560						13		13
B350						11		11
F15E20						7		7
F18AF						2		2
KC135R						2		2
S70							56	56
S65							31	31
Grand Total	26,553	8,636	9,600	20,473	3,494	354	88	69,197

Sources: FAA TAF, 2021, EYW Landing Reports FFY'21.
Prepared by: Deborah Murphy Lagos & Associates

5.2.5 Time of Day

The time of day that aircraft operations occur is a very important factor in the calculation of cumulative noise exposure. The DNL treats nighttime (10:00 p.m. to 6:59 a.m.) noise differently from daytime (7:00 a.m. to 9:59 p.m.) noise. In the calculation of DNL, each operation at night is multiplied by 10, which effectively adds 10 dB to the A-weighted levels of each nighttime operation. This weighting factor is applied to account

for people's greater sensitivity to nighttime noise. In addition, events during the night are often more intrusive because the ambient sound levels during this time are usually lower than daytime ambient sound levels. It has been assumed that the daytime vs. nighttime distribution for the Future Condition will be the same as it was for the Existing Condition and is shown in [Table 5.6](#).

**TABLE 5.6
DAYTIME VS. NIGHTTIME DISTRIBUTION**

AIRCRAFT CATEGORY	DEPARTURES		ARRIVALS	
	DAYTIME	NIGHTTIME	DAYTIME	NIGHTTIME
AC/AT JET	96%	4%	89%	11%
AC/AT PROP	97%	3%	98%	2%
GA JET	96%	4%	97%	3%
GA PROP	95%	5%	97%	3%
GA HELO	68%	32%	81%	19%
MIL	98%	2%	93%	7%
MIL HELO	88%	12%	57%	43%
OVERALL	95%	5%	93%	7%

Source: FlightRadar24, 2022.
Prepared by: Deborah Murphy Lagos & Associates

5.2.6 Departure Profiles and Stage Lengths

It has been determined that standard profiles will be used to model all aircraft operations for the Future Condition, as was done for the Existing Condition.

It has been assumed that the stage length distribution for the Future Condition will be the same as it was for the Existing Condition and is shown in [Table 5.7](#).

**TABLE 5.7
STAGE LENGTH DISTRIBUTION**

AIRCRAFT CATEGORY	STAGE LENGTH 1	STAGE LENGTH 2	STAGE LENGTH 3	STAGE LENGTH 4	STAGE LENGTH 5
AC/AT JET	15.6%	59.2%	25.1%	0%	0%
AC/AT PROP	89.9%	9.2%	0.8%	0%	0%
GA	95.5%	4.4%	0.1%	0%	0%
GA JET	51.7%	33.2%	13.6%	1.5%	0.1%
MIL	66.7%	16.7%	16.7%	0%	0%

Source: FlightRadar24, 2021.
Prepared by: Deborah Murphy Lagos & Associates

5.2.7 Runway Utilization

It has been assumed that the runway utilization for the Future Condition will be the same as it was for the Existing Condition. The runway utilization for departures is shown in [Table 5.8](#) and for arrivals in [Table 5.9](#).

**TABLE 5.8
RUNWAY UTILIZATION - DEPARTURES**

AIRCRAFT CATEGORY	RUNWAY 09		RUNWAY 27	
	DAYTIME	NIGHTTIME	DAYTIME	NIGHTTIME
AC/AT JET	88.7%	81.8%	11.3%	18.2%
AC/AT PROP	87.2%	81.8%	12.8%	18.2%
GA PROP	88.1%	87.2%	11.9%	12.8%
GA JET	88.9%	94.1%	11.1%	5.9%
MIL	100%	0%	0%	100%
OVERALL	88.4%	84.8%	11.6%	15.2%

Source: FlightRadar24, 2021.
Prepared by: Deborah Murphy Lagos & Associates

**TABLE 5.9
RUNWAY UTILIZATION - ARRIVALS**

AIRCRAFT CATEGORY	RUNWAY 09		RUNWAY 27	
	DAYTIME	NIGHTTIME	DAYTIME	NIGHTTIME
AC/AT JET	85.2%	84.9%	14.8%	15.1%
AC/AT PROP	87.1%	93.3%	12.9%	6.7%
GA PROP	87.0%	82.4%	13.0%	17.6%
GA JET	85.1%	82.4%	14.9%	17.6%
MIL	100%	100%	0%	0%
OVERALL	85.9%	84.8%	14.1%	15.2%

Source: FlightRadar24, 2021.
Prepared by: Deborah Murphy Lagos & Associates

5.2.8 Back Taxi Operations

By 2028, Taxiway B will be extended to the end of the available pavement on Runway 09. Therefore, back taxi operations will not occur on Runway 09 as they did in the Existing Condition. All aircraft will depart from the end of the available pavement on Runway 09.

