

AIRPORT LAYOUT PLAN UPDATE NARRATIVE REPORT

MAMMOTH YOSEMITE AIRPORT



PREPARED FOR THE TOWN
OF MAMMOTH LAKES



PREPARED BY



JANUARY 2023

**MAMMOTH YOSEMITE AIRPORT
MAMMOTH LAKES, MONO COUNTY, CALIFORNIA
AIRPORT LAYOUT PLAN UPDATE NARRATIVE**

*Prepared for
Town of Mammoth Lakes, California*

*Prepared by:
Brandley Engineering*

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FULL SIZE PLANS SUBMITTED SEPARATELY

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EXECUTIVE SUMMARY

Mammoth Yosemite Airport (MMH) is owned and operated by the Town of Mammoth Lakes, California. Mammoth Yosemite Airport, located 6 miles east of the Town of Mammoth Lakes immediately to the north of U.S. Highway 395, serves the commercial and general aviation needs of the Mammoth Lakes area. The main attractions to Mammoth Lakes include the Mammoth Mountain Ski Area (MMSA), Devils Postpile National Monument, fishing, boating, hiking, biking, mountain recreation, festivals, and other arts & cultural events. It is near the east entrance to Yosemite National Park, the Inyo National Forest, and several wilderness areas.

Mammoth Yosemite Airport is located in the Sierra Nevada Mountain range in Mono County, California at an elevation of 7,135 feet above mean sea level. The 263.13-acre site includes 196.23 acres of airport owned land, 49.60 acres of land leased from LADWP and 17.30 acres of land with a special use permit from USFS.

An Airport Layout Plan for Mammoth Yosemite Airport (MMH) dated July 2014, was approved by the Federal Aviation Administration (FAA) in August 2014. This new updated Airport Layout Plan has been prepared and submitted to the FAA dated January 2023.

The airport consists of one runway, Runway 9-27, which is 100 feet wide by 7,000 feet long. There is one parallel Taxiway A and five cross taxiways. The existing aircraft parking apron at the airport is approximately 475,000 square feet and has 73 aircraft parking positions.

There are currently 129 hangars at the airport ranging in size from small glider storage facilities to large turbojet hangar facilities. These hangars are privately owned on leased ground and are designated as the East Corporate Hangars, the West Executive Hangars and Town Hangars.

There is one 5,000 square foot interim terminal building, which handles nearly all commercial operations. Airline baggage pick up is located outside the building. There is also a 2,250 square foot sprung structure adjacent to the terminal building, which serves as an additional hold room.

There is one Fixed Base Operator (FBO) office and pilots' lounge on the airport, a small Airport Manager's Office, and an electrical and telephone vault.

There are currently 7 aircraft based at the airport which is projected to remain steady with zero to minimal growth over the next 10 years. There were 6,744 total operations in 2018 which are projected to grow to 7,755 total operations in 2028. There were 22,594 passenger enplanements in 2018 which is projected to grow to 24,387 passenger enplanements in 2028. The critical aircraft is the Bombardier CRJ-700 used by the airline which provide commercial service to Mammoth Yosemite Airport. The existing Airport Reference Code is C-II. The future critical aircraft is the EMB 175 commonly used by several airline services. The future Airport Reference Code is C-III.

This Airport Layout Plan Study identified the following deficiencies that have been addressed by the future planned development of Mammoth Yosemite Airport.

- The existing runway designation numbers 9-27 do not match the magnetic heading of the runway due to gradual changes in magnetic declination. It is recommended the runway numbers be updated to 10-28.
- The runway length is inadequate to accommodate the existing traffic without reasonable load restrictions. A 1,200-foot runway extension is recommended.
- The Runway Safety Area (RSA) and Runway Object Free Area (ROFA) grading between Runway 9-27 and Highway 395 does not meet FAA standards. It is recommended this area be regraded.
- The west supplemental wind cone is a Runway Object Free Area (ROFA) obstruction. It is recommended to relocate this wind cone to be in line with the existing Highway 395 fence which is still within the ROFA but is mitigated by existing obstruction lights on existing utility poles along this fence line.
- The existing taxiway fillet geometry does not meet the current FAA standard. It is recommended that the fillet geometry be upgraded in the future.
- The existing Taxiway A and associated cross taxiways do not have paved shoulders. It is recommended to add 15-foot paved shoulders to meet the current FAA standards.
- The existing cross Taxiway A3 and A4 configurations do not meet FAA standards because they provide direct access from the apron or hangar areas to the runway. It is recommended to relocate a portion of each cross taxiway to require aircraft to make two 90 degree turns when taxiing from the apron or hangar areas to the runway.
- The existing taxiway has taxiway reflectors to provide assistance during night operations. It is recommended that a taxiway lighting system be installed in the future.
- The T-Hangar taxilanes exhibit surface deterioration with a PCI of 35 in 2014. It is recommended to reconstruct or mill and fill these taxilanes. The general aviation and temporary terminal auto parking lot pavement is failing. It is recommended to reconstruct this pavement area.
- The existing approach lighting system and navigation aids are adequate except the Doe Ridge obstruction lights and poles require replacement. The addition of a MALSF on Runway 27 in the future would improve the approach in the low visibility conditions.
- The existing terminal building is inadequate as shown in the 2017 Terminal Area Development Plan. Construction of a new terminal complex including new terminal building, aircraft parking apron, deicing apron, access taxiways, access roads and parking lot is recommended.
- There is a need to construct a new ARFF/Snow Removal building to store the ARFF vehicle and snow removal equipment out of the weather elements. The new building is located in close proximity to the new terminal building. Its location is within the AWOS critical area. As a result, the AWOS will need to be relocated to a new site and upgraded to an AWOS P/T.
- The general aviation apron is constrained for space during the peak months. It is recommended to construct an expansion of the general aviation apron and reconfigure the apron to provide a dedicated area for charter jet parking and general aviation aircraft parking. In addition, there is significant helicopter traffic. It is recommended to construct a new helicopter parking apron to separate the helicopter traffic from the charter and general aviation aircraft traffic.

- There is a need for several new 17,000 to 18,000 square foot hangars to accommodate overnight parking for jet aircraft. In addition, a hangar expansion is planned to replace the existing hangars which block runway access from the valuable land behind them.
- The existing ARFF vehicle needs to be replaced when it reaches the end of its useful life.
- A large portion of the existing perimeter fencing is barb wire. In order to improve airport security and protect the airport from wildlife incursions, it is recommended to install a new 8' chain link fence.
- There are significant portions of land surrounding the airport owned by the U.S. Forest Service (USFS) and Los Angeles Department of Water and Power (LADWP). Some portions have existing leases or special use permits. It is recommended to acquire these lands to protect the runway approaches, ROFA and provide space for expansion of the airport facilities.

In order to correct deficiencies in the existing facilities at Mammoth Yosemite Airport and to provide for the forecast growth, a series of development projects have been proposed and are shown on the Airport Layout Plan. These include the following:

Short-Term – 0 to 5 Years:

- Construct – 7-bay ARFF/Snow Removal Facility (10,350 Sq. Ft.), Utilities, Access Road (25'-35' x 1,650'), Apron (31,200 Sq. Ft.) – 2023
- Design/Construct – Reconstruct General Aviation and Temporary Terminal Auto Parking Lot (83,000 Sq. Ft.) – 2023
- Environmental Assessment – Land Acquisition – U.S. Forest Service Land (155.61 Acres) – 2024
- Environmental Assessment – Land Acquisition – LADWP Land (74.24 Acres) – 2024
- Construct – Wildlife Security Fence (23,000 Ln. Ft.) – 2024
- Design/Construct – Rehabilitate Tee Hangar Taxilanes (25' x 1,280') - 2024
- Architectural/Engineering – Airline Terminal Building – 2024
- Design – Terminal Access Road, Automobile Parking Lot, Terminal Area Utilities – 2024
- Design – Airline Terminal Apron, Deicing Pad, Terminal Apron Taxiways and Relocation of T/W A4 Connector – 2024
- Design and Construct – Rental Car Kiosk – 2024
- Design/Construct – Relocate Fuel Tanks and Self Serve Island – 2024
- Relocate G Hangars (6 Hangars) – 2024
- Design/Construct – 2 New Charter Jet Hangar (18,000 Sq. Ft. Each) – 2024
- Design/Construct – Phase 1 Helicopter Parking Apron (180,925 Sq. Ft.) and Access Taxiway (1,330' x' 40') and Access Road and Parking Lot (26,000 Sq. Ft.) – 2025
- Design/Construct – Buildings/Portables, Parking Lot and Building Site – 2025
- Construct – Airline Terminal Building – 2026
- Construct – Terminal Access Road, Automobile Parking Lot, Terminal Area Utilities – 2026
- Construct – Airline Terminal Apron, Deicing Pad, Terminal Apron Taxiway and Relocation of T/W A4 Connector – 2026
- Design/Construct – Runway Safety Area (RSA) and Runway Object Free Area (ROFA) Grading (323,000 Sq. Yd.), Relocate Wind Cone – 2026
- Land Acquisition – LADWP Land (74.24 Acres) – 2026

- Land Acquisition – U.S. Forest Service Land (155.61 Acres) – 2026
- Environmental Assessment – Replace Doe Ridge Obstruction Lights – 2026
- Equipment Acquisition – Replace ARFF Vehicle – 2026
- Design/Construct – 2 New Charter Jet Hangar (18,000 Sq. Ft. Each) – 2026
- Design/Construct – Construct Taxiway A Shoulders (15' x 14,700'), Upgrade Taxiway Fillets, Relocate Taxiway A3 Connector, Install Taxiway Lights - 2027
- Design and Construct – MAGVAR Change Runway Numbers to 10-28 Including Update Signage – 2027

Mid-Term – 6 to 10 Years:

- Replace Doe Ridge Obstruction Lights - 2028
- Design/Construct – General Aviation Apron North Expansion (142,000 Sq. Ft.) – 2029
- Design/Construct - Helicopter Parking Apron (202,645 Sq. Ft.) and Access Road and Parking Lot (26,000 Sq. Ft.) – Phase 2 – 2030

Long-Term:

- Design/Construct - Expand Charter Tie Down Apron (118,500 Sq. Ft.)
- Design/Construct - New Hangar Taxilanes (35' x 3,000')
- Design/Construct - Long Term Automobile Parking Lot (Hot Creek Aviation) (90,000 Sq. Ft.)
- Environmental Assessment – Runway 10 & 28 Extension
- Design/Construct - Runway 28 Extension (124' x 700')
- Design/Construct - MALSF Runway 28
- Design/Construct - Runway 10 Extension (124' x 500')
- Design/Construct – Helicopter Parking Apron (66,450 Sq. Ft.) – Phase 3

Funding Plan:

When enplanements are met, Mammoth Yosemite Airport is eligible for \$1,000,000 in annual AIP entitlement funds from Federal Aviation Administration AIP funding and can compete for additional AIP discretionary funds. The Airport will have adequate funding to meet their local match for these projects.

On November 15, 2021, the Bipartisan Infrastructure Bill (BIL) was signed into law which includes approximately \$20 billion for airport infrastructure improvements, terminal development and airport owned towers to be allocated over 5 years. Mammoth Yosemite Airport will receive \$1,011,184 in Airport Infrastructure Grant Allocated (AIG Allocated) funds for 2022 and \$1,011,050 in 2023 and an additional undetermined amount in 2024, 2025 and 2026. In addition, Mammoth Yosemite Airport will be eligible to compete for the Airport Infrastructure Grants Competitive (AIG Competitive) funds for the Airport Terminal Program (ATP). The Allocated funds can be used for any AIP eligible project and may be best used to fund low priority projects which would otherwise not compete well for AIP discretionary funding. The Airport Terminal Program AIG Competitive funds provides Mammoth Yosemite Airport a potential avenue to fast track their planned new terminal development.

Total short-term development project costs total approximately \$76,032,650, the mid-term development project costs total approximately \$6,711,250 and the long-term development costs

total \$17,532,250. A full implementation plan for development of short-term, mid-term, and long-term projects has been presented in this Airport Layout Plan Narrative Chapter 8. It is anticipated that the New Charter Jet Hangar (2023), Relocate Fuel Tanks (2023), Relocate G Hangars (2030) and Long-Term Automobile Parking Lot (2033-2042) will be privately funded by the FBO. The Rental Car Wash Kiosk (2022) will be privately funded by Enterprise Rental Car. All other development projects will be funded under the Federal Aviation Administration Airport Improvement Program (AIP) or BIL/AIG Allocated and Airport Terminal Program Competitive funds at 90.66 to 95 percent and local monies will fund the remainder of the projects.

