Appendix D

Criteria Pollutant and Greenhouse Gas Emissions Inventories Assumptions and Methodology

This page is left intentionally blank.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

List of Attachments

APPENDIX D
Criteria Pollutant and Greenhouse Gas Emissions Inventories Assumptions and Methodology

1 Introduction

This appendix presents the overall data, assumptions, approach, and methodology for preparing criteria pollutant, pollutant precursor, and greenhouse gas (GHG) emissions inventories for Martin State Airport (MTN). The emissions inventories were prepared for an existing year (2016) and two future years (2021 and 2026) with and without the proposed improvements at the airport.

The criteria pollutant emissions inventories were prepared for carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter less than 10 micrometers in diameter (coarse or PM_{10}), particulate matter less than 2.5 micrometers in diameter (fine or $PM_{2.5}$), and lead (Pb).

The GHG emissions inventories included carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). As is customary for GHG emissions inventories, the results are reported in units of metric tons (MT) of carbon dioxide equivalents (CO_2e), by source, and on an annual basis. The GHG emission results were converted to CO_2e values using the Global Warming Potential (GWP) values of 1 for CO_2, 28 for CH_4, and 265 for nitrous oxide (N_2O), based on a 100-year period. GWP values are relative measures of how much heat a GHG traps in the atmosphere when compared to carbon dioxide (e.g., CH_4 is 25 times as potent a GHG than CO_2). For this purpose, estimates of CH_4 and N_2O emissions are multiplied by their respective GWP values (28 for CH_4 and 265 for N_2O) to determine the CO_2e.

For the purpose of disclosing the increase or decrease in criteria pollutant, pollutant precursor, and GHG emissions with the improvements to the airport, the inventories were prepared only for the emission sources that would be affected by the improvements – aircraft and construction activities.

2 Aircraft

The aircraft-related emission inventories were prepared using FAA's Aviation Environmental Design Tool (AEDT, Version 2c SP2). Aircraft operational data (i.e., fleet and aircraft engine assignments) input to the AEDT were developed in support of the analysis presented in *Section 4.12, Noise and Compatible Land Use,* of this EA. Because it is customary for criteria air pollutant and pollutant precursor inventories to be reported in tons on an annual basis, the number of operations used in the noise analysis were factored to reflect the actual annual (year 2016) and future forecast (year 2021 and 2026) level of operations. **Table 1** presents the aircraft operations by aircraft type used in the modeling analysis.

Table 1
Aircraft Fleet Mix and Operations

Airframe	Engine	2016	2021	2026
Boeing 737-800 Series	CFM56-7B26/2	2	2	2
Cessna 650 Citation III	TFE731-3	120	116	116
Bombardier Challenger 600	ALF 502L-2	572	638	676
Bombardier Challenger 601	CF34-3A	258	374	402
Cessna 500 Citation I	JT15D-4series	160	224	238
CESSNA CITATION 510	BIZLIGHTJET_F	170	164	164
Cessna 525 CitationJet	PW4090	208	266	290
Cessna 550 Citation II	PW530	336	324	326
Cessna 560 Citation V	PW530	634	738	914
Cessna 560 Citation V	JT15D-5C	78	82	84
Cessna 560 Citation XLS	BIZMEDIUMJET_F	290	312	324
Cessna 680 Citation Sovereign	BIZMEDIUMJET_F	56	98	104
Cessna 750 Citation X	AE3007C1	140	154	160
Eclipse 500 / PW610F	PW610F	28	26	26
Embraer ERJ145	AE3007A1/1	18	22	24
Fokker F100	TAY Mk620-15	40	42	42
Gulfstream IV-SP	TAY Mk611-8	378	364	364
Gulfstream G550	BR700-710A1-10	158	180	194
Israel IAI-1125 Astra	TFE731-3	104	176	192
Bombardier Learjet 35A/36A	TFE731-2/2A	494	564	622
Mitsubishi MU-300 Diamond	JT15D-5, -5A, -5B	186	186	190
Aerospatiale SA-341G/342	PT6A-27	2,920	3,544	4,314
Raytheon Beech 1900-D	PT6A-67D	34	32	30
Raytheon Beech Baron 58	TIO-540-J2B2	9,602	8,958	8,926
Cessna 172 Skyhawk	TSIO-360C Mod: IO-360-L2A	11,580	10526	10,091
Cessna 182	IO-360-B	3,624	3,502	3,452
Cessna 206	TIO-540-J2B2 Mod: IO-540-AC	482	438	406
Cessna 208 Caravan	PT6A-114	444	486	502
Cessna 441 Conquest II	TPE331-8	704	682	676
DeHavilland DHC-6-200 Twin	PT6A-27	164	134	124
DeHavilland DHC-8-100	PW121A	90	92	100
Bombardier de Havilland Dash	PW123	40	40	46
Dornier 228-200 Series	TPE331-5A	50	44	42
EADS Socata TB-9 Tampico	IO-320-D1AD	6,968	6,570	6,648
Piper PA-24 Comanche	TIO-540-J2B2	20,918	22,612	22,230

Table 1

Aircraft Fleet Mix and Operations

Airframe	Engine	2016	2021	2026
Piper PA-28 Cherokee Series	IO-320-D1AD Mod: O-320-D3G	1,060	1,018	1,016
Piper PA-30 Twin Comanche	IO-320-D1AD	134	120	96
Britten-Norman BN-2 Islander	250B17B	1,120	996	982
Bell 206 JetRanger	250B17B	1,094	1,330	3,074
Bell 429	TPE331-1	54	54	54
Bell 430	250B17B	20	12	30
Eurocopter EC-130	TPE331-3	730	886	1,078
Robinson R22B	IO-320-D1AD	2,008	2,078	2,076
Sikorsky UH-60 Black Hawk	T700-GE-700	52	50	50
Sikorsky S-76 Spirit	T700-GE-700	16	16	16
Aerospatiale SA-355F Twin	250B17B	2,190	2,665	3,236
Lockheed C-130 Hercules	T56-A-15 Mod: T56-A-15	36	28	21
Lockheed C-130 Hercules	T56-A-7 Mod: T56-A-7	36	28	21
Boeing C-17A	F117-PW-100	8	8	8
Fairchild A-10A Thunderbolt II	TF34-GE-100-100A	3,392	3,408	3,424
Kaman SH-2 Seasprite	T700-GE-401 -401C	2,008	2,436	2,966
	Total	**76,008**	**77,845**	**81,189**

Source: KB Environmental Sciences, Inc.

2.1 Taxi Times

MTN consist primarily of civil and military aircraft operations which are located at separate areas from each other. Therefore, separate taxi times were developed for civil and military aircraft operations. With the exception of ground-based taxi-in/taxi-out, the default aircraft operating times in AEDT by aircraft mode (e.g., approach, take-off, climbout) were used. Taxi times for existing conditions (i.e., 2016) and future no-build years (i.e., 2021 and 2026) were calculated based on existing taxiway distances for civil and military aircraft. Taxi times for future build years (i.e., 2021 and 2026) were calculated based on future taxiway distances for civil and military aircraft. An aircraft taxi-in/taxi-out speed of 15 miles per hour (mph) was assumed for all scenarios.

Table 2 shows the taxi times for the existing and future no-build and build years.

Table 2
Aircraft Taxi Times (minutes)

Year	Scenario	Taxi-in	Taxi-out
2016	Civil Aircraft (Existing)	5.04	3.08
	Military Aircraft (Existing)	5.84	2.04
2021	Civil Aircraft (No-Build)	5.04	3.08
	Military Aircraft (No-Build)	5.84	2.04
	Civil Aircraft (Build)	4.80	2.20
	Military Aircraft (Build)	5.68	1.12
2026	Civil Aircraft (No-Build)	5.04	3.08
	Military Aircraft (No-Build)	5.84	2.04
	Civil Aircraft (Build)	4.80	2.20
	Military Aircraft (Build)	5.68	1.12

Source: KB Environmental Sciences, Inc.

2.2 Greenhouse Gas Emissions

The level of GHG emissions from aircraft activity is directly attributable to the level of fuel consumption by the aircraft. For the purpose of preparing the MTN-related GHG inventories, estimates of fuel consumption for the existing condition (i.e., 2016) and both future build and no-build years (i.e., 2021 and 2026) were obtained from the AEDT output that was prepared for the air quality analysis presented in the EA. With the exception of ground-based taxi, AEDT default times-in-mode were used to calculate fuel estimates used in the GHG analysis.

For the purpose of calculating aircraft-related GHG emissions, the AEDT fuel usage was segregated by aircraft that are powered by Jet A fuel (i.e., aircraft with jet or turboprop engines) and those that are powered by aviation gasoline, known as AvGas, (i.e., piston aircraft). These fuel use estimates are provided in **Table 3**.

Table 3
Aircraft Fuel Usage (gallons)

Year	Scenario	Jet A	AvGas
2016	Existing	281,576	110,521
2021	No-Build	308,773	107,515
	Build	297,481	105,579
2026	No-Build	343,000	106,020
	Build	331,253	104,110

Source: KB Environmental Sciences, Inc.

GHG emissions were calculated using emission factors from the USEPA's GHG Emissions Factors Hub (November 2015 v2). **Table 4** presents the GHG emission factors that were used to prepare the emission estimates.

Table 4
Aircraft GHG Emissions Factors

Fuel	CO_2	N_2O	CH_4	Units
Jet A	21.50	0.00066	0.00[1]	lb/gallon
AvGas	18.32	0.00024	0.01556	lb/gallon

Source: USEPA, Center for Corporate Climate Leadership GHG Emission Factors Hub, November 2015, v2.