5.2.9 Standing Takeoff Operations

It has been assumed that standing takeoff operations for the Future Condition will be the same percentage by aircraft type as for the Existing Condition and are shown in [Table 5.10](#).

**TABLE 5.10
STANDING TAKEOFF OPERATIONS**

AEDT AIRCRAFT	% OF TOTAL OPS	RUNWAY USE 09 / 27	HEADING	ENGINE POWER SETTING	DURATION (SECONDS)	ANNUAL OPS	AVERAGE DAILY OPS
737700	68%	88% / 12%	90°/270°	20,400 lbs.	15.0	1,879	5.1
A319-131	80%	88% / 12%	90°/270°	18,700 lbs.	15.0	1,925	5.27
CNA208	68%	88% / 12%	90°/270°	1,955 lbs.	15.0	979	2.68
CRJ	100%	88% / 12%	90°/270°	11,496 lbs.	15.0	4	0.01
DHC6	68%	88% / 12%	90°/270°	1,700 lbs.	15.0	660	1.81
DHC8	40%	88% / 12%	90°/270°	4,038 lbs.	15.0	812	2.22
EMB145	68%	88% / 12%	90°/270°	6,375 lbs.	15.0	43	0.12
EMB170	45%	88% / 12%	90°/270°	11,730 lbs.	15.0	943	2.58
EMB175	80%	88% / 12%	90°/270°	11,730 lbs.	15.0	4,757	13.06
TOTAL						12,002	32.85

Sources: Field Observation, 2021, FlightRadar24, 2022; AEDT, 2022.
Prepared by: Deborah Murphy Lagos & Associates

5.2.10 Low Approach, Touch-and-Go, and Go-Around Operations

Some general aviation and military aircraft perform a maneuver known as a touch-and-go (T&G) at EYW, primarily for pilot training. During a touch-and-go, the pilot makes an approach to landing, configures the plane to land, and briefly touches down on the runway. Rather than coming to a stop and taxiing off the runway as a pilot would with a normal landing, once the wheels touch down, the pilot continues down the runway, reconfigures the plane for takeoff and executes an immediate takeoff without ever coming to a stop. **Table 5.11** shows the details of the T&G operations at the airport modeled for the Future Condition NEM. Approximately 6 average daily T&G operations were modeled

**TABLE 5.11
TOUCH-AND-GO OPERATIONS**

AEDT AIRCRAFT	ANNUAL OPS	AVERAGE DAILY OPS
BEC58P	761	2.08
CNA182	739	2.02
GASPEV	739	2.02
C130E	83	0.23
TOTAL	2,452	6.35

Source: FlightRadar24, 2021.
Prepared by: Deborah Murphy Lagos & Associates

Military aircraft occasionally conduct low approaches to the runway at EYW, without touching down at the airport. These are often training flights to practice landing approach to just above the runway. The military made the decision decades ago that it is safer to not perform touch and go landings in high performance jet aircraft, because every landing decreases the useful life of the tires, wheels and brakes, and actual touch and go landings introduce risks to the flight operation, including running off the end of the runway before getting airborne again. For this analysis, low approaches are being counted as a departure and an arrival (i.e., two operations).

Aircraft occasionally must perform a go-around or missed approach at EYW. Generally, if a pilot determines by the time the aircraft is at the decision height (for a precision approach) or missed approach point (for a non-precision approach), that the runway or its environment is not in sight, or that a safe landing cannot be accomplished for any reason, the landing approach must be discontinued (a "go-around") and the missed approach procedure must be immediately initiated. It is also common for pilots to practice a missed approach as part of initial or recurrent instrument flight training. For this analysis, go-arounds and missed approaches are being counted as a departure and an arrival (i.e., two operations).

5.2.11 Flight Tracks and Flight Track Utilization

It has been assumed that flight tracks and flight track utilization for the Future Condition will be the same as they were for the Existing Condition.

Figures 4.1 through **4.10** illustrate the FR24 flight trajectories and AEDT modeled flight tracks when the airport is operating in east flow and west flow, respectively. Flight track utilization is depicted on each graphic.

Title 14 CFR part 150, Airport Noise Compatibility Planning, Amendment No. 150-4, Section A150.103(b)(1), requires “A map of the airport and its environs at an adequately detailed scale (not less than 1 inch to 2,000 feet) indicating runway length, alignments, landing thresholds, takeoff start-of-roll points, airport boundary, and flight tracks out to at least 30,000 feet from the end of each runway.” Therefore, flight track maps at a scale of 1 inch to 2,000 feet are provided in **Appendix G**.