CHAPTER 1. INTRODUCTION

Mammoth Yosemite Airport, located 6 miles east of the Town of Mammoth Lakes immediately to the north of U.S. Highway 395, serves the commercial and general aviation needs of the Mammoth Lakes area. The Airport is owned and operated by the Town of Mammoth Lakes.

Airport Sponsors are required by the Federal Aviation Administration (FAA) to keep their Airport Layout Plan (ALP) current, reflecting current conditions, and growth and expandability of the facility. An Airport Layout Plan narrative and drawing set provides the Airport Sponsor with recommended airport development in the short term (0 to 5 years), mid-term (6 to 10 years), and long term (11 to 20 years). The ALP update for Mammoth Yosemite Airport (MMH) will guide the Town of Mammoth Lakes in the development of this airport.

The Airport Layout Plan was last updated in 2014. The Airport Layout Plan has been further updated and a summary of changes made and recommendations for development are presented in this Airport Layout Plan Update Narrative.

This narrative report provides an outline of the research and analysis that makes up the framework for the ALP document and its related changes. In accordance with FAA Advisory Circular 150/5370-6B-Change 2 Airport Master Plans and FAA Standard Operating Procedure 2.0, Standard Procedure for FAA Review and Approval Airport Layout Plans (ALPs), this report contains the following elements:

- Inventory
- Basic Aeronautical Forecasts
- Facility Requirements
- Preliminary Identification of Environmental Features
- Wildlife Hazard Management Issues Review
- Alternatives Development and Evaluation
- Modifications to Standards
- Development Summary
- The Airport Layout Plan Sheets No. 1 through 14 are submitted separately and included in this narrative by reference.

Airport standards, aviation forecasts, and airport development requirements to accommodate the standards and forecasts are expected to change over time with changes in economic conditions, environmental requirements, and political environment. This Airport Layout Plan and Narrative Report has been prepared to accommodate existing and forecast growth conditions and provide guidance for development of the airport to accommodate existing and forecast growth. It is important that the Airport Layout Plan be reviewed and updated at least once every five years to plan for and accommodate any changes that develop. Flexibility has been incorporated into the Airport Layout Plan to allow changes if and when required.

CHAPTER 2. INVENTORY

This chapter describes existing facilities on the Mammoth Yosemite Airport. This information is to be used as a baseline for the development of the updated Airport Layout Plan.

2-1 History of the Airport

World War II through 1965: Mammoth Yosemite Airport (MMH) was originally constructed by the United States (U.S.) Army for use as an auxiliary landing strip during World War II. The original dimensions of the landing strip were less than 4,000 feet in length by 30 feet in width. Mono County acquired part of the airfield from the U.S. Army after the war and renamed it Long Valley Field. The runway was an unpaved dirt strip and the airport was a seasonal facility closed by winter snows until it was paved in 1959. The airport was operated as an unattended landing strip until the early 1960s.

1965 to 1978: In 1965 the runway was extended to 5,000 feet and widened to 100 feet. Also at this time, the runway was relocated 300 feet to the north on USFS land to accommodate the future widening of U.S. Highway 395, which runs adjacent to the airport. The airport was renamed Mammoth Lakes Airport and private interests operated the airfield. Mammoth Sky Lodge Corporation, then the airport operator, extended the runway to 6,500 feet in 1971. A terminal building and an airport office, currently used as an FBO office and pilots' lounge, were constructed in 1972. During this time the airport became formally known as Mammoth-June Lakes Airport. In 1973 Sierra Pacific Airlines initiated service using Convair 440 aircraft and served Mammoth Lakes until 1980.

1978 to 1992: Mono County entered into an agreement with Mammoth Sky Lodge Corporation to acquire all airport property in 1978 from the USFS; however, the acquisition of the airport was not consummated until 1980. Mono County reestablished public operation of the airport in 1980. Mono County began an airfield improvement program in 1983. Using funds received under the Airport Improvement Program (AIP) a new runway, 7,000 feet by 100 feet, was constructed.

1992 to 1995: The Town of Mammoth Lakes acquired the airport from Mono County in October 1993. United Express operated flights from Mammoth Lakes to Fresno, using 19-seat Jetstream 31 turboprop aircraft for the winter seasons of 1993 and 1994. Service reliability problems associated with overbooking and the 19-seat Jetstream aircraft led to passenger dissatisfaction, causing United Express to discontinue service. Additionally, Trans World Express terminated flight operations in 1995 due to reorganization of its major code share partner, Trans World Airlines. This reorganization of Trans World Airlines was required under Chapter 11 of the Federal Bankruptcy Code.

1997 to 2007: In 1997 new airport development was proposed for the airfield. Previous plans for the crosswind runway and supporting taxiways and golf course were abandoned. An extension of the current Runway 9-27 from 7,000 to 9,000 feet was proposed, as was the construction of a hotel/condominium complex.

The new airport development, reviewed in the 1997 EIR, included both airside and landside developments by a private developer. Airside improvements included the proposed building of up to 94 private and public use hangars, an aviation fuel storage complex, and facilities for the operation of a fixed base operator (FBO). Landside development consisted of a hotel and residential condominium complex, retail

development, a restaurant complex, and a recreational vehicle park. Eventually 94 hangars and the airport water system were constructed but, for a variety of reasons, the bulk of the development was never constructed. Eventually, the developer sued the Town for breach of contract and prevailed. A settlement was reached in September of 2012, which dissolved the development agreement and returned development rights back to the airport.

In the late 1990s the Town and American Airlines proposed a large development project for MMH. The project included a longer and wider runway, a new terminal building, and related infrastructure to support Boeing 757 service from Dallas and Chicago and was based on a forecast of 330,000 annual passenger enplanements after 20 years. This project was enjoined in Federal court in 2003. After the injunction the Town has worked to initiate airline service at the airport. In 2005 an Environmental Impact Statement (EIS) was prepared to accommodate the Town's scaled-back vision for the airport. The EIS provided for regional commercial air service using aircraft of 80 seats or less, 8 flights daily in the winter, and summer service, all to regional markets. The EIS also approved the remodel of an existing airport structure, which is now the interim terminal building.

In 2000 the Town of Mammoth Lakes changed the name of the airport from Mammoth Lakes Airport to Mammoth Yosemite Airport.

Charter service began in 1999 with 720 annual turbine operations (mostly charter flights) utilizing King Air's and smaller jets. As a result of continued high end development in the Town of Mammoth Lakes, the charter service grew rapidly to 1,958 annual operations in 2003 and 2,858 annual operations in 2006.

2007 to Present: By 2007 all the pavements at the airport had shown severe cracking caused by thermal stresses. In 2008 the entire runway/taxiway complex at the airport was reconstructed.

The airport office and maintenance hangar was repurposed and remodeled in 2008 as an interim terminal building and has a floor plan area of 5,000 square feet. Air service restarted in December of 2008 with one flight daily from LAX flown by Alaska Airlines using the 76 seat Bombardier Q400. In 2010 United Airlines using the 70-seat Bombardier CRJ 701 began service from SFO. Summer air service started in 2010 with Alaska Air from LAX. In the winter of 2010-11 air service had four daily flights. In the winter of 2013-14 there were up to six flights on peak days, with three flights by United Airlines and three by Alaska Air. The 2013-14 destinations included LAX, SNA, SAN, and SFO. Commercial air service has been highly successful as evidenced by the growth in the number of flights, markets, and passenger loads, particularly from the LAX and SAN area. Due to increased interest, for the 2014-15 season, flights have been added on a limited basis to LAS and DEN.

Prior to 2012 all airline contracts were negotiated by Mammoth Mountain Ski Area (MMSA) and any required subsidies were paid to the airline by MMSA. Since 2013 airline contracts are negotiated and subsidized as necessary by both MMSA and Mammoth Lakes Tourism (MLT). MLT is an independent body that is funded through a Tourism Business Improvement District (TBID) paid by local business and a portion of the Town of Mammoth Lakes transient occupancy tax. MLT is able to pay the bulk of the airline subsidy from funds generated by the TBID.

With six flights daily passenger overcrowding in the existing interim terminal building is a major problem. Issues include passengers waiting at the security boarding gate and outside the building with minimal waiting areas away from inclement weather. Flight delays at other airports can exacerbate the capacity problems both in the terminal area and the commercial ramp area. In 2011 The Airport erected a temporary sprung structure as a temporary hold room to alleviate some of the capacity problems. Despite the addition of the sprung structure, issues including crowding of the ticket counters, TSA security checkpoints, hold rooms, rest rooms, baggage handling facilities, and space on the ramp for aircraft parking are still a significant problem for the interim terminal building.

The Town and Wallace Environmental Consulting have completed an Environmental Assessment for the new proposed terminal facilities and ARFF/Snow Removal facility and have received FAA approval.

By 2007 the strong charter service flights had 2,628 annual operations. The combination of initiation of airline service and the 2008 financial crisis resulted in a temporary dip in the charter service flights through 2016 with 1,838 to 2,022 annual charter service operations. JSX began serving Mammoth Yosemite Airport with Scheduled 135 Charter Service in winter of 2016/2017 with one flight per day, four days per week during the winter season. Between 2016 and 2019 the charter service accelerated with up to 3,000 annual operations. In the winter of 2020 Advanced Air proposed Scheduled 135 Charter Service four days per week from three Southern CA locations (Hawthorne, Carlsbad, Burbank). Unfortunately, due to the COVID 19 pandemic and subsequent travel restrictions this charter service was postponed and 2020 annual charter operations were 2,236. However, the same routes and frequency is currently planned for the winter of 2021/2022 with the possibility of additional days if an agreement can be reached with the stakeholders in Mammoth.

In 2015 the west portion of the General Aviation Apron was reconstructed. In 2019 the primary wind cone and segmented circle were relocated from the south side of the runway to the north side of the runway to move it out of the Runway Object Free Area. In 2020 the Town Hangar Taxiway was reconstructed and Taxiway A and associated cross taxiways were slurry sealed. In 2021 new security fencing, gates, cameras, and security system were installed in the airline terminal and general aviation hangar and apron areas and the east portion of the General Aviation Apron was reconstructed.

2-2 Location and Setting

MMH is located in the eastern edge of the Sierra Nevada Mountain Range. It is a mountainous area with moderately broad valleys. The airport is located 6 miles east of the Town of Mammoth Lakes immediately to the north of U.S. Highway 395. The runway centerline is parallel to the adjacent US 395 highway centerline. The nearest airports to the MMH are general aviation airports including Lee Vining, 22 miles to the northwest, and Bridgeport, 47 miles to the northwest. The nearest passenger commercial airports are Bishop, 32 miles to the southeast, Reno – 170 miles, Fresno – 190 miles, Sacramento – 250 miles, SFO Bay Area – 330 miles, Las Vegas – 310 miles, and LAX – 310 miles.

The location of the airport and adjacent facilities is shown on Exhibit 2-1.