[1] Contributions of CH_4 emissions from commercial aircraft are reported as zero. Years of scientific measurement campaigns conducted at the exhaust exit plane of commercial aircraft gas turbine engines have repeatedly indicated that CH_4 emissions are consumed over the full emission flight envelope [Reference: Aircraft Emissions of Methane and Nitrous Oxide during the Alternative Aviation Fuel Experiment, Santoni et al., Environ. Sci. Technol., July 2011, Volume 45, pp. 7075-7082]. As a result, the USEPA published that: "…methane is no longer considered to be an emission from aircraft gas turbine engines burning Jet A at higher power settings and is, in fact, consumed in net at these higher powers." [Reference: USEPA, Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet, and Turboprop Engines, May 27, 2009 [EPA-420-R-09-901], http://www.epa.gov/otaq/aviation.htm]. In accordance with the following statements in the 2006 IPCC Guidelines (IPCC 2006), the FAA does not calculate CH_4 emissions for either the domestic or international bunker commercial aircraft jet fuel emissions inventories. "*Methane (CH_4) may be emitted by gas turbines during idle and by older technology engines, but recent data suggest that little or no CH_4 is emitted by modern engines.*" "*Current scientific understanding does not allow other gases (e.g., N_2O and CH_4) to be included in calculation of cruise emissions.*" (IPCC 1999).

3 Construction

For this assessment, construction-related emissions are primarily associated with the exhaust from heavy equipment (i.e., backhoes, loaders, graders, etc.), delivery trucks (i.e., cement trucks, dump trucks, etc.), and construction worker vehicles getting to and from the airport construction site(s); dust from site preparation, land clearing, material handling, equipment movement on unpaved areas, and demolition activities; and fugitive emissions from the storage/transfer of raw materials. These emissions are temporary in nature and generally confined to the construction site and the access/egress roadways.

Emissions from construction activities were estimated based on the projected construction activity schedule (as provided in *Attachment 1, Conceptual Construction Schedule*), the number of vehicles/pieces of equipment, the types of equipment/type of fuel used, vehicle/equipment utilization rates, and the year construction occurs. For this assessment, emissions of CO, VOC, NO_x, SO_2, PM_{10} and $PM_{2.5}$, as well as GHGs (i.e., CO_2, CH_4, and N_2O) were evaluated for the construction year 2021. Emission factors for on-road motor vehicles and off-road construction equipment were developed using the USEPA's Motor Vehicle Emissions Simulator (MOVES, version 2014a).[1] MOVES input data were obtained from the Maryland Department of Environment (MDE) specific to Baltimore County.

[1] The NAAQS represent concentrations of pollutants in the ambient air over which detriment to human health and environmental welfare is likely to be incurred, based on available scientific evidence evaluated by EPA.

Data regarding the number of pieces and types of construction equipment to be used on the project, the deployment schedule of equipment (monthly and annually), and the approximate daily operating time (including power level/usage factors) were estimated for each individual construction activity based on the construction schedule.

It should be noted that the proposed improvements were originally scheduled for a 26-month construction period from February 2018 through March 2020 (as detailed in *Attachment 1, Conceptual Construction Schedule*). As a result of the delay to develop and incorporate the Marking and Lighting Plan into the Proposed Action, the construction schedule is now assumed to be condensed and occur entirely within 2021. It should be noted that construction schedules may be pushed further into the future due to impacts from additional planning, design, and from the COVID-19 pandemic, however the assumption that all projects will be constructed in 2021 presents a conservative analysis of emissions.

The construction emissions inventory was developed using 2018-2020 emission factors for on-road vehicle and off-road construction equipment. Although the construction period was revised to take place in 2021, the original inventory emission factors are still applicable and remain unchanged in the analysis. Emission factors for vehicles and equipment vary only slightly year to year, and generally decrease in future years. For this reason, using emission factors from 2018-2020 represents a more conservative estimate of emissions for construction completed in 2021.

3.1 On-Road Vehicles

For on-road vehicles, the anticipated vehicle-miles-traveled (VMT) were estimated to determine annual emissions. In deriving the VMT, the following was assumed:

- VMT by hauling, delivering, and pickup trucks were based on the number of trips and a roundtrip travel distance of 45 miles.
- In deriving the VMT for each worker traveling to and from the construction site, it was assumed that a composite of passenger cars and trucks would commute a roundtrip distance of 50 miles.

The following equation was used to obtain annual emission rates for on-road vehicles:

Emissions (tons/year) for on-road vehicles = Emission Factor (g/mile) x vehicle miles travelled per day x days/year x (1 pound/453.59 grams) x (1 ton/2,000 pounds)

MOVES emission factors associated with the hauling, delivering, and pickup trucks for the construction period are presented in **Table 5**.

Table 5
On-Road Vehicle Emission Factors (grams/mile)

Vehicles	MOVES On- road	Pollutant	2018	2019	2020
Workers	Composite of Passenger Car/Truck	CO	11.1	10.2	9.4
		VOC	1.2	1.1	1.0
		NO_x	0.7	0.6	0.5
		SO_2	0.004	0.003	0.003
		PM_{10}	0.08	0.08	0.08
		$PM_{2.5}$	0.04	0.04	0.04
		CO_2	524	511	498
		CH_4	0.06	0.06	0.05
		N_2O	0.03	0.02	0.02
Pickup Trucks	Passenger Truck	CO	15.9	14.5	13.3
		VOC	1.8	1.6	1.5
		NO_x	1.0	0.9	0.8
		SO_2	0.004	0.004	0.004
		PM_{10}	0.1	0.1	0.1
		$PM_{2.5}$	0.06	0.05	0.05
		CO_2	629	614	600
		CH_4	0.1	0.1	0.1
		N_2O	0.03	0.03	0.03
Material Delivery & Haul Trucks	Short-Haul Single Unit Truck	CO	2.9	2.7	2.5
		VOC	0.7	0.7	0.6
		NO_x	3.3	2.9	2.6
		SO_2	0.01	0.01	0.01
		PM_{10}	0.4	0.4	0.3
		$PM_{2.5}$	0.2	0.2	0.1
		CO_2	1,407	1,394	1,381
		CH_4	0.2	0.2	0.2
		N_2O	0.01	0.01	0.01

Source: USEPA MOVES2014a Emissions Model.

3.2 Off-Road Construction Equipment

USEPA's NONROAD 2008 model is used to estimate off-road equipment emissions which is embedded within the latest version of MOVES. **Table 6** presents the off-road equipment included in the analysis along with the corresponding category description used within MOVES, the usage factors, and the horsepower (hp) that was assigned to each type of construction equipment. Emissions factors (grams/hp-hour) for each equipment type were applied to the anticipated work output (hp-hours) of expected equipment use. Operating times for the equipment were based on a five-day workweek and an eight- hour workday during which the equipment may be operating. A usage factor of 0.75 (i.e., 6 hours of operation accounting for the percentage of daily operation) was also used.

Table 6
Construction Equipment Characteristics

MOVES Description	SCC	Load Factor	Usage Factor	HP
Cranes	2270002045	0.43	0.48	231
Pavers	2270002003	0.59	0.39	124
Rollers	2270002015	0.59	0.37	92
Surfacing Equipment	2270002024	0.59	0.27	111
Off-highway Trucks	2270002051	0.59	0.79	783
Tractors/Loaders/Backhoes	2270002066	0.21	0.55	93
Aerial Lifts	2270003010	0.21	0.18	49
Crawler Tractors	2270002069	0.59	0.45	260
Paving Equipment	2270002021	0.59	0.30	69
Graders	2270002048	0.59	0.46	204
Bore/Drill Rigs	2270002033	0.43	0.22	176
Excavators	2270002036	0.59	0.53	171
Tampers/Rammers	2270002006	0.43	0.22	4
Commercial Air Compressor	2270006015	0.43	0.39	83
Commercial Welders	2270006025	0.21	0.31	44
Commercial Pumps	2270006010	0.43	0.19	53
Commercial Air Compressor	2260006015	0.56	0.23	2
Inboards	2282020005	0.35	0.10	250
Other Material Handling Equipment	2270003050	0.21	0.20	126
Other Construction Equipment	2270002081	0.59	0.29	329
Concrete/Industrial Saws	2270002039	0.59	0.28	48
Other General Industrial Equipment	2270003040	0.43	0.42	116
Plate Compactors	2260002009	0.55	0.08	2

The following equation was used to obtain emission estimates for off-road construction equipment:

Construction Equipment Emissions (tons/year) = Emission Factor (grams/hp-hour) x Horsepower (hp) x hours per year x Usage Factor x (1 pound/453.59 grams) x (1 ton/2,000 pounds)

Tables 7 through Table 9 present the construction equipment emission factors (in grams per horsepower-hour) for 2018 through 2020, respectively. Notably, NO_2 emission factor are not presented as the MOVES model does not calculate NO_2 emissions for construction equipment.