5.2.12 Summary of 2028 NEM Modeled Operations

A total of 69,196 annual aircraft flight operations were modeled to develop the 2028 Future Condition NEM. This equates to 189.6 average daily operations. **Table 5.12** provides a breakdown of these operations by aircraft category.

In addition to the 69,196 annual flight operations, 12,002 annual aircraft run-up operations (i.e., standing takeoff operations) were modeled to develop the 2028 Future Condition NEM. This equates to 56 average daily run-up operations.

**TABLE 5.12
SUMMARY OF 2028 FLIGHT OPERATIONS**

CATEGORY	ANNUAL OPERATIONS	AVERAGE DAILY OPERATIONS
AC/AT JET	26,553	72.75
AC/AT PROP	8,636	23.66
GA PROP ITINERANT	18,038	49.42
GA PROP LOCAL	2,435	6.67
GA JET	9,599	26.30
GA HELO	3,493	9.57
MIL ITINERANT	262	0.72
MIL LOCAL	92	0.25
MIL HELO	88	0.24
TOTAL	69,196	189.58

Note: Numbers may not add due to rounding.
Sources: FAA TAF 2021
Prepared by: Deborah Murphy Lagos & Associates

5.3 NOISE CONTOURS AND NONCOMPATIBLE LAND USES

The information presented thus far represents the key data necessary to develop the input for the AEDT. From these data, the AEDT generates lines of equal sound levels centered upon the runway. These lines of equal noise exposure are referred to as noise contours and are based on the DNL sound metric. The contours calculated for this study include the DNL 65-, 70-, and 75-dB contours.

Figure 5.1 presents the 2028 Future Condition noise contours superimposed over the existing land use base map and is referred to as the Future Condition NEM for Part 150 purposes. A large-scale version of the NEM is included in **Appendix G**. The base map provides community and airport geographic reference data such as runway configuration, roads, streets, and bodies of water. The surrounding land uses, and the location of noise-sensitive facilities were identified from aerial photography, online database research, and cross-referenced against the current City of Key West land use and zoning maps. This figure assists in understanding the geographic relationship of the airport to the community and to the noise contours generated by the airport's forecast aircraft activity.

Figure 5.1 illustrates current compatible and noncompatible land uses surrounding EYW that are found within the DNL 65-, 70-, and 75-dB noise contours. Noncompatible land uses include single-family, multi-family, and transient lodging residential uses, as well as places of worship and community facilities (institutional land uses) and are indicated by a crosshatch pattern. Portions of Key West by the Sea Condominiums, Ocean Walk Apartments, and Las Salinas Condominiums are within the DNL 65 dB and greater contour. Places of worship and community facilities (institutional land uses) within the DNL 65 dB contour include Grace Lutheran Church and School, Catholic Charities St. Bede's Village, Peace Covenant Presbyterian Church, and Key West High School. Transient lodging facilities within the DNL 65 dB contour include the Hyatt Residence Club Key West, Windward Pointe, and Hampton Inn Key West. Single- and multi-family land uses within the DNL 65 dB contour that are shown as compatible, which would normally be considered noncompatible, have been rendered compatible through participation in the Noise Insulation Program (NIP) (see **Appendix A, Section A.6**).

In addition to residential and institutional uses, **Figure 5.1** also indicates parks and recreational properties surrounding EYW that are found within the various noise contours within the Future Condition NEM. These include Riggs Wildlife Refuge/Bridle Path, Little Hamaca City Park, 11th Street Public Boat Ramp, portions of Fran Ford White-crowned Pigeon Preserve, Smathers Beach, and Florida Keys Overseas Heritage Trail. There are no National Register properties located within the noise contours.

Table 5.13 summarizes the acreage, by land use category, located within the DNL 65-, 70-, and 75-dB contours. **Table 5.14** provides the number of housing units and population within the DNL 65-, 70-, and 75-dB contours. Single-family housing units that were split by a contour were counted in the higher-level contour. For multi-family residential and transient lodging facilities, the number of housing units was distributed amongst the various contours based on the proportion of the parcel's acreage that fell within each contour. The number of housing units was rounded to the nearest whole number.

To quantify the single-family and multi-family population within the 2028 DNL 65-, 70-, and 75-dB noise contours, U.S. Census Bureau, American Community Survey (ACS), 5-Year Estimates population data were utilized. Condominiums and apartments were considered fully occupied as these are usually owner-

occupied or long-term leases. The data for the City of Key West indicated an average household size of 2.25, which was multiplied by the number of housing units to calculate estimated population. Estimated population was rounded to the nearest whole number.