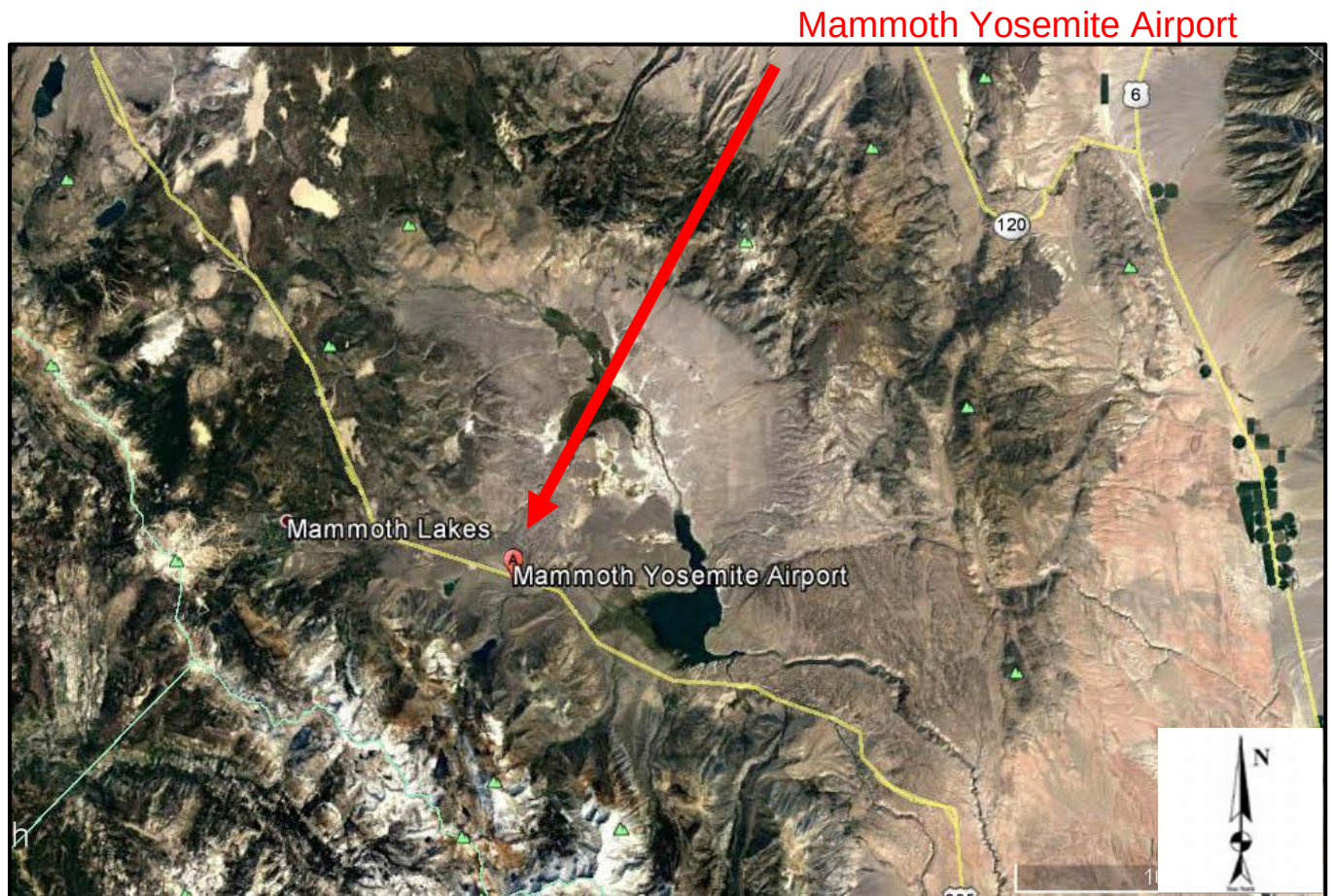


Exhibit 2-1
Location Map
Mammoth Yosemite Airport

2-3 Climate

MMH is located in the Sierra Nevada Mountain Range with an Airport elevation of 7,135 feet. During the summer, the weather is generally clear and warm with no major rainfall. A few thunderstorms occur in the area during the summer. In the winter the weather is fairly cold with significant snow. Over the past ten years, MMSA, located approximately 10 miles to the west of this airport, has an average annual snowfall of 392 inches, with a high of 668 inches and a low of 159 inches. Throughout the year the weather is generally VFR conditions except during snowstorms in the winter, at which time visibilities and ceilings become very low. There is a significant differential range in temperature of approximately 30 to 40 degrees F from day to night. This differential occurs summer and winter. Wind speeds vary significantly throughout the year from mild to moderate wind speeds to severe wind speeds in excess of 50 MPH typically from the west or southwest.

2-4 Geography

The general area is mountainous. The airport is located in the Sierra Nevada Mountain Range. The airport is located adjacent to the mountains in a moderately wide valley.

2-5 Airport Role in the Community

Mammoth Yosemite Airport plays a vital role in supporting the Town of Mammoth Lakes and surrounding community. The primary role of the airport is supporting tourism by bringing in visitors and vacationers for recreation including snow sports and sightseeing for Yosemite National Park, Devils Postpile National Monument, fishing, boating, hiking, biking, mountain recreation, festivals, and other arts & cultural events and surrounding monuments in Mammoth. However, the Airport also supports the community through many vital secondary roles including medical transport, firefighting (Forest Service and Cal Fire), search and rescue, military operations (USAF, Army, Navy), NASA weather monitoring and utility inspections (Southern California Edison, Department of Water and Power Los Angeles).

2-6 Airfield Facilities

The airfield consists of features and facilities required to accommodate safe and efficient current and future aircraft operations. The airfield includes one runway, taxiways, aircraft parking aprons, hangar facilities, terminal facilities and a fixed base operator building. The major airfield facilities at this airport consist of the following items:

- Runway 9-27 is 7,000 feet long by 100 feet wide with 12-foot shoulders. The runway has full-length runway sighting distance. Runway 9 is a visual runway. Runway 27 is a Non-Precision runway with 1¼-mile visibility minimums. The Runway Design Code (RDC) for Runway 9 is C/II/VIS and for Runway 27 is C/II/5000.
- The taxiway system consists of one parallel taxiway (Taxiway A) and five cross taxiways, which are 50 feet wide. The centerline of the parallel taxiway is located 300 feet from the centerline of the runway. Taxiway A runs the full length of the runway. There are holding aprons at the ends of the runway. There are no shoulders on the taxiway. Taxiway A is classified as a Taxiway Design Group (TDG) 2.

The following 50-foot-wide collector taxiways exist on the airport:

- Taxiway A1 connects Taxiway A to Runway 27
- Taxiway A2 connects Taxiway A to Runway 9-27
- Taxiway A3 connects Taxiway A to Runway 9-27 and to the east tee hangar taxilane.
- Taxiway A4 connects Taxiway A to Runway 9-27 and to the aircraft parking apron.
- Taxiway A5 connects Taxiway A to Runway 9 and to the west tee hangar taxilane.

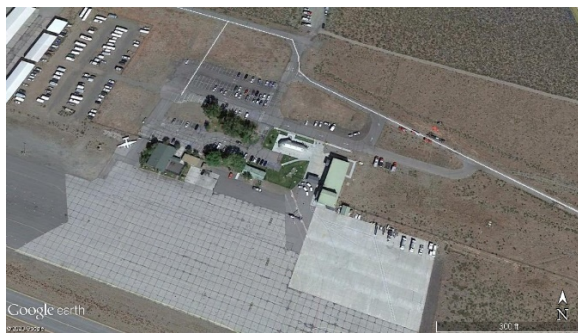
- The aircraft parking apron consists of 58,000 square feet of 12-inch Portland cement concrete and 417,000 square feet of flexible pavement section. There are 73 tie down spaces for small aircraft and additional space for charter aircraft short term parking and/or passenger pick up and drop off on the apron.

A Google Earth photo depicting the airfield facilities is presented in Exhibit 2-2.





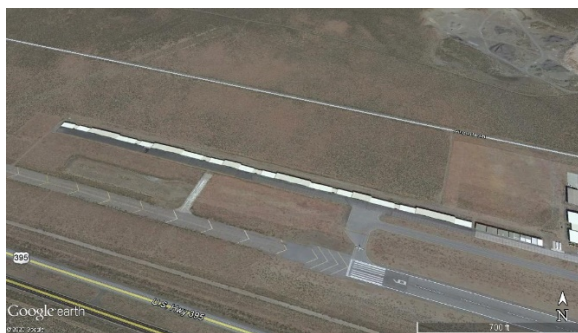
Overall Airport Facilities



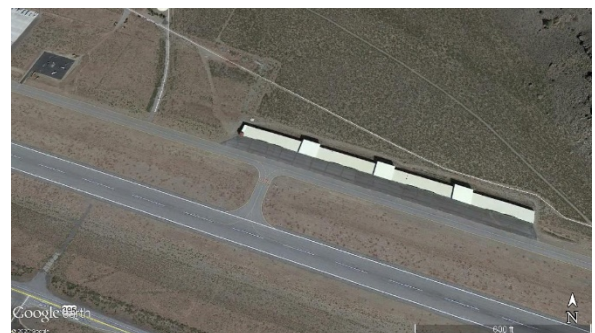
Terminal Building and Apron



Aircraft Hangars and Tie Down Apron



West Executive Hangars and Town Hangars



East Corporate Hangars

Exhibit 2-2 Airport Facilities * Mammoth Yosemite Airport

2-7 Airfield Pavements/Geotechnical

The existing airfield pavement sections at this airport are summarized in Table No. 2-1.

TABLE NO. 2-1 MAMMOTH YOSEMITE AIRPORT PAVEMENT SECTIONS			
Item	Pavement Section - inches		
	AC	AB	ASB
Runway 9-27	3	5	10
Taxiway A	3	6	10
Taxiway A1	3	6	10
Taxiway A2	3	6	10
Taxiway A3	3	6	10
Taxiway A4	3	6	10
Taxiway A5	3	6	10
Apron A1 PCC	10 PCC	4	-
Apron A1 AC*	4	6	11
Apron A2*	4	6	11
Apron A3	3	6	7
T-Hangars	3	4	-
West Hangars	3	8	6
West Hangars	3	6	-
East Hangars	3	6	-

* Represents conditions after 2021 Reconstruct East General Aviation Apron Project

Geotechnical studies were undertaken at Mammoth Yosemite Airport in 1998, 2000, 2008 and 2020. A series of cores, test holes and test pits were excavated at representative areas on the airport. Soil samples were taken from the test holes and test pits and tested in the Geotechnical Laboratory to provide data for classification and strength characteristics of the foundation soils. The results of these studies are presented in the December 2014, *Mammoth Yosemite Airport, Pavement Evaluation/Pavement Maintenance Management Plan* and February 2021 *Reconstruct East General Aviation Apron Engineer's Report*. These studies showed that throughout most of the site the subgrade soils consist of clean, fine to medium sand and gravels with small cobbles intermixed in many areas. There were no areas where clay, silt, or even very fine sand was encountered.

All of the sand and gravel soils at the site below a depth of 1 to 2 feet are highly compacted and stable. The surface soils are looser due to weathering and disturbance. The soils are high-quality materials and will provide a stable subgrade for the pavement section when compacted. The soils are very pervious and rainwater will readily infiltrate the soils.

California Bearing Ratio (CBR) tests indicate that the CBR of the existing soils in the uncompacted state (estimated at 85 percent relative compaction) is 8. The CBR of soil compacted to 95 percent relative compaction ranged from 12 to 14. These soils are classified as SW-SM based on the Unified Soil Classification System.

Based on the existing pavement sections and using a subgrade CBR of 12 and a subsoil CBR of 8 the aircraft bearing capacity of the various pavements are as shown in Table No. 2-2. The bearing values given are based on 1,200 annual aircraft departures.

TABLE NO. 2-2 MAMMOTH YOSEMITE AIRPORT PAVEMENT BEARING CAPACITY		
Airfield Segment	Aircraft Bearing Capacity - Pounds	
	Single Gear Aircraft	Dual Gear Aircraft
Runway 9-27	80,000	150,000
All Taxiways	80,000	150,000
Apron A1 PCC	80,000	150,000
Apron A1 AC*	80,000	150,000
Apron A2*	50,000	70,000
Apron A3	75,000	110,000
Hangar Taxilanes	25,000 to 35,000	35,000 to 48,000

* Represents conditions after 2021 Reconstruct East General Aviation Apron Project

The Pavement Condition Number (PCN) for Runway 9-27 is 32/F/B/X/T.

2-8 **Building Facilities**

Airline and Support Facilities:

In 2008, an existing equipment maintenance building was remodeled for use as an interim airline terminal. This 5,000 square foot building currently handles all commercial operations, including electronic check-in kiosks, baggage check and passenger check-in. It is also utilized for TSA screening and the secure passenger waiting area, including restrooms. Airline baggage pick up is located outside of the building. The building also houses rental car operations. Apart from these passenger areas, the building also includes areas for TSA baggage screening, lost baggage storage, and airline and TSA storage lockers.



In 2011, a fabric 2,250 square foot membrane structure (Sprung Structure) was erected adjacent to the terminal to serve as an additional hold room. This structure, which has a projected useful life of approximately 20 years, includes additional restrooms, a non-secure passenger waiting area and a minimal food and beverage operation. A communication

system does enable waiting passengers to hear airline arrival and departure and other announcements.

Other ground transportation providers are typically stationed outside, using movable kiosks.