Table 7
2018 Construction Equipment Emission Factors (g/hp-hr)

Description	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CH_4
Aerial Lifts	4.9	1.1	5.0	0.004	0.7	0.7	692	0.03
Bore/Drill Rigs	1.1	0.3	3.7	0.003	0.2	0.2	539	0.01
Concrete/Industrial Saws	1.1	0.2	2.6	0.003	0.2	0.2	574	0.02
Cranes	1.8	0.4	3.9	0.003	0.3	0.3	568	0.02
Crawler Tractors	4.2	0.9	4.6	0.004	0.6	0.6	692	0.03
Excavators	1.6	0.3	3.0	0.003	0.2	0.2	591	0.02
Graders	0.5	0.2	1.9	0.003	0.1	0.1	533	0.01
Inboards	0.7	0.2	1.6	0.003	0.1	0.1	539	0.01
Commercial Air Compressor	0.4	0.2	1.1	0.003	0.1	0.1	541	0.01
Commercial Pumps	0.4	0.2	1.1	0.003	0.1	0.1	537	0.01
Commercial Welders	1.0	0.3	5.1	0.018	0.1	0.1	532	0.02
Off-highway Trucks	0.5	0.2	1.9	0.003	0.1	0.1	536	0.02
Other Construction Equipment	1.1	0.2	2.6	0.003	0.2	0.2	537	0.01
Other General Industrial Equipment	0.7	0.2	2.0	0.003	0.1	0.1	546	0.02
Other Material Handling Equipment	2.8	0.8	4.3	0.004	0.5	0.4	640	0.03
Pavers	0.7	0.2	1.6	0.003	0.1	0.1	550	0.02
Paving Equipment	1.1	0.2	2.2	0.003	0.2	0.2	556	0.02
Rollers	1.0	0.2	1.9	0.003	0.1	0.1	559	0.02
Surfacing Equipment	1.5	0.3	3.1	0.003	0.2	0.2	555	0.02
Tampers/Rammers	4.5	0.7	4.6	0.004	0.4	0.4	588	0.05
Tractors/Loaders/Backhoes	3.3	0.7	3.6	0.004	0.5	0.5	664	0.03
Commercial Air Compressor	233	63.0	2.4	0.006	8.0	7.3	1,041	2.3
2-Stroke Plate Compactors	222	49.6	2.4	0.006	7.6	7.0	1,052	2.2

Source: USEPA MOVES2014a Emissions Model.

Table 8
2019 Construction Equipment Emission Factors (g/hp-hr)

Description	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CH_4
Aerial Lifts	4.5	1.0	4.8	0.004	0.6	0.6	693	0.03
Bore/Drill Rigs	1.0	0.3	3.5	0.003	0.2	0.2	540	0.01
Concrete/Industrial Saws	1.0	0.2	2.4	0.003	0.1	0.1	574	0.02
Cranes	1.7	0.4	3.7	0.003	0.3	0.3	568	0.02
Crawler Tractors	3.9	0.8	4.5	0.004	0.6	0.5	692	0.03
Excavators	1.4	0.2	2.8	0.003	0.2	0.2	591	0.02
Graders	0.4	0.2	1.6	0.003	0.1	0.1	533	0.01
Inboards	0.6	0.2	1.4	0.003	0.1	0.1	539	0.01
Commercial Air Compressor	0.3	0.2	0.9	0.003	0.0	0.0	542	0.01
Commercial Pumps	0.3	0.2	0.9	0.003	0.1	0.0	537	0.01
Commercial Welders	1.0	0.3	4.9	0.018	0.1	0.1	532	0.02
Off-highway Trucks	0.5	0.2	1.8	0.003	0.0	0.0	536	0.02
Other Construction Equipment	1.0	0.2	2.3	0.003	0.1	0.1	537	0.01
Other General Industrial Equipment	0.6	0.2	1.7	0.003	0.1	0.1	546	0.02
Other Material Handling Equipment	2.6	0.7	4.0	0.004	0.4	0.4	640	0.03
Pavers	0.6	0.2	1.4	0.003	0.1	0.1	550	0.01
Paving Equipment	1.0	0.2	2.0	0.003	0.2	0.2	556	0.02
Rollers	0.8	0.2	1.7	0.003	0.1	0.1	559	0.02
Surfacing Equipment	1.4	0.3	2.9	0.003	0.2	0.2	555	0.02
Tampers/Rammers	4.5	0.7	4.5	0.004	0.4	0.4	588	0.05
Tractors/Loaders/Backhoes	3.1	0.6	3.3	0.004	0.5	0.5	664	0.03
Commercial Air Compressor	233	63.0	2.4	0.006	8.0	7.3	1,041	2.3
2-Stroke Plate Compactors	222	49.6	2.4	0.006	7.6	7.0	1,052	2.2

Source: USEPA MOVES2014a Emissions Model.

Table 9
2020 Construction Equipment Emission Factors (g/hp-hr)

Description	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CH_4
Aerial Lifts	4.2	0.9	4.6	0.004	0.6	0.6	693	0.03
Bore/Drill Rigs	1.0	0.3	3.2	0.003	0.2	0.2	540	0.01
Concrete/Industrial Saws	0.9	0.2	2.2	0.003	0.1	0.1	574	0.02
Cranes	1.6	0.4	3.5	0.003	0.3	0.2	568	0.02
Crawler Tractors	3.6	0.8	4.3	0.004	0.5	0.5	693	0.03
Excavators	1.2	0.2	2.6	0.003	0.2	0.1	591	0.02
Graders	0.4	0.2	1.4	0.003	0.1	0.1	533	0.01
Inboards	0.5	0.2	1.2	0.003	0.1	0.1	539	0.01
Commercial Air Compressor	0.3	0.2	0.8	0.003	0.0	0.0	542	0.01
Commercial Pumps	0.3	0.2	0.7	0.003	0.0	0.0	537	0.01
Commercial Welders	1.0	0.3	4.8	0.018	0.1	0.1	532	0.02
Off-highway Trucks	0.4	0.2	1.7	0.003	0.0	0.0	536	0.02
Other Construction Equipment	0.9	0.2	2.1	0.003	0.1	0.1	537	0.01
Other General Industrial Equipment	0.5	0.2	1.5	0.003	0.1	0.1	546	0.01
Other Material Handling Equipment	2.4	0.6	3.8	0.004	0.4	0.4	640	0.02
Pavers	0.5	0.2	1.3	0.003	0.1	0.1	550	0.01
Paving Equipment	0.9	0.2	1.8	0.003	0.1	0.1	556	0.02
Rollers	0.7	0.2	1.5	0.003	0.1	0.1	559	0.02
Surfacing Equipment	1.3	0.2	2.7	0.003	0.2	0.2	555	0.02
Tampers/Rammers	4.5	0.6	4.4	0.004	0.4	0.4	589	0.05
Tractors/Loaders/Backhoes	2.9	0.6	3.0	0.004	0.4	0.4	664	0.03
Commercial Air Compressor	233	63.0	2.4	0.006	8.0	7.3	1,041	2.3
2-Stroke Plate Compactors	222	49.6	2.4	0.006	7.6	7.0	1,052	2.2

Source: USEPA MOVES2014a Emissions Model.

Fugitive dust emissions for PM were estimated and included in the total construction emissions. A fugitive dust PM_{10} emission factor of 1.2 tons per acre disturbed per month during construction activity was used, assuming that fugitive dust is generated throughout the construction period such that 25 percent of the project area would be disturbed per construction month. Based on EPA's AP-42, $PM_{2.5}$ emissions were assumed to be 10 percent of PM_{10} emissions. Erosion control measures and water programs are typically taken into account to minimize fugitive dust and particulate emissions at construction sites. For this analysis, a dust control efficiency of 75 percent due to daily watering and other measures (limiting vehicle speed, stockpile control) was assumed.

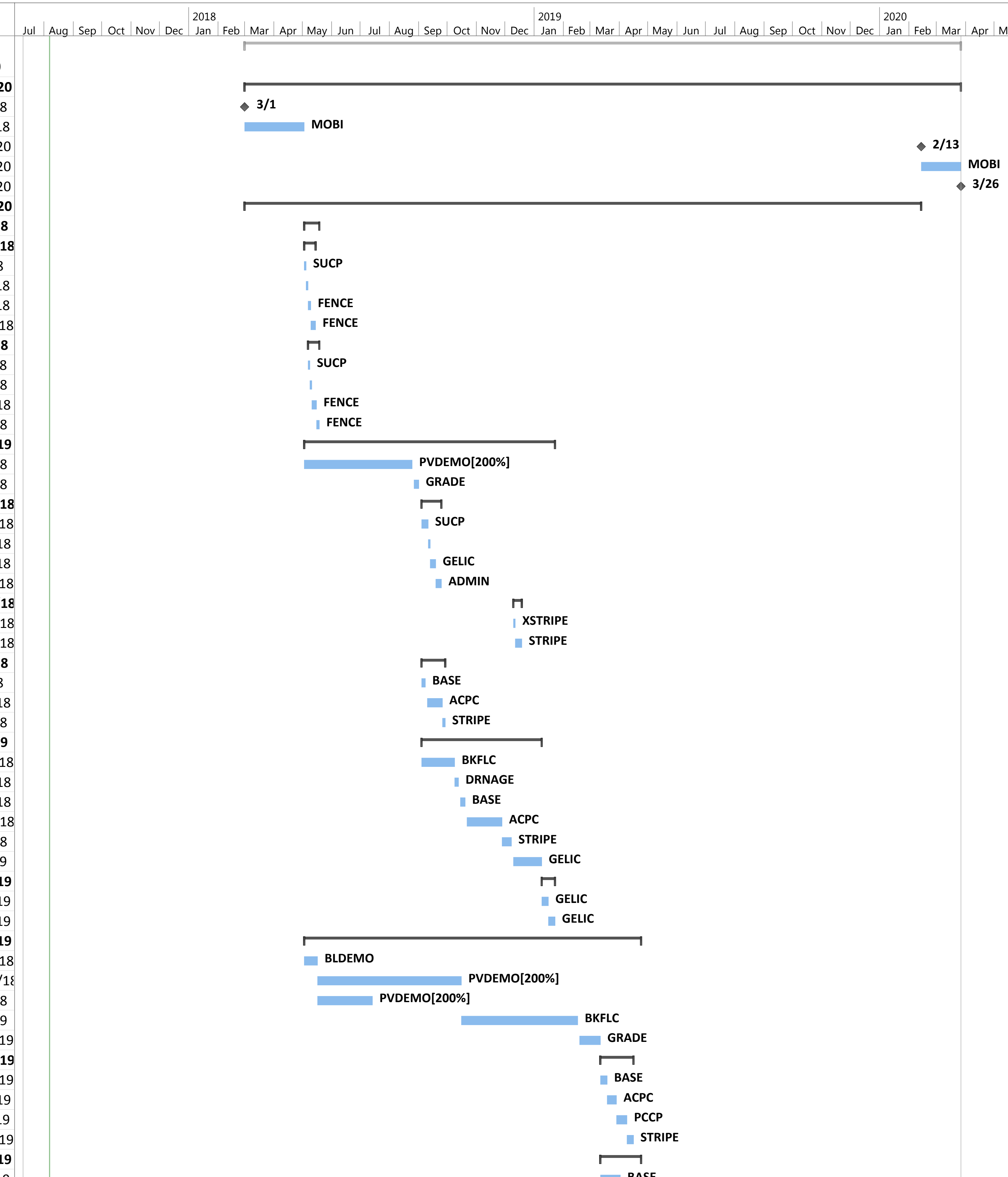
Evaporative VOC emissions associated with the application of hot mix asphalt on areas requiring paving were estimated using raw materials quantities listed in the projected construction schedule, as well as an emission factor of 0.053 tons of VOC per acre of asphalt material laid, following methodology outlined by the National Association of Clean Air Agencies (NACAA, formerly STAPPA-ALAPCO).