To calculate transient lodging population, Key West Hotel Occupancy Tourism Statistics were obtained from the Key West Travel Guide. The number of available transient lodging units was determined for the Hyatt Residence Club Key West, Windward Pointe, and Hampton Inn Key West. (A. Henriquez, personal communication, April 14, 2022) The average occupancy rate of 84.175% (for 2019) was then multiplied by the number of units to calculate estimated population. Estimated population was rounded to the nearest whole number.

Table 5.14 identifies the number of housing units that have participated in the NIP. These residences are now considered compatible land uses. The distribution of population between mitigated and unmitigated is based upon the number of mitigated and unmitigated housing units. Additional details regarding homes that have participated in the NIP are included in **Appendix A, Section A.6**.

**TABLE 5.13
FUTURE CONDITION NOISE EXPOSURE ESTIMATES - ACREAGE**

LAND USE TYPE (ACRES)	DNL 65 TO 70 dBA	DNL 70 TO 75 dBA	DNL 75+ dBA	TOTAL OVER DNL 65 dBA
Airport	66.4	74.9	88.3	229.6
Commercial/Office	0.7	0.0	0.0	0.7
Institutional	8.5	0.0	0.0	8.5
Open Space	2.1	1.5	0.0	3.6
Public/Semi-Public	78.5	18.6	6.5	103.6
Residential – Multi-Family	0.5	0.1	0.0	0.6
Key West by the Sea Condominiums	7.5	0.0	0.0	7.5
Ocean Walk Apartments	9.5	4.6	0.4	14.5
Las Salinas Condominiums	0.9	0.0	0.0	0.9
Residential – Single Family	19.7	7.7	0.3	27.7
Transient Lodging	11.8	1.0	0.0	12.8
Transportation/Utility/Right of Way	11.4	2.9	0.1	14.4
Vacant	0.6	0.0	0.0	0.6
Water	75.4	3.3	0.5	79.2
Total Acreage	293.5	114.6	96.1	504.2

Prepared by: Deborah Murphy Lagos & Associates and HD Mapping, 2022

TABLE 5.14

FUTURE CONDITION NOISE EXPOSURE ESTIMATES – HOUSING UNITS AND POPULATION

NUMBER OF HOUSING UNITS	DNL 65 TO 70 dBA	DNL 70 TO 75 dBA	DNL 75+ dBA	TOTAL OVER DNL 65 dBA
Unmitigated (i.e., Noncompatible)				
Residential – Single Family	45	5	0	50
Residential – Multi-Family	5	0	0	5
Key West by the Sea Condominiums	21	0	0	21
Ocean Walk Apartments	159	77	6	242
Las Salinas Condominiums	39	0	0	39
Transient Lodging (Occupancy Rate 84.175%)	145	14	0	159
Total Unmitigated Housing Units	414	96	6	516
Mitigated¹ (i.e., Compatible)				
Residential – Single Family	96	63	8	167
Residential – Multi-Family	3	1	0	4
Key West by the Sea	183	0	0	183
Total Mitigated Housing Units	282	64	8	354
Total Housing Units	696	160	14	870
POPULATION	DNL 65 TO 70 dBA	DNL 70 TO 75 dBA	DNL 75+ dBA	TOTAL OVER DNL 65 dBA
Unmitigated (i.e., Noncompatible)				
Residential – Single Family	101	11	0	113
Residential – Multi-Family	11	0	0	11
Key West by the Sea Condominiums	47	0	0	47
Ocean Walk Apartments	357	173	14	544
Las Salinas Condominiums	89	0	0	89
Transient Lodging (Occupancy Rate 84.175%)	326	30	0	356
Total Unmitigated Population	931	214	14	1,159
Mitigated¹ (i.e., Compatible)				
Residential – Single Family	216	142	18	376
Residential – Multi-Family	8	2	0	10
Key West by the Sea	412	0	0	412
Total Mitigated Population	636	144	18	798
Total Population	1,567	358	32	1,957