General Aviation Facilities:

There is currently one Fixed Base Operator (FBO), Hot Creek Aviation, at Mammoth Yosemite Airport. Hot Creek Aviation offers aviation fuel, oxygen service, aircraft parking, hangar rental, passenger terminal and lounge, rental cars, pilots' lounge, restrooms, and a cafe.



Ninety-four hangars on the airport were constructed by the FBO on leased property of which ninety-one were sold and land sub-leased to individual aircraft owners and three retained by the FBO. One of the FBO hangars is sub-leased by the airport as an ARFF/Snow Removal unit. The other two hangars are used by the FBO for storage of vehicles and equipment. Tenants typically store their airplanes indoors each year when they come to the area for skiing and other recreational activities.

These ninety-four hangars consist of the following units:

<u>West</u>	<u>East</u>	<u>FBO</u>	<u>Unit Size</u>
--	16	--	60' x 56' = 3,360 sq. ft.
--	3	--	72' x 70' = 5,040 sq. ft.
22	--	--	10' x 36' = 360 sq. ft.
30	--	--	42' x 40' = 1,680 sq. ft.
20	--	--	50' x 48' = 2,400 sq. ft.
--	--	3	72' x 70' = 5,040 sq. ft.



West Executive Hangars



East Corporate Hangars

Thirty-four tenant owned hangars have been constructed on land leased by the airport to individual owners who typically store their airplanes indoors each year when they come to the area for skiing and other recreational activities. One additional airport owned hangar is used for storage of equipment. These hangars were constructed at different times and range in size from 1,077 to 3,480 square feet.



Tenant Owned Hangars

2-9 Airfield Lighting and Navigational Aids

A navigation aid is any form of marker, signal or device that aids the aircraft by providing guidance to its destination. The lighting and navigation aid system of the Runway 9-27 Complex at MMH generally meets all F.A.A. minimum standards. Specifically, the existing lighting and navigation aid system consists of the following:

- *Runway 9-27* – There are medium intensity runway edge lights on the runway. There are lighted airfield guidance signs on this runway.
- *Taxiway A and Connector Taxiways* – There are no taxiway lights on any of the taxiways. The Airport uses retroreflective markers.
- *Navigational aids* – The navigation aids at MMH consist of Runway End Identifier Lights (REIL) and Precision Approach Path Indicators (PAPI) on Runway 27 approach. Eastern Sierra Regional Airport in Bishop, which is located 32 miles to the southeast, has a VOR but terrain blocks the signal when aircraft descend into the MMH.
- *Airport Beacon* – There is a medium-intensity airport beacon located on top of the terminal building, which operates from sunset to sunrise.
- *Wind Indicators and Segmented Circle* – There is a primary wind cone and segmented circle located on the north side of Taxiway A. There are two supplemental wind cones. One located on the south side of Runway 9 and once located on the north side of Runway 27.
- *Obstruction Lighting* – The airport has numerous obstruction lights identifying potential obstacles to air navigation including a row of 3 obstruction lights on Doe Ridge, an obstruction light on Little Antelope Hill, the Southern California Edison and Version poles and two obstruction lights on the East Corporate Hangars.

2-10 Approach Procedures

Mammoth Yosemite Airport has the following published instrument approach procedures:

- Satellite-based GPS instrument approach procedure to Runway 27
- Satellite-based GPS instrument approach procedure to Runway 27 circling to land on Runway 9.

2-11 Fuel Facilities

One hundred low-lead aviation fuel and Jet-A fuel are available at the airport and owned and operated by the FBO. The storage facilities are located in the west hangar area and fueling is performed by truck or at the self-serve dispenser.



2-12 Weather Facilities

An Automatic Weather Observation System (AWOS III P) is located on the north side of Taxiway A at Mammoth Yosemite Airport and is owned by the Airport.

2-13 Airport Access Road and Parking

Access to the Mammoth Yosemite Airport is by a Mono County 24-foot-wide paved single dead-end road from U.S. Highway 395 by way of Hot Creek Hatchery Road and Airport Road.

There is one automobile parking lot located to the northwest of the existing interim airline terminal. The parking lot has approximately 124 automobile parking spaces. There is also a 230' by 380' gravel parking lot which is used by the FBO for additional long-term parking for hangar owners and frequent visitors.



2-14 Utilities and Drainage

Water is provided by on-site wells and storage tanks. There is a 1,080 square foot building that houses domestic water pumps and electrical switchgear. There are two wells that are enclosed with small removable covers adjacent to the pump station and a storage tank. The pump system provides domestic low flows and has a high-capacity fire flow pump. The storage tank is a 450,000-gallon bolted steel tank that provides operational and fire storage. The water system is owned and operated by the Town of Mammoth Lakes.

Sewer facilities currently consist of septic tanks and leaching fields, which are very effective due to the high coefficient of permeability of the sand and gravel soils. It is proposed with future development to construct a package sewage treatment plant at the

airport and to continue to use leach fields for disposal of effluent. No water is to be released on the surface of the ground.

Electrical service is provided by Southern California Edison. Telephone service is provided by Verizon. There is no natural gas service at the airport. Propane, stored in tanks located adjacent to the terminal building, airport office, FBO building, FBO hangars, and the east & west hangars, is used to heat buildings on the airport.

The airport is also served by the Digital 395 fiber optic cable that can provide high speed communications and internet service.

There is no off-site drainage from or onto the airport. All storm water infiltrates the ground, except in paved areas, where the storm water is collected and carried to ditches or leach fields and rapidly infiltrates into the ground. The apron storm drain system was upgraded with new grading and pipes to better accommodate the storm water from the apron and improve snow plow operations by elimination of the existing slot drain in the 2021 Reconstruct East General Aviation Apron project.

2-15 Perimeter Fencing and Security

With the completion of the 2020 Security Gates and Terminal Area Fencing project, fencing at the airport consists of an eight-foot chain link fence in the terminal area with four strand barbed wire fencing around the rest of the airport. Airport access is provided through one 20-foot-wide single sliding cantilever automatic vehicle gate for the west hangars, one 20-foot-wide single sliding cantilever automatic vehicle gate near the FBO and GA Apron and one 4-foot magnetically locked pedestrian gate near the FBO. Both automatic gates will be programmed and controlled by a network access controller and equipped with an area light and security cameras. The security camera system is transmitted and stored via fiber optic cable to a network video recorder located in the Airport Manager's office. In addition, the airport has 4 security web cameras covering the aircraft parking apron. The airport also has an approved TSA security plan.

2-16 Airport Maintenance Equipment

Airport maintenance activities are performed by the Town of Mammoth Lakes through the Public Works Department. The Town is responsible for monitoring the condition of the airport and performing maintenance activities including snow removal, grass mowing, and overall maintenance of the airfield.

The Town of Mammoth Lakes owns the following maintenance equipment:

Year	Make	Model	Material Condition of Vehicle
1980	John Deere	644E Wheel Loader with 12' Blade & Chains	Good
1983	Caterpillar	966D Loader with 352SC Kodiak Snow Blower (1997 Blower Attachment)	Fair
1985	Michigan	L90 Wheel Loader with 15' Blade & Chains	Good
1994	Kodiak	CR 3000 Snow Blower (3,500 ton/hr. Capacity)	Fair
2000	Ford	F250 XL Super Duty Diesel Crew Cab 4X4 Pickup	Fair

Year	Make	Model	Material Condition of Vehicle
2001	Caterpillar	966G Wheel Loader with 15' Blade & Chains	Good
2002	Ford	F-250 XL Super Duty Gas Crew Cab 4X4 Pickup	Fair
2005	Caterpillar	966G.2 Wheel Loader with 15' Blade & Chains	Excellent
2006	Colet	K-15 Jaguar ARFF Vehicle (1,500 gal. water; 100 gal. foam; 500 lbs. dry chemical, Nitrogen 125 psi)	Fair
2008	Caterpillar	966H Wheel Loader with 15' Blade & Chains	Excellent
2009	Kodiak	CR 700D Heavy Duty Snow Blower (5,000 ton/hr. Capacity)	Excellent
2009	Tool Cat	Multi-Purpose Vehicle	Good
2009	Ford	F150 Gas Pickup	Fair
2010	Peterbilt	Dump Truck with Plow Blade	Excellent
2018	Ford	F-150 XL Gas Pickup	Excellent

This equipment is stored in a hangar leased from Hot Creek Aviation.

2-17 Airport Property Ownership

The Property Map, Exhibit "A" of the Airport Layout Plan set of drawings, Sheet No. 14, shows the property that is owned in fee simple.

All of the land surrounding the airport belongs to the USFS or LADWP. The Airport has fee simple title to significant portions of the airport and long-term leases from USFS and LADWP for the remaining land. The parcels that make up the airport property are shown on the Airport Property Map, Exhibit A, and include:

Parcel A – 196.23 Acres – Airport Property – Existing – Fee Simple Title

Parcel B – 49.60 Acres – 50-year Lease LADWP

Parcel C – 17.30 Acres – USFS Special Use Permit

2-18 Land Use Controls – Zoning

The Mono County has zoned property around the airport to be generally compatible with airport operations. The Airport Land Use Compatibility Plan is shown on Sheet No. 13 of the Airport Layout Plan set of drawings.

CHAPTER 3. AVIATION FORECASTS

3-1 Mammoth Yosemite Airport, Aviation Activity Forecasts, by Mead & Hunt

A report entitled, *Mammoth Yosemite Airport, Aviation Activity Forecasts*, was prepared by Mead & Hunt on March 31, 2017. An addendum to this report was prepared on May 15, 2019. This report was submitted to the F.A.A. and approved by F.A.A. on April 13, 2017 and the addendum approved June 19, 2019. The report, addendum and the approvals are included in this narrative as Appendix A.

This report and addendum concluded that the critical aircraft (also referred to as design aircraft) at Mammoth Yosemite Airport is the Bombardier CRJ 700, which is classified as a C II aircraft.



Bombardier CRJ 700

Summary of Changes Since 2019 Aviation Activity Forecasts Report - In late March of 2020 airline operations at Mammoth Yosemite Airport were temporarily suspended due to significant reduction in tourism, visitors and vacationing in the area due to the COVID 19 pandemic and the resulting State of California mandated restrictions on travel. Currently the airline operations are still not operating due to COVID 19 and it is unclear when they will return. As a result, the 2020 operations of the CRJ 700 and total airline operations for 2020 are not representative of the historical or expected future operations at Mammoth Yosemite Airport and should not be used as a basis of critical aircraft determination. Since the winter snow season tourism is the primary driver of airline operation demand, it is probable that airline operations will restart. As COVID 19 impacts wane and tourism returns to pre-pandemic levels, Mammoth Yosemite Airport will remain an ideal location to continue serving the Southern California airline market. Throughout the COVID 19 pandemic, Mammoth Yosemite Airport has maintained the capability to restart airline operations at any time and is ready and able to accept the airline operations when the airline demand returns. The approved 2019 Mammoth Yosemite Airport Aviation Activity Forecasts remains a valid depiction of anticipated aviation traffic with the exception of helicopter traffic, which is addressed below.

3-2 Aviation Forecast Supplement – Helicopter Operations

One new trend observed at MMH is the increasingly frequent operations of helicopters at the airport. The helicopters which frequent MMH are used for a variety of missions including firefighting (Forest Service and Cal Fire), military operations, search and rescue operations, medical transport, law enforcement (CHP), utility inspections (Southern California Edison, Department of Water and Power Los Angeles) and private use. MMH

saw a dramatic increase in the frequency of helicopter operations in 2019, 2020 and 2021 and this trend is expected to continue.

As discussed in the 2017 *Mammoth Yosemite Airport, Aviation Activity Forecasts* prepared by Mead & Hunt, the FBO's staff keeps a record of all arriving aircraft during business hours including helicopter operations. The FBO counts only include arriving aircraft and not departing aircraft so the counts have been doubled to convert to operations. In addition, the FBO counts do not include multiple flights by the same helicopter in the same day. As a result, the FBO counts are considered a conservative measure of actual operations. The FBO record of helicopter operations and their corresponding missions are shown in Table 3-1 below.