Attachment 1:

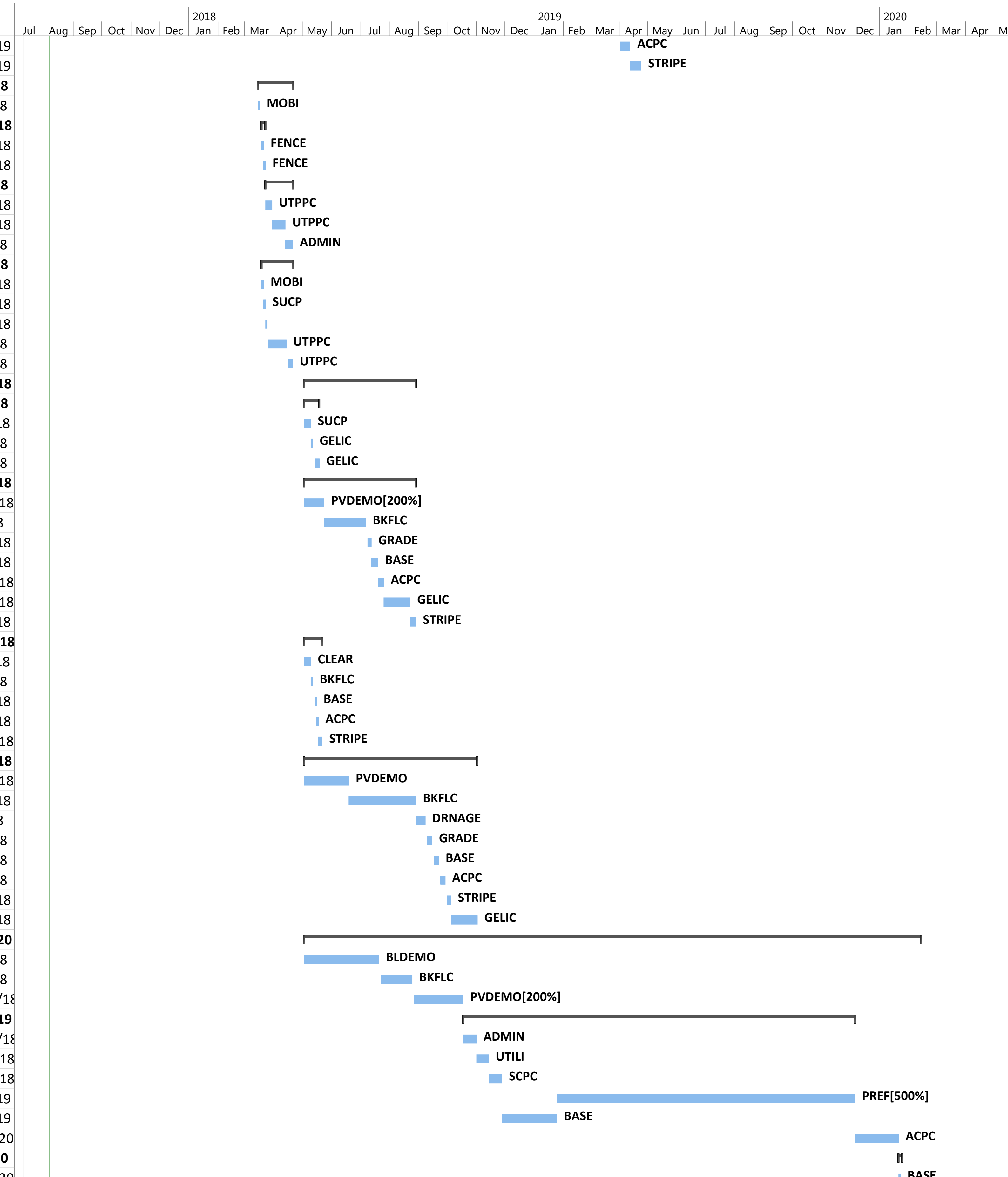
Conceptual Construction Schedule

Based on 2018-2020 Schedule

ID	Project Number	Task Name	Resource Names	Duration	Start	Finish
0		**Martin State Airport Conceptual Construction Schedule for Environmental Assessment**		**527 days**	**Thu 3/1/18**	**Thu 3/26/20**
1	**PM**	**Project Management**		**527 days**	**Thu 3/1/18**	**Thu 3/26/20**
2	PM	NTP		0 days	Thu 3/1/18	Thu 3/1/18
3	PM	Mobilization	MOBI	45 days	Thu 3/1/18	Wed 5/2/18
4	PM	Construction Complete		0 days	Thu 2/13/20	Thu 2/13/20
5	PM	De-Mobilization	MOBI	30 days	Fri 2/14/20	Thu 3/26/20
6	PM	COMPLETE		0 days	Thu 3/26/20	Thu 3/26/20
7	**PM**	**Construction Project Milestones**		**497 days**	**Thu 3/1/18**	**Thu 2/13/20**
66	**1**	**Relocate Windsock 15 and 33**		**12 days**	**Thu 5/3/18**	**Fri 5/18/18**
67	**1**	**Relocate Windsock 15**		**8 days**	**Thu 5/3/18**	**Mon 5/14/18**
68	1	Form and Place Slab for Relocated Windsock 15	SUCP	2 days	Thu 5/3/18	Fri 5/4/18
69	1	Cure Slab		7 days	Fri 5/4/18	Mon 5/7/18
70	1	Remove Existing Windsock 15	FENCE	3 days	Mon 5/7/18	Wed 5/9/18
71	1	Relocate Windsock 15	FENCE	3 days	Thu 5/10/18	Mon 5/14/18
72	**1**	**Relocate Windsock 33**		**10 days**	**Mon 5/7/18**	**Fri 5/18/18**
73	1	Form and Place for Relocated Windsock 33	SUCP	2 days	Mon 5/7/18	Tue 5/8/18
74	1	Cure Slab		7 days	Tue 5/8/18	Fri 5/11/18
75	1	Remove Existing Windsock 33	FENCE	3 days	Fri 5/11/18	Tue 5/15/18
76	1	Relocate Windsock 33	FENCE	3 days	Wed 5/16/18	Fri 5/18/18
77	**2**	**Relocate RW 15 End**		**182 days**	**Thu 5/3/18**	**Tue 1/22/19**
78	2	Demolish Existing Pavement	PVDEMO[2]	80 days	Thu 5/3/18	Fri 8/24/18
79	2	Grade Work Area	GRADE	5 days	Mon 8/27/18	Fri 8/31/18
80	**2**	**Relocate PLASI (15)**		**15 days**	**Tue 9/4/18**	**Mon 9/24/18**
81	2	Form and Place Slab for PLASI	SUCP	5 days	Tue 9/4/18	Mon 9/10/18
82	2	Cure Slab		7 days	Mon 9/10/18	Thu 9/13/18
83	2	Remove Existing PLASI (15)	GELIC	4 days	Thu 9/13/18	Tue 9/18/18
84	2	Relocate PLASI (15)	ADMIN	4 days	Wed 9/19/18	Mon 9/24/18
85	**2**	**Displace RW 15 Threshold**		**7 days**	**Mon 12/10/18**	**Tue 12/18/18**
86	2	Remove Existing Striping and Markings	XSTRIPE	2 days	Mon 12/10/18	Tue 12/11/18
87	2	Re-Stripe/Mark Displaced RW 15 Threshold	STRIPE	5 days	Wed 12/12/18	Tue 12/18/18
88	**2**	**New Blast Pad (15)**		**19 days**	**Tue 9/4/18**	**Fri 9/28/18**
89	2	Place Basecourse (14" P209)	BASE	4 days	Tue 9/4/18	Fri 9/7/18
90	2	Place HMA Pavement (8" HMA)	ACPC	12 days	Mon 9/10/18	Tue 9/25/18
91	2	Stripe Blast Pad (15)	STRIPE	3 days	Wed 9/26/18	Fri 9/28/18
92	**2**	**Relocate Taxiway A**		**87 days**	**Tue 9/4/18**	**Tue 1/8/19**
93	2	Cut and Fill Operation	BKFLC	25 days	Tue 9/4/18	Mon 10/8/18
94	2	Install Drainage	DRNAGE	4 days	Tue 10/9/18	Fri 10/12/18
95	2	Place Basecourse (14" P209)	BASE	5 days	Mon 10/15/18	Fri 10/19/18
96	2	Place HMA Pavement (8" HMA)	ACPC	25 days	Mon 10/22/18	Tue 11/27/18
97	2	Stripe Taxiway A	STRIPE	8 days	Wed 11/28/18	Fri 12/7/18
98	2	Install Lighting for Relocated Taxiway A	GELIC	20 days	Mon 12/10/18	Tue 1/8/19
99	**2**	**Relocate RW Lighting (15)**		**10 days**	**Wed 1/9/19**	**Tue 1/22/19**
100	2	Remove Existing Lighting	GELIC	5 days	Wed 1/9/19	Tue 1/15/19
101	2	Install Lighting for RW 15	GELIC	5 days	Wed 1/16/19	Tue 1/22/19
102	**3**	**Reconstruct MANG Apron and Lower Taxiway T**		**247 days**	**Thu 5/3/18**	**Tue 4/23/19**
103	3	Demo Existing Hangars as needed	BLDEMO	10 days	Thu 5/3/18	Wed 5/16/18
104	3	Demolish Existing MANG Apron Sections	PVDEMO[2]	105 days	Thu 5/17/18	Mon 10/15/18
105	3	Demolish Exiting Taxiway T Sections	PVDEMO[2]	40 days	Thu 5/17/18	Fri 7/13/18
106	3	Cut and Fill Operation	BKFLC	85 days	Tue 10/16/18	Fri 2/15/19
107	3	Grade Site	GRADE	16 days	Mon 2/18/19	Mon 3/11/19
108	**3**	**MANG Apron**		**25 days**	**Tue 3/12/19**	**Mon 4/15/19**
109	3	Place Basecourse (6" P209)	BASE	5 days	Tue 3/12/19	Mon 3/18/19
110	3	Place HMA Pavement (6" HMA)	ACPC	8 days	Tue 3/19/19	Thu 3/28/19
111	3	Place PCC Pavement (16" PCC)	PCCP	7 days	Fri 3/29/19	Mon 4/8/19
112	3	Stripe MANG Apron	STRIPE	5 days	Tue 4/9/19	Mon 4/15/19
113	**3**	**Lower Taxiway T**		**31 days**	**Tue 3/12/19**	**Tue 4/23/19**
114	3	Place Basecourse (14" P209)	BASE	15 days	Tue 3/12/19	Mon 4/1/19