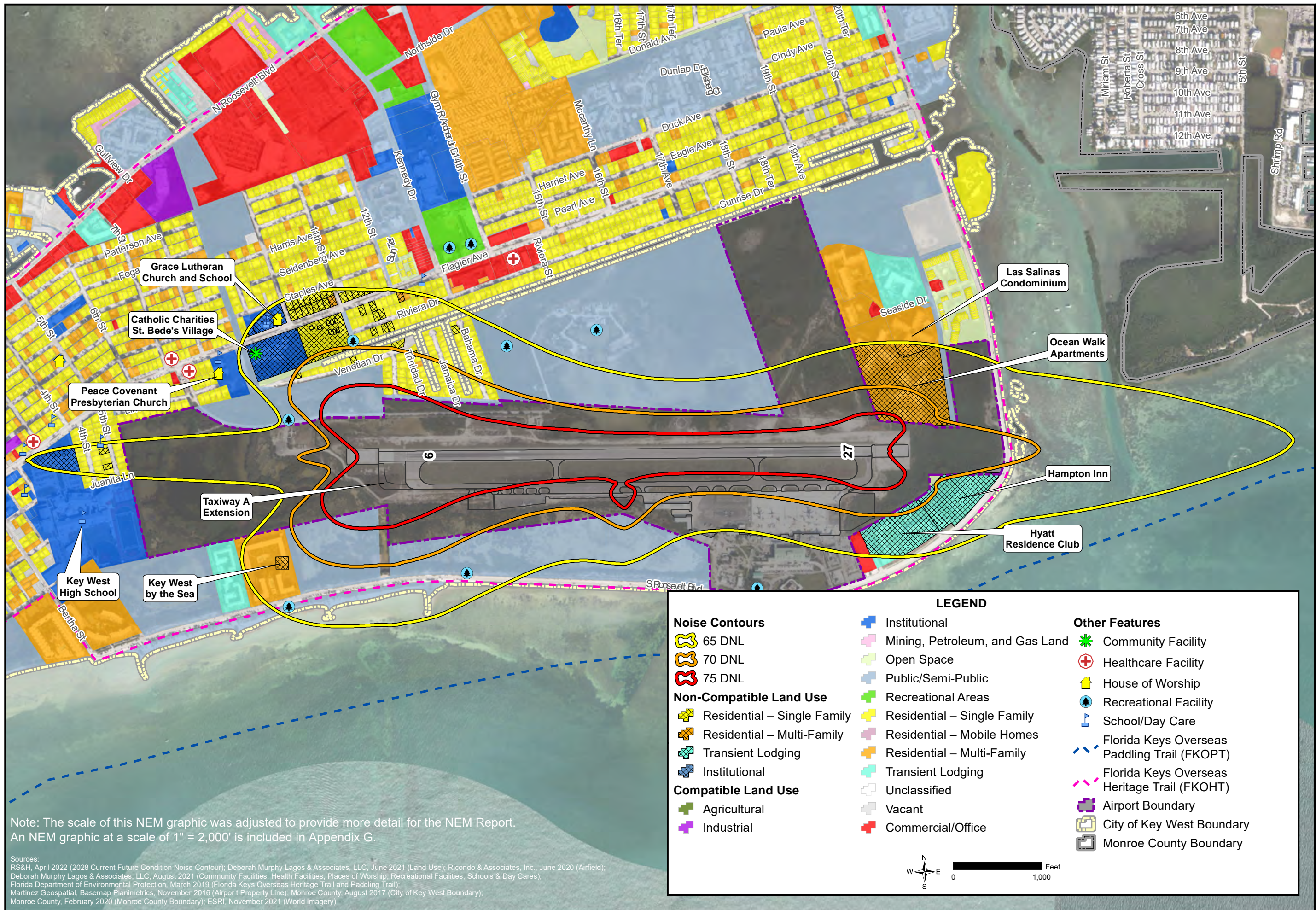
Notes: ¹ Population and housing units are mitigated through participation in the NIP.
Sources: U.S. Department of Commerce. Census Bureau, QuickFacts, 2021.
<https://www.hyattresidenceclub.com/resorts/hyatt-windward-pointe>, 2022.
Alexis Averette Henriquez, Director of Sales, Hampton Inn Key West, 2022.
Key West Hotel Occupancy Tourism Statistics, Key West Travel Guide, 2022.
Prepared by: Deborah Murphy Lagos & Associates and HD Mapping, 2022

The total number of flight operations for the 2022 Existing Condition NEM was 64,128, for an average daily number of 175.69 operations. The forecast number of annual aircraft flight operations for the 2028 Future Condition NEM is 69,196, or 189.58 average daily operations.

Figure 5.2 presents the 2028 Future Condition noise contours with the 2022 Existing Condition noise contours superimposed; this figure is provided for comparison purposes. The area within the 2028 Future Condition NEM noise contours increased in size by 29.9 acres, or approximately 6.0 percent when compared to the 2022 Existing Condition NEM noise contours. This increase in size can be attributed to the increase in aircraft operations from 2021 to 2028. The contours also shifted to the west, which can be attributed to the relocation of Taxiway B to the end of the pavement. As a result, all aircraft departing on Runway 09 begin their takeoff roll at the end of the pavement. The 2028 Future Condition NEM encompasses 30 more acres of noncompatible land when compared to the 2022 Existing Condition NEM. The total housing units and population within the DNL 65 dB noise contour increases by approximately 23 percent.