Table 3-1					
Historical Helicopter Activity – Mammoth Yosemite Airport					
Month	Total Operations				
	Fire Fighting	Military & Search & Rescue	Utility Inspection & CHP	Private*	Total
2018					
January	0	4	4	8	16
February	0	10	0	4	14
March	0	2	2	2	6
April	2	6	4	10	22
May	0	2	0	14	16
June	0	4	6	16	26
July	0	12	8	20	40
August	0	4	0	14	18
September	0	4	4	16	24
October	0	4	2	10	16
November	0	0	0	6	6
December	0	0	0	6	6
Total 2018	2	52	30	126	210
2019					
January	0	2	2	16	20
February	0	0	0	0	0
March	0	6	6	2	14
April	0	4	2	2	8
May	0	0	2	2	4
June	0	14	6	10	30
July	4	10	10	12	36

Table 3-1					
Historical Helicopter Activity – Mammoth Yosemite Airport					
Month	Total Operations				
	Fire Fighting	Military & Search & Rescue	Utility Inspection & CHP	Private*	Total
2019					
August	6	14	8	14	42
September	10	14	20	12	56
October	0	6	6	10	22
November	0	6	8	12	26
December		0	0	4	4
Total 2019	20	76	70	96	262
2020					
January	0	0	0	10	10
February	0	0	24	2	26
March	0	2	10	0	12
April	0	0	4	4	8
May	20	0	2	8	30
June	22	8	8	2	40
July	0	26	30	32	88
August	0	36	12	24	72
September	20	6	2	10	38
October	96	0	10	4	110
November	28	6	8	32	74
December	0	4	0	6	10
Total 2020	186	88	110	134	518
2021					
January	0	6	0	20	26
February	0	12	2	8	22
March	0	0	4	2	6
April	0	0	4	4	8
May	10	2	12	8	32
June	20	10	12	20	62
July	134	28	18	44	224
August	28	12	14	8	62
September	2	2	8	18	30
October	4	14	0	10	28
November	2	0	0	20	22
December	2	4	2	6	14
Total 2021	202	90	76	168	536

* Private missions include Skytime Helicopter Tours, Air Ambulance, USFS Ranger and Hangar Owners

The types of helicopters for the various missions are shown in below.

- Fire Fighting – Kmax, Sky Crane, Black Hawk, Chinook, Cobra
- Military & Search & Rescue – Black Hawk, Apache, Osprey
- Utility Inspection & CHP – Black Hawk, Astar, A5350

The Critical Helicopter is the Black Hawk UH60 which is utilized for the firefighting, Military and Search and Rescue, Utility Inspection and CHP missions.



Black Hawk UH60

Helicopter operations are expected to increase at the same rate as the general aviation operations. Per the 2019 *Mammoth Yosemite Airport, Aviation Activity Forecasts* prepared by Mead & Hunt, the general aviation operation forecast was prepared using the Socioeconomic methodology with population growth considered the best available indicator of future general aviation operations with an expected growth rate of 0.37% compound annual growth rate. Applying this growth rate to the 2021 historical helicopter operation counts yields the following forecast annual helicopter operations:

- 536 Operations in 2021 (historical)
- 546 Operations in 2026
- 556 Operations in 2031
- 564 Operations in 2036
- 577 Operations in 2041

The peak month for helicopter operations will vary depending on the variability of the fire season but will typically be in July through October. Based on analysis of Table 3-1 and using an average of the peak month for each year, the peak month is expected to account for 25% of the total annual helicopter operations. Peak month operations will range between 134 operations per month and 144 operations per month over the next 20 years.

3-3 Future Critical Aircraft

The future critical aircraft is the EMB 175 commonly used by several airline services including United Airlines which recently provided service to Mammoth Yosemite Airport. This aircraft was selected as the future design aircraft because it is the logical progression to a commercial service aircraft with greater seating capacity than the currently utilized CRJ 700. The EMB 175 has a seating capacity of 76 passengers while the CRJ 700 has a seating capacity of 70 passengers.



EMB 175

CHAPTER 4. FACILITY REQUIREMENTS

This chapter of the narrative evaluates the Airport's ability of existing facilities outlined in Chapter 2 to meet current and future demand based on the forecast presented in Chapter 3 and Appendix A.

4-1 Airfield Facility Requirements

Runway 9-27

- Runway Orientation – Wind data indicate that Runway 9-27 has a wind coverage of 96.6 percent at 10.5 knots, 96.3 percent at 13 knots, 97.9 percent at 16 knots, and 99.1 percent at 20 knots crosswind. FAA recommends runway orientation and number of runways constructed at an airport to provide 95 percent wind coverage. The single runway at MMH meets this requirement. MMH experiences a few short periods where very strong southerly winds occur that are 90 degrees from the runway orientation. These winds reach velocities of 110 to 120 miles per hour. With winds of this velocity, it is not practical to land or take off aircraft even if the wind was straight down the runway. It is, therefore, concluded that the single Runway 9-27 will provide adequate operational capacity and that there is no need for a crosswind runway.
- Runway Line of Sight – The Runway 9-27 has full line of sight from a point 5 feet above the runway on the west end to a point 5 feet above the runway on the east end. This exceeds the FAA standards for a runway with a full parallel taxiway.
- Runway Designation - The runway designations define the runway orientation in relation to the magnetic compass bearing. The magnetic declination changes slowly overtime. As a result, the runway designations require periodic revisions to remain representative of the magnetic compass bearing. The existing runway at Mammoth Yosemite Airport has existing runway designations of 9 and 27. The current magnetic orientation of Runway 9-27 is $96.506^{\circ}/276.520^{\circ}$. As a result, the runway designations require updating to Runway 10-28. This will involve removing and repainting the runway numbers and surface painted signs and updating the hold bar guidance signs. The published approach procedures will also need to be updated which has a two year lead time and requires advanced planning. A flight procedure amendment request to change the runway numbers was submitted in the fall of 2021.
- Runway Dimensions - The existing runway length at MMH is 7,000'. Runway length determination is conducted according to FAA Advisory Circular 150/5325-4 and evaluates factors including maximum takeoff weight and useful load factor of the design aircraft, airport elevation and mean maximum temperature of the hottest month. The required runway length at MMH for various aircraft and categories of aircraft which frequently operate at MMH for both winter and summer operations are shown in Table 4-1 below:

TABLE 4-1 RUNWAY LENGTH REQUIREMENT MAMMOTH YOSEMITE AIRPORT			
Airplane or Airplane Category	Temperature	Elevation	Runway Length Required
95% of Small Airplanes (less than 12,500 lbs)	Summer (83°)	7135.6	8,300
	Winter (40°)	7135.6	6,600
Small Jets (75% of Fleet 12,500 lbs to 60,000 lbs with 60% useful load)	Summer (83°)	7135.6	7,400
	Winter (40°)	7135.6	6,100
Small Jets (75% of Fleet 12,500 lbs to 60,000 lbs with 90% useful load)	Summer (83°)	7135.6	8,600*
	Winter (40°)	7135.6	8,400
Business Jets (100% of Fleet 12,500 lbs to 60,000 lbs with 60% useful load)	Summer (83°)	7135.6	11,000*
	Winter (40°)	7135.6	8,200
Business Jets (100% of Fleet 12,500 lbs to 60,000 lbs with 90% useful load)	Summer (83°)	7135.6	T11,000*
	Winter (40°)	7135.6	10,500
CRJ 701** 60% Useful Load (62,400 lbs)	Summer (82°)	7135.6	7,300
CRJ 701** 60% Useful Load (62,400 lbs)	Winter (38°)	7135.6	5,500
CRJ 701** 90% Useful Load (71,900 lbs)	Summer (82°)	7135.6	11,000*
CRJ 701** 90% Useful Load (71,900 lbs)	Winter (38°)	7135.6	8,500

* Runway Length controlled by climb limitation

**Runway Length determination from Aircraft Characteristics Manuals (ACM)

As shown in Table 4-1 above, the existing runway length at MMH is inadequate for the majority of current traffic and should be extended in the future to accommodate the aircraft which currently operate at MMH. The existing runway length of 7,000 feet results in the most aircraft being required to operate at a reduced load capacity, particularly in the warmer summer months. Table 4-2 below shows the required load capacity restrictions for the existing 7,000-foot runway for the CRJ 700 airplane used by the airline which recently operated at MMH.

TABLE 4-2 EXISTING LOAD CAPACITY RESTRICTIONS MAMMOTH YOSEMITE AIRPORT			
Airplane or Airplane Category	Temperature	Elevation	Takeoff Weight Restriction
CRJ 701*	Summer (82°)	7135.6	61,000 lbs (55% Load Capacity)
	Winter (38°)	7135.6	66,000 lbs (71% Load Capacity)

*Runway capacity determination from Aircraft Characteristics Manuals (ACM)

The runway at MMH should be extended by 1,200 feet to better accommodate existing traffic and minimize load capacity restrictions.

The required runway width standard is based on the Runway Design Code (RDC) and approach visibility minimums. The MMH runway width of 100 feet meets the FAA standard for the current C II RDC but requires widening to 150 feet in the future to accommodate the future C III RDC.

The existing runway shoulders of 12 feet exceeds the FAA standard for a C II airport of 10 feet but will need to be widened in the future to accommodate the C III FAA standard of 25 feet.

- Runway RSA, ROFA and Separation – Some of the soil between Highway 395 and the Runway Safety Area (RSA) south of Runway 9-27 is not in compliance with FAA Advisory Circular 150/5300-13B transverse grade limitations. The RSA from 150' to 250' from the runway centerline and the ROFA from 150' from the runway centerline to the Highway 395 fence line is not graded to FAA standard grades. This area is located on land owned by the U.S. Forest Service. This area should be regraded to meet FAA standards.

In addition, the highway 395 fence, two utility poles, the west supplemental wind cone and the East Corporate hangars are within the ROFA. It is not practical to move the highway 395 fence and two utility poles outside of the ROFA due to the proximity to Highway 395 and the Highway 395 right-of-way requirements. The utility poles are much taller than the fence and have existing solar powered obstruction lights to mitigate the ROFA obstructions. The supplemental wind cone will need to be relocated outside the RSA, however there is not an acceptable location outside the ROFA which provide visibility for aircraft on Runway 9 due to the proximity of Highway 395 Right of Way and the existing West Executive Hangars. It is recommended to relocate the wind cone to be in line with the highway 395 fence so that it will be in line with the existing utility pole obstruction lights. It is not practical at this time to move the East Corporate hangars outside the ROFA and the hangars have existing obstruction lights to mitigate the ROFA obstruction. For long term planning, when the land lease expires in November 2055, the East Corporate hangars can be relocated out of the ROFA.

The existing Runway to Taxiway separation of 300 feet meets the FAA standards for the current C II airport but is deficient of the 400' standard for the future C III airport. It is not feasible to move the runway or parallel taxiway to increase the

runway to taxiway separation in the future due to the proximity of highway 395 and the apron and hangar areas. When the airport is upgraded to a C III in the future, a Modification of Standards will need to be obtained.

Taxiway System

- Taxiway Dimensions - Mammoth Yosemite Airport is a Taxiway Design Group (TDG) 2 and future TDG 3 based on the dimensions of the existing and future critical aircraft's undercarriage. The existing taxiway width of 50 feet exceeds the FAA TGD 2 standard and meets the FAA TDG 3 standard.

The existing taxiway and cross taxiway fillets are circular fillets conforming to the outdated FAA standard. These fillets should be upgraded to conform to the AC 150/5300-13B tapered and angular fillet design standards.

The existing taxiway does not have any shoulders. FAA standards for a TDG 2 include 15-foot shoulders and a future TDG 3 include 20-foot shoulders. The absence of shoulders causes problems for snow plow operations resulting in soil erosion. Shoulders should be added to the taxiway to accommodate the snow plow operations and comply with FAA standards.

- Taxiway TSA, TOFA, and Separation - The existing Taxiway Safety Area (TSA) complies with all FAA standards for the existing ADG II and future ADG III.

The existing Taxiway Object Free Area (TOFA) and taxiway to fixed or movable object dimension complies with all FAA standards for the existing ADG II. However, the East Corporate Hangars penetrate the TOFA and fixed or movable object dimension for the future ADG III. These hangars have existing obstruction lights which will mitigate the TOFA obstruction when the airport is upgraded to a ADG III in the future. For long term planning, when the land lease expires in November 2055, the East Corporate hangars can be relocated out of the TOFA.

The taxiway centerline to parallel taxiway/taxiway centerline dimension complies with all FAA standards for the existing ADG II and future ADG III.