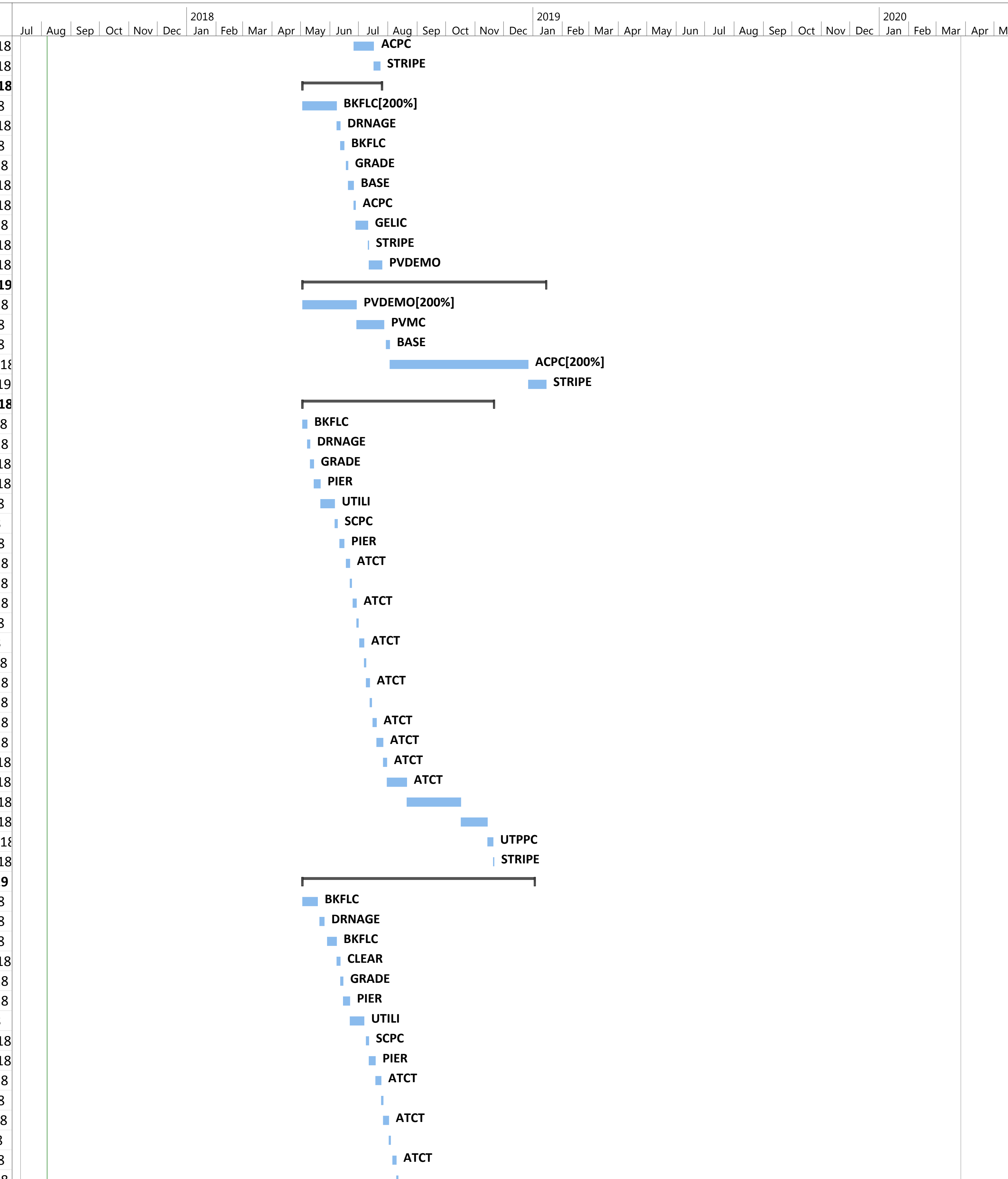
ID	Project Number	Task Name	Resource Names	Duration	Start	Finish
115	3	Place HMA Pavement (8" HMA)	ACPC	8 days	Tue 4/2/19	Thu 4/11/19
116	3	Stripe Taxiway T	STRIPE	8 days	Fri 4/12/19	Tue 4/23/19
117	**4**	**Lower Street Signs and Light Poles**		**27 days**	**Thu 3/15/18**	**Fri 4/20/18**
118	4	Deliver Lower Sign Post and Light Poles to Material Lay Down Area	MOBI	2 days	Thu 3/15/18	Fri 3/16/18
119	**4**	**Street Signs**		**4 days**	**Mon 3/19/18**	**Thu 3/22/18**
120	4	Place New Street Sign Posts	FENCE	2 days	Mon 3/19/18	Tue 3/20/18
121	4	Place Sign on New Posts	FENCE	2 days	Wed 3/21/18	Thu 3/22/18
122	**4**	**Light Poles**		**21 days**	**Fri 3/23/18**	**Fri 4/20/18**
123	4	Remove Existing Light Poles	UTPPC	5 days	Fri 3/23/18	Thu 3/29/18
124	4	Install New (Lower) Light Poles	UTPPC	10 days	Fri 3/30/18	Thu 4/12/18
125	4	Install Lighting on New (Lower) Poles	ADMIN	6 days	Fri 4/13/18	Fri 4/20/18
126	**5**	**Lower Catenary Lines**		**25 days**	**Mon 3/19/18**	**Fri 4/20/18**
127	5	Deliver Catenary Poles to Material Laydown Area	MOBI	2 days	Mon 3/19/18	Tue 3/20/18
128	5	Place Foundations for New Catenary Poles	SUCP	2 days	Wed 3/21/18	Thu 3/22/18
129	5	Foundation Cure Time		7 days	Thu 3/22/18	Sun 3/25/18
130	5	Install New Catenary Poles	UTPPC	15 days	Mon 3/26/18	Fri 4/13/18
131	5	Transfer Cables to New Catenary Poles	UTPPC	5 days	Mon 4/16/18	Fri 4/20/18
132	**6**	**Extend Taxiway F - Includes Demo**		**82 days**	**Thu 5/3/18**	**Tue 8/28/18**
133	**6**	**Relocate Anemometer**		**12 days**	**Thu 5/3/18**	**Fri 5/18/18**
134	6	Place Foundation at New Anemometer Location	SUCP	5 days	Thu 5/3/18	Wed 5/9/18
135	6	Remove Existing Anemometer	GELIC	2 days	Thu 5/10/18	Fri 5/11/18
136	6	Install Anemometer at New Location	GELIC	5 days	Mon 5/14/18	Fri 5/18/18
137	**6**	**Extend Taxiway F**		**82 days**	**Thu 5/3/18**	**Tue 8/28/18**
138	6	Demolish Existing Pavement	PVDEMO[2]	15 days	Thu 5/3/18	Wed 5/23/18
139	6	Cut Operation	BKFLC	30 days	Thu 5/24/18	Fri 7/6/18
140	6	Grade Site Area	GRADE	4 days	Mon 7/9/18	Thu 7/12/18
141	6	Place Basecourse (14" P209)	BASE	5 days	Fri 7/13/18	Thu 7/19/18
142	6	Place HMA (8" HMA)	ACPC	4 days	Fri 7/20/18	Wed 7/25/18
143	6	Install Lighting for Taxiway F	GELIC	20 days	Thu 7/26/18	Wed 8/22/18
144	6	Stripe Taxiway F	STRIPE	4 days	Thu 8/23/18	Tue 8/28/18
145	**7**	**Additional Parking**		**13 days**	**Thu 5/3/18**	**Mon 5/21/18**
146	7	Clear and Grub Area	CLEAR	5 days	Thu 5/3/18	Wed 5/9/18
147	7	Cut Operation	BKFLC	2 days	Thu 5/10/18	Fri 5/11/18
148	7	Place Basecourse (10" P209)	BASE	2 days	Mon 5/14/18	Tue 5/15/18
149	7	Place HMA (5" HMA)	ACPC	2 days	Wed 5/16/18	Thu 5/17/18
150	7	Stripe Parking Lot	STRIPE	2 days	Fri 5/18/18	Mon 5/21/18
151	**8**	**Taxiway C - Includes Demo**		**128 days**	**Thu 5/3/18**	**Thu 11/1/18**
152	8	Demolish Existing Pavement	PVDEMO	32 days	Thu 5/3/18	Mon 6/18/18
153	8	Cut and Fill Operation	BKFLC	50 days	Tue 6/19/18	Tue 8/28/18
154	8	Install New Drainage	DRNAGE	7 days	Wed 8/29/18	Fri 9/7/18
155	8	Grade Site	GRADE	5 days	Mon 9/10/18	Fri 9/14/18
156	8	Place Basecourse (14" P209)	BASE	5 days	Mon 9/17/18	Fri 9/21/18
157	8	Place HMA (8" HMA)	ACPC	5 days	Mon 9/24/18	Fri 9/28/18
158	8	Stripe Taxiway C	STRIPE	4 days	Mon 10/1/18	Thu 10/4/18
159	8	Install Lighting for Taxiway C	GELIC	20 days	Fri 10/5/18	Thu 11/1/18
160	**9**	**Midfield GA Development - Including Demo**		**452 days**	**Thu 5/3/18**	**Thu 2/13/20**
161	9	Remove Existing T Hangars (20+28 Units)	BLDEMO	55 days	Thu 5/3/18	Fri 7/20/18
162	9	Cut and Fill Operation	BKFLC	25 days	Mon 7/23/18	Fri 8/24/18
163	9	Demolish Existing Pavement	PVDEMO[2]	37 days	Mon 8/27/18	Wed 10/17/18
164	**9**	**New Corporate Hangars (5 Units)**		**287 days**	**Thu 10/18/18**	**Thu 12/5/19**
165	9	Form Foundations for Hangars	ADMIN	10 days	Thu 10/18/18	Wed 10/31/18
166	9	Install Utility Lines for New Hangars	UTILI	9 days	Thu 11/1/18	Tue 11/13/18
167	9	Place Foundations for New Hangars	SCPC	8 days	Wed 11/14/18	Tue 11/27/18
168	9	Erect New Corporate Hangars	PREF[5]	220 days	Fri 1/25/19	Thu 12/5/19
169	9	Place Basecourse (14" P209) - New Hangar Area/Access	BASE	40 days	Wed 11/28/18	Thu 1/24/19
170	9	Place HMA (8" HMA) - New Hangar Area/Access	ACPC	30 days	Fri 12/6/19	Mon 1/20/20
171	**9**	**Access Roads**		**4 days**	**Tue 1/21/20**	**Fri 1/24/20**
172	9	Place Basecourse (10" P209)	BASE	2 days	Tue 1/21/20	Wed 1/22/20