Figure 5.3 presents the 2028 Future Condition noise contours with the 2018 Future Condition noise contours (from the previous NEM Update) superimposed. This figure is provided for comparison purposes.

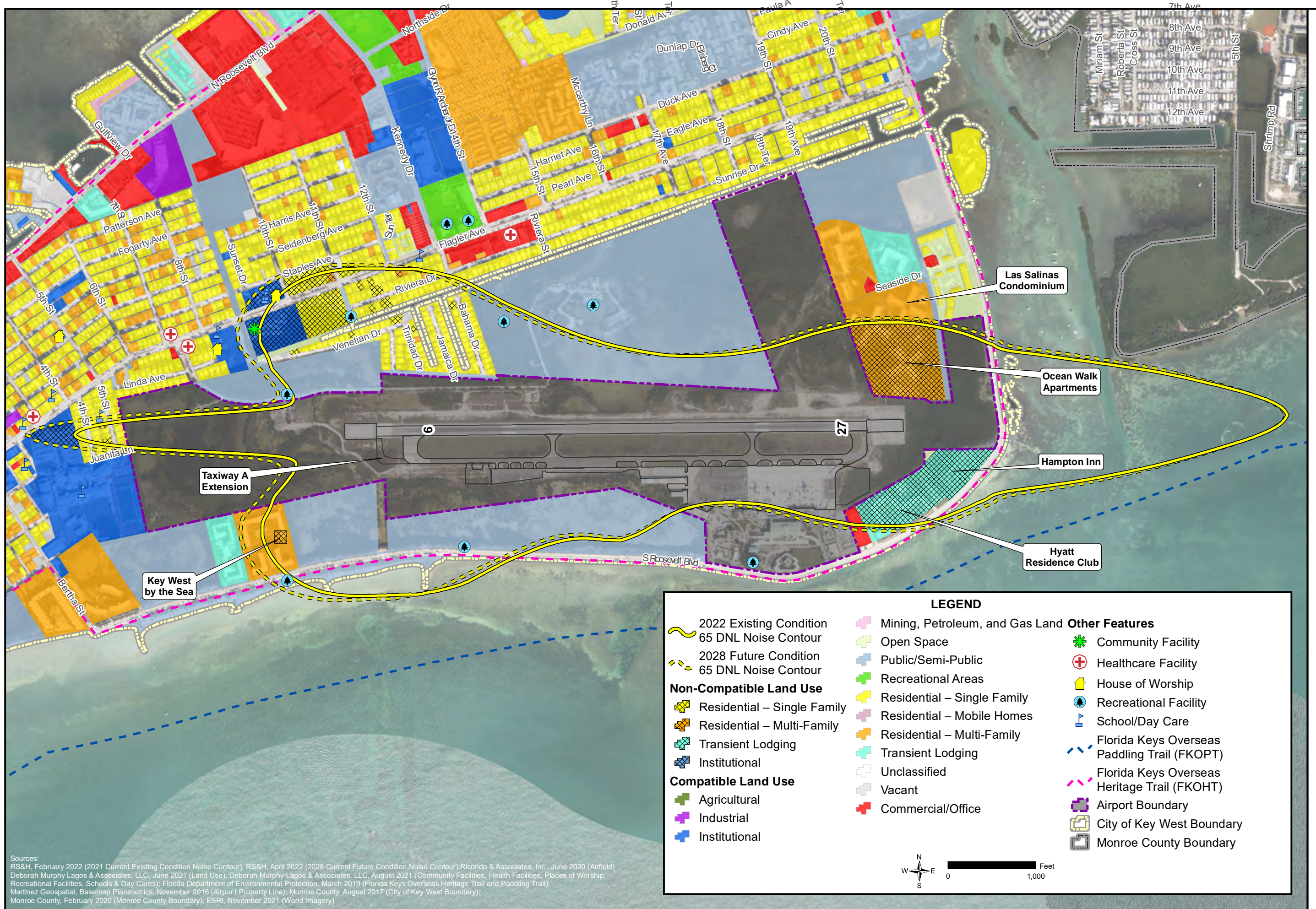
Path: C:\Users\dale_e\dropbox\Deborah Murphy Lagos & Associates, LLC\Projects\Key West - NEM Update\maps\Figures\Figure 5-1 2028 Future Condition NEM.mxd, Date Saved: 8/20/2022 11:43:41 PM



Note: The scale of this NEM graphic was adjusted to provide more detail for the NEM Report. An NEM graphic at a scale of 1" = 2,000' is included in Appendix G.