- Taxiway System Configuration - The existing taxiway system provides adequate ease of traffic flow to and from the runway and apron and hangar areas without any congestion or "hot spots" which pose safety concerns. However cross Taxiway A3 provides direct access from the East Corporate Hangar to the Runway and cross Taxiway A4 provides direct access from the apron to the runway. FAA Advisory Circular 150/5300-13B requires taxiway systems to be configured to avoid direct access from the apron or hangar areas to the runway. Cross Taxiways A3 and A4 need to be reconfigured to eliminate direct access from the apron and hangar areas to the runway.

Airfield Lighting and Marking

- The existing runway and taxiway marking is sufficient and meets all current FAA standards.

- The existing runway lighting is sufficient. The existing taxiway has taxiway reflectors which provide some guidance at night. The airport has significant night operations. The installation of taxiway lights would improve the aircraft taxiing operations during night and is recommended.

Weather Facilities

The existing AWOS III P was installed in 1988 and many sensors and parts are old and outdated and have reached the end of their useful life. Mammoth Yosemite Airport experiences frequent thunderstorms. As a result, the addition of thunderstorm detection would improve the weather reporting capabilities of this airport. Replacement of the existing AWOS with a new AWOS III P/T is under contract and schedule for summer of 2023.

The existing AWOS critical area (500 feet) is clear of any significant objects except for the East Corporate hangars. The East Corporate Hangars are 400 feet from the existing AWOS with a sheltering angle of 8 degrees. This does not meet the criteria to be considered a sheltering object. The existing AWOS location is adequate but the impact of future development should be considered during the alternatives analysis.

Airfield Pavement

A Pavement Maintenance Management Plan was prepared in 2014 by Brandley Engineering which analyzed all pavement sections with both existing traffic and enhanced traffic with increased airline aircraft size and frequency of operations. This report predicted the following pavement failures based on deep seated distress with existing traffic. Some of these areas have already been reconstructed as noted below:

- Apron A3 (West GA Apron) – failure in 2024 – reconstructed in 2015.
- Apron A2 (East GA Apron) – failure in 2027 – reconstructed in 2021.

If the airline traffic expands to use of a B737, Taxiway A will require rehabilitation and possibly the runway, depending on the frequency of use of the B737. Operations of the B737 are not expected at this time so rehabilitation of these areas should not be planned but should be re-evaluated if/when the B737 begins operations at MMH.

The areas which have adequate remaining life but are exhibiting surface distress, which should be addressed, are as follows:

- T-Hangar Taxilanes – PCI 35
- Terminal and GA Parking lot

Based on this report the following pavement rehabilitation projects are recommended:

- T-Hangar Taxilanes 2" Mill and Fill – 2024
- Reconstruct General Aviation and Temporary Terminal Auto Parking Lot – 2027

In addition, periodic maintenance and crack sealing should take place in order to preserve the pavements and the Pavement Maintenance Management Plan should be updated every 10 years.

4-2 Airspace Requirements

Approach Lighting/Navigation Aid

The existing navigation aids at the airport consisting of runway edge lighting, REIL, PAPI, Beacon, Wind Indicator and Segmented Circle are sufficient. However, the nighttime taxi operations would be improved with the addition of taxiway edge lighting. All obstructions to navigation have adequate obstruction lighting except the Doe Ridge Obstruction lights. The Doe Ridge wooden obstruction light poles have deteriorated and pose significant safety issues for maintenance personnel. In addition, two of the three Doe Ridge obstruction lights are currently functional but with temporary solar powered lights and the third light is not functional. The three Doe Ridge Obstruction lights and poles should be replaced with new steel poles and permanent solar obstruction lights. The addition of a MALSF on Runway 27 would improve the approach.

Approaches

Eastern Sierra Regional Airport in Bishop, which is located 32 miles to the southeast, has a VOR but terrain blocks the signal when aircraft descend into the MMH. MMH has published GPS approaches to Runway 27 plus circling to land on Runway 9.

Tower Requirements

The 2017 *Aviation Activity Forecast* by Mead & Hunt (see Appendix A) established the peak day operations of 44. The nearest airports to the MMH are general aviation airports including Lee Vining, 22 miles to the northwest, and Bridgeport, 47 miles to the northwest and one commercial service airport in Bishop, 32 miles to the southeast. The airspace surrounding MMH has more than enough capacity to accommodate the 44 operations per day at MMH and the operations at other surrounding airports. There is not a need for a tower at this time nor in the foreseeable future.

Obstruction Surfaces

Airfield safety area requirements are set forth in FAA Advisory Circular 150/5300-13B and FAR Part 77. The Airport Design Manual defines the requirements for threshold siting surfaces, runway protection zones (RPZ), runway safety areas (RSA), and runway object free areas (ROFA). Part 77 defines the surfaces surrounding the airport above which objects penetrating those surfaces will affect navigable airspace. These surfaces include primary surface, approach surface, transitional surface, horizontal surface, and conical surface.

There are several objects located around the airport that are considered obstructions to the Part 77 transitional surfaces, horizontal surface, conical surface and obstacle clearance departure surface at this time. These obstructions include the following:

- There is a Southern California Edison pole that penetrates the Part 77 transitional surfaces. There is an obstruction light located at the top of the pole.

- There is a Verizon pole that penetrates the Part 77 transitional surfaces. There is an obstruction light located at the top of the pole.
- East Corporate Hangars 1, 5, 10, and 15 penetrate the Part 77 transitional surfaces. There are obstruction lights located at the ends of each row of hangars.
- Doe Ridge, located to the north of Runway 27, penetrates the Part 77 transitional surfaces. There is a row of three obstruction lights installed perpendicular to and 1190 to 1880 feet north of the runway centerline to clearly identify the edge of Doe Ridge. As discussed above, these obstruction lights and poles are in poor condition.
- The mountains to the south of the airport and the hillside to the northwest of the airport penetrate the horizontal and conical surfaces. Existing special approach and departure procedures are in effect. There are no anticipated changes.
- Little Antelope Hill is a mountain located in line with and west of Runway 9 and just at the end of the OCS Departure Surface. There is an existing obstruction light on Little Antelope Hill and existing special approach and departure procedures are in effect. There are no anticipated changes.

Runway Protection Zone

The Runway Protection Zones (RPZ) for Runway 9 and Runway 27 are shown on the Airport Layout Plan, Sheet No. 2.

The only incompatible land uses inside the Runway Protection Zone (RPZ) to Runway 9 or Runway 27 is Benton Crossing Road in the Runway 27 RPZ. There is no planned future development at Mammoth Yosemite Airport in the RPZ.

4-3 Terminal Facility Requirements

With six flights daily and the peaking of commercial operations required to accommodate the skiers, daily passenger overcrowding in the existing interim terminal building is a major problem, particularly during the winter ski season. All sections of the existing terminal are overcrowded. The hold room size is such a major problem that the Airport erected a temporary sprung structure as a temporary hold room, and the hold room capacity is still inadequate.

In 2017 a *Terminal Area Development Plan* was prepared by Reinard W. Brandley Consulting Airport Engineer (Brandley Engineering) and Van Sant Group Architects and approved by FAA to accommodate the current and forecast airline traffic without overcrowding. This comprehensive study included determination of the terminal area location, size and configuration, terminal building configuration and size, aircraft parking apron, deicing facilities, automobile parking, access and service roads, terminal area support facilities including baggage handling, delivery and maintenance facilities. The resulting proposed new terminal development is located just east of the existing terminal and includes a 40,000 sq. ft. terminal building, three gates and aircraft parking positions with room for expansion up to six aircraft parking positions, adequate access and parking including rental car parking, and a new airport maintenance facility just east of the new

terminal development. A copy of the *Terminal Area Development Plan* is included in this narrative as Appendix B.

4-4 General Aviation Facility Requirements

Aircraft Parking Aprons

The general aviation apron accommodates three distinct types of aircraft including air taxi/charter service, general aviation, and helicopters.

The *Aviation Activity Forecast* by Mead & Hunt (see Appendix A) concludes the following assumptions:

- Air Taxi Operations are 28.2% of the general aviation (non-airline) operations.
- Itinerant General Aviation Operations are 69.3% of the general aviation (non-airline) operations.
- The Peak Day Operations are 0.65% of the total annual operations.
- 20% of transient non-charter operations are housed in hangars and 80% are parked on the apron.

Applying these assumptions, the peak day apron demand is shown in the Table 4-3 below:

TABLE 4-3 PEAK DAY APRON AIRCRAFT PARKING DEMAND MAMMOTH YOSEMITE AIRPORT							
Year	Total Annual Operations			Peak Day Non-Airline Operations***		Peak Day Non-Airline Operations Parked on Apron	
	Non-Airline	Air Taxi & Commuter*	Itinerant General Aviation**	Air Taxi & Commuter (Charter)	Itinerant General Aviation	Air Taxi & Commuter (Charter)	General Aviation****
2016	5826	1643	4037	11	26	11	21
2021	6252	1763	4333	11	28	11	23
2026	6470	1825	4484	12	29	12	23

*Air Taxi operations are assumed to be 28.2% of Non-Airline Operations

**Itinerant General aviation operations are assumed to be 69.3% of Non-Airline Operations

***Peak Day is 0.65% of Total Annual Operations

****Assumes 20% of GA is housed in hangars & 80% on apron

Most charter aircraft arrive, drop off their passengers and depart a short time later with some late arrivals parking overnight. As a result, the charter jet apron should be designed to accommodate 25% of the forecast Peak Day Air Taxi & Commuter operations at one time. So, a capacity of 3 charter/jet apron parking spaces is required.

Most of the general aviation traffic at MMH during the peak month of March are visitors coming to the area for skiing and winter sports. Typical stays range from a long weekend to a two-week vacation. As a result, the majority traffic arrives on Thursday and Friday and departs on Sunday and Monday. The apron should be designed to accommodate 3.5 times the peak day general aviation operations parked on the apron. An apron capacity of 81 general aviation tiedowns is required.

The existing apron has zero dedicated charter jet parking spaces and 73 general aviation tiedown spaces. Reconfiguring the existing apron to provide 3 larger charter jet parking spaces, will decrease the existing general aviation tiedown spaces to 57. As a result, an apron expansion of 24 additional spaces is required to accommodate the general aviation apron demand.



Chapter 3, Aviation Forecasts, provides an analysis of the helicopter operations at the airport. The helicopter operations at MMH were 536 operations in 2021 and are projected to grow to 577 operations in 2041. In addition, the peak month for helicopter operations is generally in the summer or early fall and accounts for 25% of the annual helicopter operations with 134 to 144 helicopter operations per month. Several frequent helicopter operators involve multiple helicopters, typically 6 to 8, arriving and departing together including military and firefighting operation. The frequency and quantity of helicopters in the peak months occupy a large portion of the existing general aviation apron. Helicopters are generally incompatible with other general aviation operations due to the rotor wash effect on the area and objects surrounding the helicopters. To alleviate overcrowding of the general aviation apron and separate the helicopter operations from other incompatible general aviation operations, it is recommended to plan a separate helicopter parking apron with space to accommodate up to 9 helicopters with future expansion capabilities to accommodate up to 12 helicopters as future demand grows and requires additional parking space.



Fixed Based Operator (FBO) Services

The single FBO Hot Creek Aviation currently provides adequate services to the local and transient pilots including aviation fuel, oxygen service, aircraft parking, hangar rental, passenger terminal and lounge, rental cars, restrooms, and a cafe. Although a second FBO is not required now or in the immediate future, space should be reserved to allow for a second FBO in the long-term future if and when demand increases.

Hangars

All existing small box hangars on the airport are occupied, however two are currently listed for sale. There is not currently a waiting list for additional small box hangars. The existing small box hangars are adequately serving the Airports current needs. Space should be reserved for additional small box or tee hangars as the future demand increases.

There is an unmet demand for overnight parking for larger charter type jets out of the weather elements which cannot currently be accommodated by the existing hangars. Four or five 17,000 to 18,000 square foot hangars should be planned to accommodate protected overnight parking for one large jet or two smaller jets in each hangar.