ID	Project Number	Task Name	Resource Names	Duration	Start	Finish
173	9	Place HMA (5" HMA)	ACPC	2 days	Thu 1/23/20	Fri 1/24/20
174	9	Install Foundations For Lighting	SUCP	4 days	Mon 1/27/20	Thu 1/30/20
175	9	Lighting Foundation Cure Time		7 days	Thu 1/30/20	Sun 2/2/20
176	9	Install Lighting	UTPPC	8 days	Mon 2/3/20	Wed 2/12/20
177	9	Stripe Area	STRIPE	1 day	Thu 2/13/20	Thu 2/13/20
178	**10**	**New Hangars and Associated Aprons**		**51 days**	**Thu 5/3/18**	**Mon 7/16/18**
179	**10**	**Remove existing Fuel Tanks and Above Grade Pipeline**		**19 days**	**Thu 5/3/18**	**Wed 5/30/18**
180	10	Evacuate Fuel Lines/Tanks	FUELP	2 days	Thu 5/3/18	Fri 5/4/18
181	10	Remove Existing Above Grade Pipeline	FUELP	5 days	Mon 5/7/18	Fri 5/11/18
182	10	Remove Fuel Tanks	FUELP	4 days	Mon 5/14/18	Thu 5/17/18
183	10	Demo Existing Pavement as Needed	PVDEMO	2 days	Fri 5/18/18	Mon 5/21/18
184	10	Place Basecourse (14" P209)	BASE	2 days	Tue 5/22/18	Wed 5/23/18
185	10	Place HMA (8" HMA)	ACPC	2 days	Thu 5/24/18	Fri 5/25/18
186	10	Stripe Area	STRIPE	2 days	Tue 5/29/18	Wed 5/30/18
187	**10**	**Demolish Existing Hangars**		**15 days**	**Thu 5/3/18**	**Wed 5/23/18**
188	10	Demolish Existing Hangars	BLDEMO	15 days	Thu 5/3/18	Wed 5/23/18
189	**10**	**New T Hangar Complex (23+23+17)**		**31 days**	**Thu 5/24/18**	**Mon 7/9/18**
190	10	New T Hangar Pavement Tie-Ins	SUCP[3]	6 days	Thu 5/24/18	Fri 6/1/18
191	10	Erect New T Hangars	THANG[3	25 days	Mon 6/4/18	Mon 7/9/18
192	**10**	**New Corporate Aircraft Storage (2 Units)**		**32 days**	**Thu 5/3/18**	**Mon 6/18/18**
193	10	Cut Operation	BKFLC	2 days	Thu 5/3/18	Fri 5/4/18
194		Grade Site	GRADE	2 days	Mon 5/7/18	Tue 5/8/18
195	10	Place Foundations for New Corporate Aircraft Storage	SCPC[2]	6 days	Wed 5/9/18	Wed 5/16/18
196	10	Erect Aircraft Storage Building (Unit 1)	PREF	22 days	Thu 5/17/18	Mon 6/18/18
197	10	Erect Aircraft Storage Building (Unit 2)	PREF	6 days	Thu 5/17/18	Thu 5/24/18
198	10	Stripe Area	STRIPE	5 days	Tue 7/10/18	Mon 7/16/18
199	**11**	**Reconfigure Existing Midfield Access Road**		**8 days**	**Thu 5/3/18**	**Mon 5/14/18**
200	11	Clear and Grub Area	CLEAR	2 days	Thu 5/3/18	Fri 5/4/18
201	11	Grade New Access Road	GRADE	2 days	Mon 5/7/18	Tue 5/8/18
202	11	Place Basecourse (10" P209)	BASE	2 days	Wed 5/9/18	Thu 5/10/18
203	11	Place HMA (5" HMA)	ACPC	1 day	Fri 5/11/18	Fri 5/11/18
204	11	Stripe New Midfield Access Road	STRIPE	1 day	Mon 5/14/18	Mon 5/14/18
205	**12**	**Snow Removal Equipment Building Alternative 1**		**66 days**	**Thu 5/3/18**	**Mon 8/6/18**
206	12	Clear and Grub Area (Tree Removal)	CLEAR	2 days	Thu 5/3/18	Fri 5/4/18
207	12	Fill and Grade Site	BKFLC	5 days	Mon 5/7/18	Fri 5/11/18
208	12	Grade Site	GRADE	2 days	Mon 5/14/18	Tue 5/15/18
209	12	Install Storm Drain	DRNAGE	5 days	Wed 5/16/18	Tue 5/22/18
210	12	Form Building Slab		2 days	Wed 5/23/18	Thu 5/24/18
211	12	Rough-In Utilities	UTILI	10 days	Fri 5/25/18	Fri 6/8/18
212	12	Place Building Slab	SCPC	4 days	Mon 6/11/18	Thu 6/14/18
213	12	Erect Building	PREF	8 days	Fri 6/15/18	Tue 6/26/18
214	12	Interior Finishings		20 days	Wed 6/27/18	Wed 7/25/18
215	12	Place Basecourse (14" P209)	BASE	4 days	Thu 7/26/18	Tue 7/31/18
216	12	Place HMA (8" HMA)	ACPC	2 days	Wed 8/1/18	Thu 8/2/18
217	12	Stripe Area	STRIPE	2 days	Fri 8/3/18	Mon 8/6/18
218	**13**	**Snow Removal Equipment Building Alternative 2**		**94 days**	**Thu 5/3/18**	**Fri 9/14/18**
219	13	Grade Site	GRADE	2 days	Thu 5/3/18	Fri 5/4/18
220	13	Install Storm Drain	DRNAGE	6 days	Mon 5/7/18	Mon 5/14/18
221	13	Form Building Slab		2 days	Tue 5/15/18	Wed 5/16/18
222	13	Rough-In Utilities	UTILI	10 days	Thu 5/17/18	Thu 5/31/18
223	13	Place Building Slab	SCPC[2]	9 days	Fri 6/1/18	Wed 6/13/18
224	13	Erect Building	PREF	45 days	Thu 6/14/18	Thu 8/16/18
225	13	Interior Finishings		20 days	Fri 8/17/18	Fri 9/14/18
226	**14**	**Modify Pier**		**22 days**	**Thu 3/1/18**	**Fri 3/30/18**
227	14	Mobilize Barges	MWPILE	5 days	Thu 3/1/18	Wed 3/7/18
228	14	Drive Piles (23 units)	WPILE	8 days	Thu 3/8/18	Mon 3/19/18
229	14	Construct Wooden Pier	PIER	4 days	Tue 3/20/18	Fri 3/23/18
230	14	Demobilize Barges	MWPILE	5 days	Mon 3/26/18	Fri 3/30/18