Sources:
 RS&H, April 2022 (2028 Current Future Condition Noise Contour); Deborah Murphy Lagos & Associates, LLC, June 2021 (Land Use); Ricondo & Associates, Inc., June 2020 (Airfield);
 Deborah Murphy Lagos & Associates, LLC, August 2021 (Community Facilities, Health Facilities, Places of Worship, Recreational Facilities, Schools & Day Cares);
 Florida Department of Environmental Protection, March 2019 (Florida Keys Overseas Heritage Trail and Paddling Trail);
 Martinez Geospatial, Basemap Planimetrics, November 2016 (Airport Property Line); Monroe County, August 2017 (City of Key West Boundary);
 Monroe County, February 2020 (Monroe County Boundary); ESRI, November 2021 (World Imagery)

Path: C:\Users\stake_edgar\000\Dropbox\Deborah Murphy Lagos & Associates, LLC\Projects\Key West - NEM Update\maps\Figures\Figure 5.2 Comparison of Existing and Future Condition Noise Contours.mxd, Date Saved: 9/5/2022 7:32:00 PM



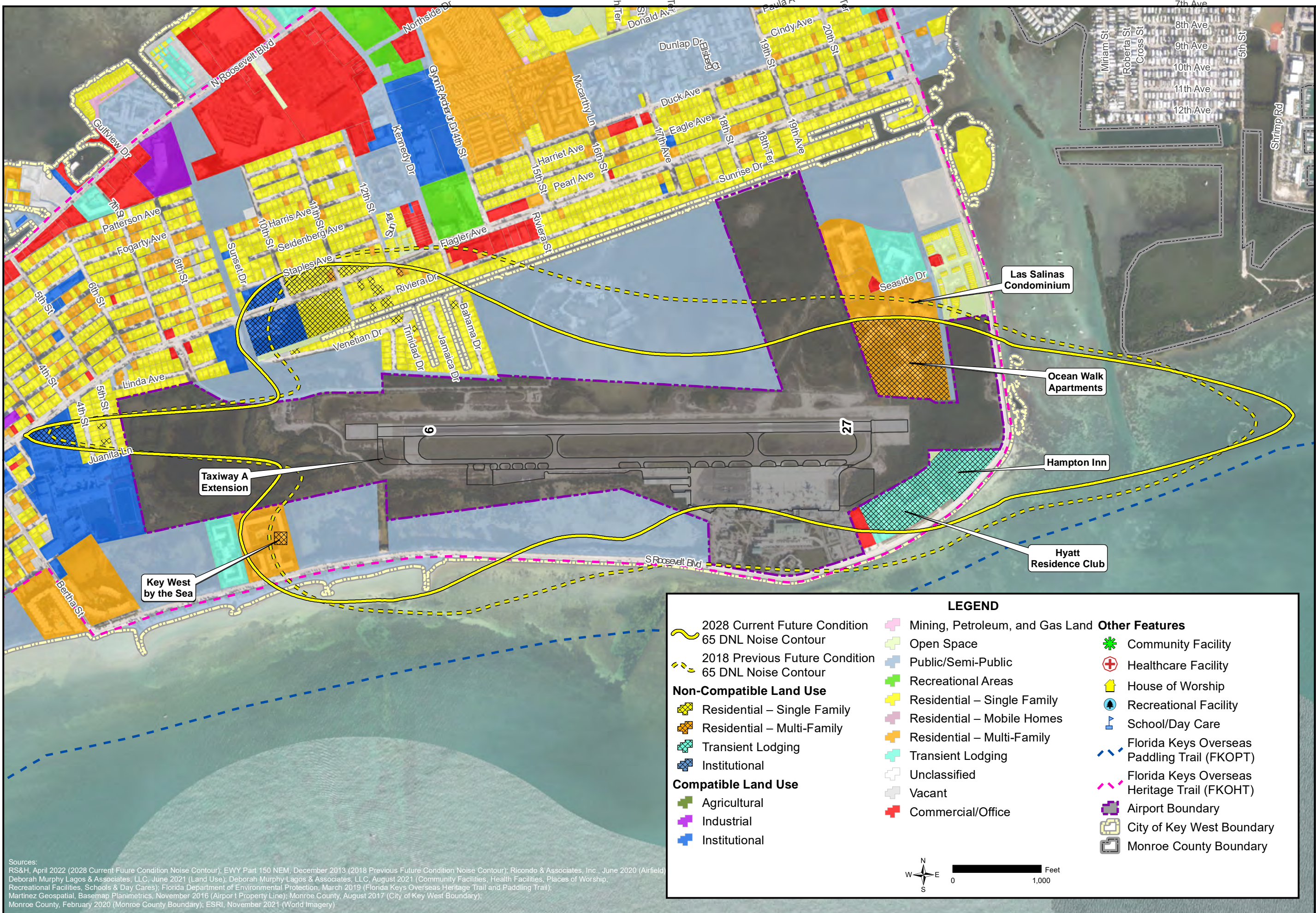
LEGEND

2022 Existing Condition 65 DNL Noise Contour	2028 Future Condition 65 DNL Noise Contour	Mining, Petroleum, and Gas Land	Other Features Community Facility
Non-Compatible Land Use Residential – Single Family	Open Space	Public/Semi-Public	Healthcare Facility
Residential – Multi-Family	Recreational Areas	House of Worship	Recreational Facility
Transient Lodging	Residential – Single Family	School/Day Care	Florida Keys Overseas Paddling Trail (FKOPT)
Institutional	Residential – Mobile Homes	Florida Keys Overseas Heritage Trail (FKOHT)	Airport Boundary
Compatible Land Use Agricultural	Residential – Multi-Family	City of Key West Boundary	Monroe County Boundary
Industrial	Transient Lodging	City of Key West Boundary	
Institutional	Unclassified	Monroe County Boundary	
	Vacant		
	Commercial/Office		

Sources: RS&H, February 2022 (2021 Current Existing Condition Noise Contour); RS&H, April 2022 (2028 Current Future Condition Noise Contour); Ricondo & Associates, Inc., June 2020 (Airfield); Deborah Murphy Lagos & Associates, LLC, June 2021 (Land Use); Deborah Murphy Lagos & Associates, LLC, August 2021 (Community Facilities, Health Facilities, Places of Worship, Recreational Facilities, Schools & Day Cares); Florida Department