4-5 Support Facilities

Deicing

The major airline activity occurs in the winter, and many of the jet aircraft using the airport will require deicing before departure. MMH does not currently have a dedicated deicing area and deicing operations are conducted on the concrete terminal apron. Deicing on the apron is incompatible from an environmental standpoint and ties up valuable terminal apron space for longer periods than necessary. It is, therefore, recommended that a separate deicing pad be constructed to deice these aircraft. This pad should slope to a center collection inlet structure and all of the deicing fluids diverted to a holding tank and disposed of offsite.

ARFF

The existing airport ARFF vehicle is a 2007 model and is 16 years old. It is currently functioning and adequately serving the airport's needs. As this vehicle continues to age, it will require replacement.

Fuel

The existing fueling facilities provide adequate capacity and functionality at this time. The existing fuel tanks are approximately 10 feet in from the outer edge of the Runway Object Free Area (ROFA). These are private facilities operating under a ground lease. The majority of the fueling at this airport is provided by the FBO's fuel truck service. The existing self serve fuel dispenser is sparsely used and is not considered vital to the airport.

Airport Maintenance Facilities

The airport maintenance equipment listed in Chapter 2-16 are currently stored in a leased hangar which is overcrowded. A new airport ARFF/Snow Removal Equipment building is required to provide adequate space to store and maintain snow plows, snow blowers, ARFF and other equipment. The sizing and planning of this facility is included in the 2017 *Terminal Area Development Plan* in Appendix B and



the 2022 7-Bay ARFF/Snow Removal Facility Project Scope and Justification Report in Appendix C.

4-6 Ground Access and Parking Facilities

Access Roads

Airport Road is an existing 24-foot-wide paved service road to the airport and does not serve any other residential or business facilities. The road is maintained by Mono County with an easement through land administered by Inyo National Forest. It has adequate capacity to accommodate all existing and future planned development at the airport. Airport Road was rehabilitated with the addition of bike lanes in 2021. An extension to the existing access road will be required for the future terminal development and is included in the 2017 *Terminal Area Development Plan* in Appendix B. In 2021, Mono County wrote a letter to the FAA expressing their knowledge and support of extending Airport Road in accordance with the Terminal Area Development Plan.

Automobile Parking

The existing automobile parking lot and long-term gravel parking lot provide adequate capacity to meet the existing demand. Expansion of these facilities are not required at this time, but space should be reserved in the long-term planning to accommodate expansion.

4-7 Perimeter Fencing and Security Requirements

With the completion of the 2020 Security Gates and Terminal Area Fencing project, the fencing and security requirements in the general aviation apron, hangar and commercial terminal areas provide adequate protection and security to protect the general aviation and commercial terminal portions of the airport from security threats and wildlife. Security upgrades will be required to accommodate the proposed new Terminal Development and are address in the 2017 *Terminal Area Development Plan* which is included in this narrative as Appendix B.

The barb wire fence around the rest of the airport provides very poor security and protections from threats and wildlife incursions. Deer and other wildlife are frequently observed on the airport as a result of the inadequate fencing which provides a hazard to aircraft operating on the airport. The Wildlife Hazard Management Plan prepared for this airport recommends installing a fence around the entire airport property. It is proposed to replace the barb wire fence with a new 8-foot chain link fence to provide security and prevent wildlife from entering the airport. This project is temporarily on hold until agreements with USFS are completed.



There is a Caltrans funded project for a US 395 Wildlife Crossing Project which includes an 8-foot tall fence to the east and west of MMH. This Caltrans project has received funding to begin design and environmental documents. This project is being coordinated

with the airport and future airport fencing project and anticipates tying the proposed future Caltrans fence into the proposed future MMH 8-foot tall wildlife fence.

4-8 Drainage and Utilities

The existing utilities are adequate to accommodate the existing and proposed expansion of the airport. Consideration should be given to consolidate the multiple propane tanks into one location. Utility upgrades will be required to accommodate the proposed new Terminal Development and are address in the 2017 *Terminal Area Development Plan* which is included in this narrative as Appendix B.

The native soil is extremely pervious, all storm water easily and quickly infiltrates into the ground, except in paved areas, where storm water is collected and carried to ditches and infiltration fields where it rapidly infiltrates into the ground. No additional drainage improvements are required at this airport.

4-9 Land Ownership and Acquisition

The Airport has fee simple title to significant portions of the airport and long-term leases from USFS and LADWP for the remaining land. In order to provide better control and protection of the airport and facilitate additional expansion opportunities, the airport should acquire the USFS and LADWP land.

4-10 Facility Requirement Summary

This chapter of the narrative evaluates the Airport's ability of existing facilities outlined in Chapter 2 to meet current and future demand based on the forecast presented in Chapter 3 and Appendix A. A summary of the items which were found to be deficient and not meeting the current and future needs of the airport are presented in Table 4-4 below. These items have been included in the proposed Airport Layout Plan development presented in Chapter 8.

TABLE 4-4 FACILITY REQUIREMENT SUMMARY MAMMOTH YOSEMITE AIRPORT			
Airport Feature	Adequate	Deficient	Recommended Action
Airfield Facility Requirements			
Runway Orientation	✓		No Action Recommended
Runway Line of Sight	✓		No Action Recommended
Runway Designation		✓	Revise Runway Numbers to 10-28
Runway Length		✓	Extend Runway 1,200 feet
Runway Width	✓		No Action Recommended
Runway Shoulders	✓		No Action Recommended
RSA Compliance		✓	Regrade RSA between Runway 9-27 and Highway 395
OFA Compliance		✓	Regrade ROFA between Runway 9-27 and Highway 395, Relocate Supplemental Wind cone out of ROFA, Other penetrations are mitigated with obstruction lights

TABLE 4-4 FACILITY REQUIREMENT SUMMARY MAMMOTH YOSEMITE AIRPORT			
Airport Feature	Adequate	Deficient	Recommended Action
Runway to Taxiway Separation	✓ (existing)	✓ (future)	No Action Recommended for CII, Obtain MOS for future CIII
Taxiway Width	✓		No Action Recommended
Taxiway Fillets		✓	Upgrade fillets to conform to AC 150/5300-13B tapered and angular fillet design standards
Taxiway Shoulders		✓	Add 15' taxiway shoulders to Taxiway A and associated cross taxiways
TSA Compliance	✓		No Action Recommended
TOFA Compliance	✓		No Action Recommended
Taxiway to taxiway/taxiway centerline separation	✓		No Action Recommended
Taxiway System Configuration		✓	Relocate cross Taxiway A3 and A4 to avoid direct access from the apron and/or hangar areas to the runway
Airfield Marking	✓		No Action Recommended
Airfield Facility Requirements			
Airfield Lighting		✓	Replace taxiway reflectors with taxiway lights
Weather Facilities AWOS		✓	Add thunderstorm detection and upgrade old outdated AWOS with new AWOS III P/T
Airfield Pavement		✓	T-Hangar Taxilanes 2" Mill and Fill and Reconstruct Temporary Terminal Auto Parking Lot
Airspace Requirements			
Approach Lights/Navigation Aids		✓	Replace Doe Ridge Obstruction Lights and Poles Install MALSF on Runway 27
Approaches	✓		No Action Recommended
Tower Requirements	✓		No Action Recommended
Obstruction Surfaces	✓		No Action Recommended
Runway Protection Zone	✓		No Action Recommended
Terminal Facility Requirements			
Terminal Facility Requirements		✓	Construct new terminal facilities
General Aviation Facility Requirements			
Aircraft Parking Aprons		✓	Expand GA Apron and Construct new helicopter parking apron
Fixed Based Operator (FBO) Services	✓		
Hangars		✓	Construct additional hangars as demand increases Add four or five 17,000 to 18,000 square foot hangars to accommodate overnight parking for jet aircraft
Support Facilities			
Deicing		✓	Construct dedicated deicing pad

TABLE 4-4 FACILITY REQUIREMENT SUMMARY MAMMOTH YOSEMITE AIRPORT			
Airport Feature	Adequate	Deficient	Recommended Action
ARFF	✓ (existing)	✓ (future)	Replace ARFF vehicle when it reaches the end of its useful life
Fuel	✓		Consider relocation as necessary
Airport Maintenance Facilities		✓	Construct new ARFF/Snow Removal building
Ground Access and Parking Facilities			
Access Roads	✓		Extend access road to future terminal facilities
Automobile Parking	✓ (existing)	✓ (future)	Expand parking lot in the future as demand requires
Perimeter Fencing and Security Requirements			
Perimeter Fencing		✓	Replace barb wire fence with new chain link fence
Security	✓ (existing)	✓ (future)	Include security upgrades with new terminal development
Drainage and Utilities			
Utilities	✓ (existing)	✓ (future)	Include utility upgrades with new terminal development Consider consolidating multiple propane tanks to one location
Drainage and Utilities			
Drainage	✓		No Action Recommended
Land Ownership and Acquisition			
Land Ownership and Acquisition		✓	Acquire surrounding USFS and LADWP land

CHAPTER 5. ENVIRONMENTAL AND WILDLIFE HAZARD MANAGEMENT CONSIDERATIONS

5-1 Environmental Process

This chapter provides an overview of environmental conditions and issues at MMH and the immediate vicinity. The review is organized according to the National Environmental Policy Act (NEPA) checklist but does not meet the full analytical and procedural requirements associated with the NEPA process. Appropriate NEPA documentation in accordance with Federal Aviation Administration (FAA) Order 5050.4B, *NEPA Instructions for Airport Actions*, and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, needs to be conducted before beginning future projects.

The following environmental documentation may be required for projects utilizing federal grant funds on airports:

- **Categorical Exclusion (CATEX).** This documentation is used for actions that have a very low potential for environmental impacts. Typical projects that can be covered by a CATEX include planning projects and standard, low-impact development projects such as pavement rehabilitation or lighting replacement. Documentation required includes the completion of a checklist and supporting information as needed certifying that the project will not exceed applicable environmental impact thresholds.
- **Environmental Assessment (EA).** Typical projects that require an EA are those that are not categorically excluded (see above) and include significant development actions, land acquisition, and runway extensions. Extraordinary circumstances such as impacts to wetlands, historical properties, or floodplains may also trigger the need to complete an EA. Documentation required includes a more comprehensive environmental review of the proposed action and the potential for impacts resulting from the project. Public and agency review is an important part of the EA process. The primary purpose of the EA is to determine if an Environmental Impact Statement (EIS) is required. If the result of the EA process is a Finding of No Significant Impact (FONSI) as issued by FAA, an EIS is not required.
- **Environmental Impact Statement (EIS).** This is the most comprehensive level of environmental analysis in the NEPA program. Projects that require an EIS include those that will have significant environmental impacts as determined in the EA process. A Record of Decision (ROD) is produced at the end of the process in support of the Final EIS.

5-2 Resource Category Impact Overview

Air Quality: The Clean Air Act (CAA) (42 U.S.C. §§ 7401-761q) is the primary federal statute which addresses air quality. The U.S. Environmental Protection Agency (USEPA) sets National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The potentially affected environment for the air quality analysis consists of the Mammoth Lakes Planning Area designated by the Great Basin Unified Air Pollution Control District.

On November 15, 1990, the Mammoth Lakes Planning Area was designated as a moderate nonattainment area for the 24-hour PM₁₀ Federal Standard (56 FR 11101). The adopted control measures of the 2014 Air Quality Maintenance Plan, enforceable through District Rule 431-Particulate Emissions and the Town of Mammoth Lakes Municipal Code Chapter 8.30, have proven to be sufficient to maintain compliance with the PM₁₀ Federal Standard for the Town of Mammoth Lakes. On November 4, 2015, the Mammoth Lakes area received re-designation to a Maintenance area.¹

The Great Basin Unified Air Pollution Control District (District) maintains a network of air quality cameras and monitoring stations throughout Alpine, Mono, and Inyo Counties. These monitors record concentrations of pollutants in the ambient air to determine compliance with the NAAQS. The District has conducted PM₁₀ monitoring in the Town of Mammoth Lakes since 1979. Air quality monitoring data collected in Mammoth Lakes, is the closest station to MMH and shows no violation of the PM-10 (1987) NAAQS. Occurrence of the Federal PM₁₀ exceedance, Moderate Non-Attainment areas were last documented in July – August of 2018 during peak wildfire season. Federal PM₁₀ exceedance has not occurred since August 4, 2018.