ID	Project Number	Task Name	Resource Names	Duration	Start	Finish
231	**15**	**Relocate Helipad**		**2 days**	**Thu 5/3/18**	**Fri 5/4/18**
232	15	Remove Existing Striping and Markings	XSTRIPE	1 day	Thu 5/3/18	Thu 5/3/18
233	15	Restripe Area for Helipad Designation	STRIPE	1 day	Fri 5/4/18	Fri 5/4/18
234	**16**	**Relocate RW 33 End**		**85 days**	**Thu 5/3/18**	**Fri 8/31/18**
235	16	Demolish Existing Pavement	PVDEMO[2]	56 days	Thu 5/3/18	Mon 7/23/18
236	16	Grade Work Area	GRADE	6 days	Tue 7/24/18	Tue 7/31/18
237	**16**	**Relocate PLASI**		**13 days**	**Wed 8/1/18**	**Fri 8/17/18**
238	16	Form and Place Slab for PLASI	SUCP	2 days	Wed 8/1/18	Thu 8/2/18
239	16	Cure Slab		7 days	Fri 8/3/18	Mon 8/13/18
240	16	Remove Existing PLASI (33)	GELIC	2 days	Tue 8/14/18	Wed 8/15/18
241	16	Relocate PLASI (33)	GELIC	2 days	Thu 8/16/18	Fri 8/17/18
242	**16**	**Displace RW 33 Threshold**		**4 days**	**Wed 8/8/18**	**Mon 8/13/18**
243	16	Remove Existing Striping and Markings	XSTRIPE	2 days	Wed 8/8/18	Thu 8/9/18
244	16	Re-Stripe/Mark Displaced RW 33 Threshold	STRIPE	2 days	Fri 8/10/18	Mon 8/13/18
245	**16**	**New Blast Pad (33)**		**7 days**	**Wed 8/1/18**	**Thu 8/9/18**
246	16	Place Basecourse (14" P209)	BASE	4 days	Wed 8/1/18	Mon 8/6/18
247	16	Place HMA Pavement (8" HMA)	ACPC	2 days	Tue 8/7/18	Wed 8/8/18
248	16	Stripe Blast Pad (33)	STRIPE	1 day	Thu 8/9/18	Thu 8/9/18
249	**16**	**Relocate Taxiway E**		**21 days**	**Tue 7/24/18**	**Tue 8/21/18**
250	16	Grade Work Area	GRADE	4 days	Tue 7/24/18	Fri 7/27/18
251	16	Place Basecourse (14" P209)	BASE	4 days	Mon 7/30/18	Thu 8/2/18
252	16	Place HMA Pavement (8" HMA)	ACPC	2 days	Fri 8/3/18	Mon 8/6/18
253	16	Stripe Taxiway E	STRIPE	1 day	Tue 8/7/18	Tue 8/7/18
254	16	Install Lighting for Relocated Taxiway E	GELIC	10 days	Wed 8/8/18	Tue 8/21/18
255	**16**	**Relocate RW Lighting (33)**		**8 days**	**Wed 8/22/18**	**Fri 8/31/18**
256	16	Remove Existing Lighting	GELIC	4 days	Wed 8/22/18	Mon 8/27/18
257	16	Install Lighting for RW 33	GELIC	4 days	Tue 8/28/18	Fri 8/31/18
258	**17**	**Install MALS**		**24 days**	**Mon 7/30/18**	**Thu 8/30/18**
259	17	Trenching / Conduit for MALS	UTILI	10 days	Mon 7/30/18	Fri 8/10/18
260	17	Install Runway MALS	GELIC	12 days	Mon 8/13/18	Tue 8/28/18
261	17	Pace Foundations for Elevated MALS	SUCP	4 days	Mon 8/13/18	Thu 8/16/18
262	17	Install Elevated MALS	UTPPC	10 days	Fri 8/17/18	Thu 8/30/18
263	**18**	**Relocate Localizer**		**88 days**	**Thu 3/1/18**	**Tue 7/3/18**
264	18	Clear Area (Tree Removal)	CLEAR	1 day	Thu 5/3/18	Thu 5/3/18
265	18	Cut Operation	BKFLC	1 day	Fri 5/4/18	Fri 5/4/18
266	18	Place Basecourse (10" P209)	BASE	1 day	Mon 5/7/18	Mon 5/7/18
267	18	Place HMA (5" HMA)	ACPC	1 day	Tue 5/8/18	Tue 5/8/18
268	18	Mobilize Barge	MWPILE	5 days	Thu 3/1/18	Wed 3/7/18
269	18	Drive Piles for Debris Shield (33 count)	WPILE	10 days	Thu 3/8/18	Wed 3/21/18
270	18	Place Debris Shield	WPILE	15 days	Thu 3/22/18	Wed 4/11/18
271	18	Drive Piles for Pier (45 count)	WPILE	15 days	Thu 4/12/18	Wed 5/2/18
272	18	Construct Wooden Pier	PIER	12 days	Wed 5/9/18	Thu 5/24/18
273	18	Install Localizer	FENCE	2 days	Fri 5/25/18	Tue 5/29/18
274	18	Remove Debris Shield and Piles	WPILE	20 days	Wed 5/30/18	Tue 6/26/18
275	18	Demolish Existing Localizer	GELIC	2 days	Wed 5/30/18	Thu 5/31/18
276	18	Demolish Existing Pavement	PVDEMO	2 days	Fri 6/1/18	Mon 6/4/18
277	18	Demobilize Barges	MWPILE	5 days	Wed 6/27/18	Tue 7/3/18
278	**19**	**Relocate Glideslope**		**12 days**	**Thu 5/3/18**	**Fri 5/18/18**
279	19	Grade Area for Access Road	GRADE	2 days	Thu 5/3/18	Fri 5/4/18
280	19	Place Basecourse (10" P209)	BASE	2 days	Mon 5/7/18	Tue 5/8/18
281	19	Place HMA (5" HMA)	ACPC	2 days	Wed 5/9/18	Thu 5/10/18
282	19	Place Slabs for Glideslope Equipment	SUCP	2 days	Fri 5/11/18	Mon 5/14/18
283	19	Relocate Existing Glideslope Equipment	GELIC	2 days	Tue 5/15/18	Wed 5/16/18
284	19	Stripe Access Road	STRIPE	2 days	Thu 5/17/18	Fri 5/18/18
285	**20**	**Rehabilitate - Reconstruct Taxiway T**		**56 days**	**Thu 5/3/18**	**Mon 7/23/18**
286	20	Full Depth Demolition as Needed	PVDEMO	25 days	Thu 5/3/18	Thu 6/7/18
287	20	Mill Pavement	PVMC	10 days	Fri 6/8/18	Thu 6/21/18
288	20	Place Basecourse (14" P209)	BASE	2 days	Fri 6/22/18	Mon 6/25/18