of Environmental Protection, March 2019 (Florida Keys Overseas Heritage Trail and Paddling Trail); Martinez Geospatial, Basemap Planimetrics, November 2016 (Airport Property Line); Monroe County, August 2017 (City of Key West Boundary); Monroe County, February 2020 (Monroe County Boundary); ESRI, November 2021 (World Imagery)



Path: C:\Users\edgar_0001\Dropbox\Deborah Murphy Lagos & Associates, LLC\Projects\Key West - NEM Update\maps\Figures\Figure 5.3 Comparison of Current, Future and Previous Future Condition Noise Contours.mxd, Date Saved: 8/20/2022 11:40:14 PM



Sources:
 RS&H, April 2022 (2028 Current Future Condition Noise Contour); EWY Part 150 NEM, December 2013 (2018 Previous Future Condition Noise Contour); Ricordo & Associates, Inc., June 2020 (Airfield);
 Deborah Murphy Lagos & Associates, LLC, June 2021 (Land Use); Deborah Murphy Lagos & Associates, LLC, August 2021 (Community Facilities, Health Facilities, Places of Worship, Recreational Facilities, Schools & Day Cares); Florida Department of Environmental Protection, March 2019 (Florida Keys Overseas Heritage Trail and Paddling Trail);
 Martinez Geospatial, Basemap Planimetrics, November 2016 (Airport Property Line); Monroe County, August 2017 (City of Key West Boundary);
 Monroe County, February 2020 (Monroe County Boundary); ESRI, November 2021 (World Imagery)

LEGEND

2028 Current Future Condition 65 DNL Noise Contour	Mining, Petroleum, and Gas Land	Other Features
2018 Previous Future Condition 65 DNL Noise Contour	Open Space	Community Facility
Non-Compatible Land Use	Public/Semi-Public	Healthcare Facility
Residential – Single Family	Recreational Areas	House of Worship
Residential – Multi-Family	Residential – Single Family	Recreational Facility
Transient Lodging	Residential – Mobile Homes	School/Day Care
Institutional	Residential – Multi-Family	Florida Keys Overseas Paddling Trail (FKOPT)
Compatible Land Use	Transient Lodging	Florida Keys Overseas Heritage Trail (FKOHT)
Agricultural	Unclassified	Airport Boundary
Industrial	Vacant	City of Key West Boundary
Institutional	Commercial/Office	Monroe County Boundary



COMPARISON OF CURRENT FUTURE CONDITION AND
 PREVIOUS FUTURE CONDITION NOISE EXPOSURE MAPS