ID	Project Number	Task Name	Resource Names	Duration	Start	Finish
289	20	Place HMA (8" HMA)	ACPC	14 days	Tue 6/26/18	Mon 7/16/18
290	20	Restripe Taxiway T	STRIPE	5 days	Tue 7/17/18	Mon 7/23/18
291	**21**	**Relocate Taxiway J - Including Demo**		**58 days**	**Thu 5/3/18**	**Wed 7/25/18**
292	21	Cut Operation	BKFLC[2]	25 days	Thu 5/3/18	Thu 6/7/18
293	21	Install Storm Drain	DRNAGE	2 days	Fri 6/8/18	Mon 6/11/18
294	21	Fill Operation	BKFLC	4 days	Tue 6/12/18	Fri 6/15/18
295	21	Grade Site	GRADE	2 days	Mon 6/18/18	Tue 6/19/18
296	21	Place Basecourse (14" P209)	BASE	4 days	Wed 6/20/18	Mon 6/25/18
297	21	Place HMA (8" HMA)	ACPC	2 days	Tue 6/26/18	Wed 6/27/18
298	21	Install Taxiway Lighting	GELIC	8 days	Thu 6/28/18	Tue 7/10/18
299	21	Stripe Taxiway	STRIPE	1 day	Wed 7/11/18	Wed 7/11/18
300	21	Demolish Old Taxiway J	PVDEMO	10 days	Thu 7/12/18	Wed 7/25/18
301	**22**	**Overlay Runway 15-33**		**176 days**	**Thu 5/3/18**	**Mon 1/14/19**
302	22	Full Depth Demolition as Needed	PVDEMO[2]	40 days	Thu 5/3/18	Thu 6/28/18
303	22	Mill Pavement	PVMC	20 days	Fri 6/29/18	Fri 7/27/18
304	22	Place Basecourse (14" P209)	BASE	4 days	Mon 7/30/18	Thu 8/2/18
305	22	Place HMA (8" HMA)	ACPC[2]	100 days	Fri 8/3/18	Wed 12/26/18
306	22	Restripe Runway 15-33	STRIPE	12 days	Thu 12/27/18	Mon 1/14/19
307	**23**	**Replace ATCT Alternative 1**		**141 days**	**Thu 5/3/18**	**Tue 11/20/18**
308	23	Cut Operation	BKFLC	3 days	Thu 5/3/18	Mon 5/7/18
309	23	Install Storm Drain	DRNAGE	3 days	Tue 5/8/18	Thu 5/10/18
310	23	Grade Site	GRADE	2 days	Fri 5/11/18	Mon 5/14/18
311	23	Frame Foundation	PIER	5 days	Tue 5/15/18	Mon 5/21/18
312	23	Rough-In Utilities	UTILI	10 days	Tue 5/22/18	Tue 6/5/18
313	23	Place Foundation	SCPC	3 days	Wed 6/6/18	Fri 6/8/18
314	23	Erect Form Work	PIER	5 days	Mon 6/11/18	Fri 6/15/18
315	23	Place Tower Lift 01	ATCT	4 days	Mon 6/18/18	Thu 6/21/18
316	23	Cure Lift 01		7 days	Thu 6/21/18	Sun 6/24/18
317	23	Place Tower Lift 02	ATCT	4 days	Mon 6/25/18	Thu 6/28/18
318	23	Cure Lift 02		7 days	Thu 6/28/18	Sun 7/1/18
319	23	Place Tower Lift 03	ATCT	4 days	Mon 7/2/18	Fri 7/6/18
320	23	Cure Lift 03		7 days	Fri 7/6/18	Mon 7/9/18
321	23	Place Tower Lift 04	ATCT	4 days	Mon 7/9/18	Thu 7/12/18
322	23	Cure Lift 04		7 days	Thu 7/12/18	Sun 7/15/18
323	23	Erect Form Work for Cab	ATCT	4 days	Mon 7/16/18	Thu 7/19/18
324	23	Place Cab	ATCT	5 days	Fri 7/20/18	Thu 7/26/18
325	23	Place Interior Elements into Cab for Installation	ATCT	2 days	Fri 7/27/18	Mon 7/30/18
326	23	Set Exterior Cab Panels	ATCT	15 days	Tue 7/31/18	Mon 8/20/18
327	23	Install ATCT Interior Utilities and Systems		40 days	Tue 8/21/18	Tue 10/16/18
328	23	Interior Finish Work		20 days	Wed 10/17/18	Tue 11/13/18
329	23	Install Access Road and Lot Lighting	UTPPC	4 days	Wed 11/14/18	Mon 11/19/18
330	23	Stripe ATCT Access Road and Lot	STRIPE	1 day	Tue 11/20/18	Tue 11/20/18
331	**24**	**Replace ATCT Alternative 2**		**168 days**	**Thu 5/3/18**	**Wed 1/2/19**
332	24	Cut Operation	BKFLC	12 days	Thu 5/3/18	Fri 5/18/18
333	24	Install Storm Drain	DRNAGE	5 days	Mon 5/21/18	Fri 5/25/18
334	24	Fill Operation	BKFLC	8 days	Tue 5/29/18	Thu 6/7/18
335	24	Clearing Operation	CLEAR	2 days	Fri 6/8/18	Mon 6/11/18
336	24	Grade Site	GRADE	3 days	Tue 6/12/18	Thu 6/14/18
337	24	Frame Foundation	PIER	5 days	Fri 6/15/18	Thu 6/21/18
338	24	Rough-In Utilities	UTILI	10 days	Fri 6/22/18	Fri 7/6/18
339	24	Place Foundation	SCPC	3 days	Mon 7/9/18	Wed 7/11/18
340	24	Erect Form Work	PIER	5 days	Thu 7/12/18	Wed 7/18/18
341	24	Place Tower Lift 01	ATCT	4 days	Thu 7/19/18	Tue 7/24/18
342	24	Cure Lift 01		7 days	Tue 7/24/18	Fri 7/27/18
343	24	Place Tower Lift 02	ATCT	4 days	Fri 7/27/18	Wed 8/1/18
344	24	Cure Lift 02		7 days	Wed 8/1/18	Sat 8/4/18
345	24	Place Tower Lift 03	ATCT	4 days	Mon 8/6/18	Thu 8/9/18
346	24	Cure Lift 03		7 days	Thu 8/9/18	Sun 8/12/18



ID	Project Number	Task Name	Resource Names	Duration	Start	Finish
347	24	Place Tower Lift 04	ATCT	4 days	Mon 8/13/18	Thu 8/16/18
348	24	Cure Lift 04		7 days	Thu 8/16/18	Sun 8/19/18
349	24	Place Tower Lift 05	ATCT	4 days	Mon 8/20/18	Thu 8/23/18
350	24	Cure Lift 05		7 days	Thu 8/23/18	Sun 8/26/18
351	24	Erect Form Work for Cab	ATCT	4 days	Mon 8/27/18	Thu 8/30/18
352	24	Place Cab	ATCT	5 days	Fri 8/31/18	Fri 9/7/18
353	24	Place Interior Elements into Cab for Installation	ATCT	2 days	Mon 9/10/18	Tue 9/11/18
354	24	Set Exterior Cab Panels	ATCT	10 days	Wed 9/12/18	Tue 9/25/18
355	24	Install ATCT Interior Utilities and Systems		40 days	Wed 9/26/18	Tue 11/20/18
356	24	Interior Finish Work		20 days	Wed 11/21/18	Thu 12/20/18
357	24	Install Access Road and Lot Lighting	UTPPC	5 days	Fri 12/21/18	Fri 12/28/18
358	24	Stripe ATCT Access Road and Lot	STRIPE	2 days	Mon 12/31/18	Wed 1/2/19
359	**25**	**Relocate AWOS and Taxiway D Demo**		**40 days**	**Thu 5/3/18**	**Thu 6/28/18**
360	**25**	**Relocate AWOS**		**7 days**	**Thu 5/3/18**	**Fri 5/11/18**
361	25	Place Pad(S) for AWOS Systems	SUCP	2 days	Thu 5/3/18	Fri 5/4/18
362	25	Relocate AWOS Systems	GELIC	5 days	Mon 5/7/18	Fri 5/11/18
363	**25**	**Taxiway D Demolition**		**33 days**	**Mon 5/14/18**	**Thu 6/28/18**
364	25	Demolish Taxiway D	PVDEMO	15 days	Mon 5/14/18	Mon 6/4/18
365	25	Cut Operation	BKFLC	15 days	Tue 6/5/18	Mon 6/25/18
366	25	Remove Storm Drain	DRNAGE	3 days	Tue 6/26/18	Thu 6/28/18
367	**26**	**C-EB-Geometry Modifications**		**20 days**	**Thu 5/3/18**	**Thu 5/31/18**
368	26	Demolish Existing Pavement	PVDEMO	10 days	Thu 5/3/18	Wed 5/16/18
369	26	Cut Operation	BKFLC	2 days	Thu 5/17/18	Fri 5/18/18
370	26	Grade Site	GRADE	2 days	Mon 5/21/18	Tue 5/22/18
371	26	Place Basecourse (14" P209)	BASE	2 days	Wed 5/23/18	Thu 5/24/18
372	26	Place HMA (8" HMA)	ACPC	2 days	Fri 5/25/18	Tue 5/29/18
373	26	Stripe Area	STRIPE	2 days	Wed 5/30/18	Thu 5/31/18
374	**27**	**Extend Vehicle Service Road**		**18 days**	**Thu 5/3/18**	**Tue 5/29/18**
375	27	Demolish Existing Service Road	PVDEMO	12 days	Thu 5/3/18	Fri 5/18/18
376	27	Place Basecourse (10" P209)	BASE	2 days	Mon 5/21/18	Tue 5/22/18
377	27	Place HMA (5" HMA)	ACPC	2 days	Wed 5/23/18	Thu 5/24/18
378	27	Stripe Service Road	STRIPE	2 days	Fri 5/25/18	Tue 5/29/18
379	**28**	**Taxiway S Demolition**		**23 days**	**Thu 5/3/18**	**Tue 6/5/18**
380	28	Demolish Existing Taxiway S	PVDEMO	8 days	Thu 5/3/18	Mon 5/14/18
381	28	Cut Operation	BKFLC	10 days	Tue 5/15/18	Tue 5/29/18
382	28	Remove Storm Drain	DRNAGE	3 days	Wed 5/30/18	Fri 6/1/18
383	28	Regrade Site	GRADE	2 days	Mon 6/4/18	Tue 6/5/18
384	**29**	**Relocate-Reconstruct T Hangars/New Corporate Hangars**		**222 days**	**Thu 5/3/18**	**Tue 3/19/19**
385	**29**	**Site Preparation**		**64 days**	**Thu 5/3/18**	**Thu 8/2/18**
386	29	Demolish Existing Pavement	PVDEMO	40 days	Thu 5/3/18	Thu 6/28/18
387	29	Clearing Operations	CLEAR	2 days	Fri 6/29/18	Mon 7/2/18
388	29	Grade Area	GRADE	12 days	Tue 7/3/18	Thu 7/19/18
389	29	Install Storm Drain	DRNAGE	10 days	Fri 7/20/18	Thu 8/2/18
390	**29**	**Apron Work**		**158 days**	**Fri 8/3/18**	**Tue 3/19/19**
391	29	Place Base Course (14" P209)	BASE	10 days	Fri 8/3/18	Thu 8/16/18
392	29	Place HMA (8" HMA)	ACPC	7 days	Fri 8/17/18	Mon 8/27/18
393	29	Place Tie-Ins for New Corporate Hangars	SUCP	16 days	Tue 8/28/18	Wed 9/19/18
394	29	Erect Frame Work for Corporate Hangars	PREF	80 days	Thu 9/20/18	Tue 1/15/19
395	29	Interior Finishings		40 days	Wed 1/16/19	Tue 3/12/19
396	29	Stripe Apron	STRIPE	5 days	Wed 3/13/19	Tue 3/19/19
397	**29**	**Service Road**		**13 days**	**Tue 8/28/18**	**Fri 9/14/18**
398	29	Place Basecourse (10" P209)	BASE	3 days	Tue 8/28/18	Thu 8/30/18
399	29	Place HMA (5" HMA)	ACPC	3 days	Fri 8/31/18	Wed 9/5/18
400	29	Install Service Road Lighting	FENCE	5 days	Thu 9/6/18	Wed 9/12/18
401	29	Stripe Service Road	STRIPE	2 days	Thu 9/13/18	Fri 9/14/18