Biological Resources: MMH is located within the East Sierra Nevada Region of the Great Basin Floristic Province at approximately 7,080 to 7,130 feet above sea level (ASL). The airport environment includes the existing MMH facility and adjacent areas including portions of US 395 and Airport Road. One primary biological community is present within MMH – sagebrush scrub, which is characterized by low, generally sparse shrubs and native and weedy herbaceous species. Common species include sagebrush (*Artemisia tridentata*), antelope bush (*Purshia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), Parry's rabbitbrush (*E. parryi*), desert peach (*Prunus andersonii*), tumbleweed (*Salsola tragus*), and cheatgrass (*Bromus tectorum*). Vegetative cover over most of MMH is about 50%. There are no surface water features, no waters of the U.S., a few ornamental trees and no significant habitat.

U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Conservation (IPaC) database identified federally threatened and endangered species with the potential to occur within the vicinity of the airport as shown in the following table.

¹ US Environmental Protection Agency (2019, August 31) Greenbook, California Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. Retrieved September 2019, from https://www3.epa.gov/airquality/greenbook/anayo_ca.html.

TABLE NO. 5-1 POTENTIAL FEDERALLY THREATENED AND ENDANGERED SPECIES MAMMOTH YOSEMITE AIRPORT				
<i>Species</i>	<i>Status</i>	<i>Designated Critical Habitat Present</i>	<i>Habitat</i>	<i>Species or Habitat Potentially</i>
Owens tui chub <i>Siphateles bicolor snyderi</i>	FE FE- Federal Endangered	Yes	Generally these fishes are found in shallow water associated with submerged objects or beds of aquatic vegetation, or in the quiet waters of sluggish rivers. Historically they inhabited various habitats, including thermal spring pools, lakes, rivers, and canals. Primary habitat requirements appear to include clear, clean water, adequate cover in the form of rocks, undercut banks, or aquatic vegetation, and adequate insect food.	No habitat within MMH. There are no streams or rivers located on MMH.
Sierra Nevada yellow-legged frog <i>Rana sierrae</i>	FE	No	Streams, lakes and ponds in montane riparian, lodgepole pine, subalpine conifer and wet meadow habitats, elevation 4495 to 11975 feet.	No habitat within MMH. There are no streams, lakes or ponds on MMH
Greater sage-grouse <i>Centrocercus urophasianus</i>	FPT FPT – Federal Proposed Threatened	No locations identified	Mosaics of big and low sagebrush and grasslands, meadows and aspen in valley bottoms, foothills, shrub lands, and mountain slopes.	No habitat within MMH. There are no mosaics of big and low sagebrush and grasslands, meadows and aspen in valley bottoms, foothills, shrub lands, and mountain slopes.

Climate: The U.S. Government Accountability Office reports that “domestic aviation contributes about three percent of total carbon dioxide emissions, according to USEPA data,” compared with other industrial sources, including the remainder of the transportation sector (20 percent) and power generation (41 percent). The International Civil Aviation Organization (ICAO) estimates that GHG emissions from aircraft account for roughly three percent of all anthropogenic GHG emissions globally. Aircraft, aircraft

support equipment, and surface vehicles typically generate the most GHG emissions at an airport. An airport does not control these sources, which are operated by corporate entities and private individuals.

The scientific community is continuing efforts to understand the impact of aviation emissions on the global atmosphere more fully. The FAA is leading and participating in a number of initiatives intended to clarify the role that commercial aviation plays in GHG emissions and climate. The FAA, with support from the U.S. Global Change Research Program and its participating federal agencies (the National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, USEPA, and U.S. Department of Energy) has developed the Aviation Climate Change Research Initiative to advance scientific understanding of regional and global climate impacts from aircraft emissions. The FAA also funds the Partnership for Air Transportation Noise & Emissions Reduction Center of Excellence research initiative to quantify the effects of aircraft exhaust and contrails on global and U.S. climate and atmospheric composition. The ICAO is examining similar research topics at the international level.²

Coastal Resources: MMH is located approximately 175 miles east of the Pacific Ocean and is not located in a coastal zone.

Department of Transportation Act, Section 4(f) and Land and Water Conservation Fund Act Section 6(f): U.S. Department of Transportation Act, Section 4(f) provides protection for special properties, including publicly owned parks, recreation areas, wildlife and waterfowl refuges, or any historic and archaeological sites. Section 6(f) of the Land and Water Conservation Fund, 16 U.S.C. § 4601-8(f) applies if property was acquired or developed with financial assistance under the Land and Water Conservation Fund State Assistance Program.

The potentially affected environment for Section 4(f) and Section 6(f) resources would consist of areas that would be affected by a Proposed Action. Section 4(f) of the USDOT Act provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly-owned park, recreational area, or wildlife or waterfowl refuge of national, state, or local significance or land from a historic site of national, state, or local significance, as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land and such program, and the project includes all possible planning to minimize harm resulting from the use.

Actions that would use Section 4(f) lands must also comply with Section 6(f) of the Land and Water Conservation Fund State Assistance Program. Section 6(f) requires areas funded through the program to remain for public outdoor recreation use, or be replaced by lands of equal value, location, and recreation usefulness.

Land administered by the US Forest Service qualifies as Section 4(f) land. The Inyo National Forest surrounds the Airport on the east, south and north. A portion of Airport Road near the Airport's northern boundary and maintained by Mono County serves as the primary access to the MMH, the land underlying the road and all other National Forest lands represents the closest 4(f) eligible property. The next closest Section 4(f) properties

² Maurice, L. Q., & Lee, D. S. (2007). Aviation Impacts on Climate. In International Civil Aviation Organization, *Final Report of the International Civil Aviation Organization Committee on Aviation and Environmental Protection Workshop* (pp. 25-32). Washington, DC and Manchester: U.S. Federal Aviation Administration and Manchester Metropolitan University. Retrieved March 2018.

to MMH are the Whitmore Recreation Area, managed by the Town of Mammoth Lakes, Hot Creek Ranch (fly fishing recreation area), Hot Creek Trout Fish Hatchery, Sherwin Creek Campground, and the Convict Lake Campground. In December of 2020, the Inyo National Forest wrote a letter to the FAA agreeing that Section 4(f) does not apply to the extension of Airport Road.

Farmlands: There are no soil units in Mono County, where MMH is located, that qualify as prime, unique, statewide or locally important.³

Hazardous Materials, Solid Waste, and Pollution Prevention: The use, transport, storage and disposal of hazardous materials and solid waste are heavily regulated. In a regulatory context, the terms “hazardous wastes,” “hazardous substances,” and “hazardous materials” have very specific meanings, as described below.

- **Hazardous Wastes.** Subpart C of the Resource Conservation and Recovery Act (RCRA) defines hazardous wastes (sometimes called characteristic wastes) as solid wastes that are ignitable, corrosive, reactive, or toxic. Examples include waste oil, mercury, lead or battery acid. In addition, the EPA has determined specific types of solid wastes to be hazardous. Examples include degreasing solvents, petroleum refining waste, or pharmaceutical waste.
- **Hazardous Substances.** Section 101(14) of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) defines this term broadly to include hazardous wastes, hazardous air pollutants, or hazardous substances designated under the Clean Water Act (CWA) and the Toxic Substances Control Act (TSCA). These substances include elements, compounds, mixtures, or solutions, or substances that pose substantial harm to human health or environmental resources. Hazardous substances do not include petroleum or natural gas or materials such as ammonia, bromine, chlorine, or sodium cyanide.
- **Hazardous Materials.** According to 49 CFR Part 172, hazardous materials are any substances commercially transported that pose unreasonable risk to public health, safety, and property. These substances include hazardous wastes and hazardous substances, petroleum and natural gas substances and materials such as household batteries, gasoline and fertilizers.

Future construction projects could involve the demolition and development of vacant land. Therefore, hazardous materials investigations and mitigation programs could be necessary. In June 2020, MMH conducted a preliminary investigation to determine the presence of perfluoroalkyl and/or polyfluoroalkyl substances (PFAS) in soil and groundwater at two locations; the results of that investigation will be available in August 2020.

The closest site listed in the US Environmental Protection Agency RCRA database is Hot Creek Aviation LLC, located on Airport property at 1334 Airport Road.⁴ Hot Creek Aviation

³ California Department of Conservation, Farmland Mapping and Monitoring Program, 2019.

⁴ US Environmental Protection Agency (2019) <https://enviro.epa.gov/enviro/rcrainfoquery>, retrieved December 2019.

LLC is the Airport's fixed-base operator (FBO); they are listed as a handler for aviation fuel and de-icing fluid.

Historical, Architectural, Archaeological, and Cultural Resources: The National Historic Preservation Act (NHPA) is the primary federal statute governing historic architectural, archaeological, and cultural resources. A Cultural Resources Review conducted in September 2019⁵ assessed the potential for a Proposed Action to significantly affect archaeological resources and cited 30 previous studies conducted in the vicinity of the airport.

Materials found on airport property do not appear to be eligible for listing in the National Register of Historic Places (NRHP) and, therefore, do not constitute a historic property (36 CFR 800.16(l)(1)). The closest NRHP listed properties are in Yosemite National Park, approximately 30-miles northwest of the Airport⁶ and the Laws Narrow Gauge Railroad Historic District, located northeast of Bishop, CA, about 32-miles southeast of the Airport.

Land Use: Affected land uses are generally related to consistency with zoning ordinances, land use plans and land use policies for the Airport and the surrounding areas. MMH is located in a rural setting where low density residential development is restricted to the Hot Creek corridor about 1.4-miles west of the project area and one-mile from the end of Runway 9-27.⁷

Land use in the vicinity MMH, between Hot Creek and Convict Creek, includes agricultural open space (grazing), resource management areas and recreational areas. Land north, northwest, and south of MMH is within the Inyo National Forest. The lands northeast of MMH are undeveloped and are managed by the US Bureau of Land Management (BLM) or owned by the Los Angeles Department of Water and Power (LADWP). Eastern portions of MMH, including lands under a portion of Runway 9-27, are owned by LADWP; the Town of Mammoth Lakes currently leases this land.

Several small parcel lots within 1.4-miles of the proposed project area are used for public agency and industrial purposes. Hot Creek Ranch, a privately-owned fly-fishing campground, and Hot Creek Fish Hatchery are located approximately one-mile northwest of MMH. A U.S. Forest Service gravel-borrow pit is located north of MMH. Additionally, a reclamation site owned by U.S. Forest Service and managed by the Town is located north of MMH.

The no longer used High Sierra Community Church, or "Green Church", building is located on the north side of U.S. Route 395 near the intersection with Benton Crossing Road. Sierra Nevada Aquatic Research Laboratory (SNARL) headquarters are located approximately one mile southeast of the Airport, south of U.S. Route 395 along Convict Creek. Convict Lake Recreation Area, including Inyo National Forest campground and additional facilities, is located approximately two miles south of MMH.

⁵ Natural Investigations Company, *Cultural Resources Inventory and Effects Assessment for the Mammoth Yosemite Airport Terminal Area Development Plan, Town of Mammoth Lakes, Mono County, California*, September 20, 2019.

⁶ U.S. Department of the Interior (2019) National Park Service, National Register of Historic Places. Retrieved September 2019, from <https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466>.

⁷ Residential housing along Hot Creek is generally associated with the Hot Creek Fish Hatchery or with recreational lodging.

There are no residential areas within the vicinity of the project area. The closest residences are located about 1.5-miles northwest of the airport at the Hot Creek Fish Hatchery. The Town of Mammoth Lakes is located about 7-miles west of the MMH.

Section 163 FAA Reauthorization Act 2018: Section 163 narrows the scope of the FAA's authority over airport land uses by generally prohibiting the FAA from “directly or indirectly regulating” airport land, except when the FAA considers whether to require a release of aeronautical use and other grant obligations before an airport sponsor moves forward with a change in airport land use or disposal of airport land. The Town is not considering the release of any Airport property for non-aeronautical use regardless of how the property was acquired.

Natural Resources and Energy Supply: The Federal government encourages airport development that minimizes the use of consumable natural resources and minimizes demands on energy supplies. FAA policy also encourages developing facilities that use the highest design standards and that incorporate sustainable designs. Airport personnel and tenants regularly use consumable materials to maintain various airside and landside facilities and services. Those materials may include asphalt, concrete, aggregate for sub-base materials, and various metals associated with such maintenance.

Electrical power is necessary to keep MMH operational and safe. Airport lighting consists of airfield navigational aids, runway edge lighting, landside lighting for buildings, apron areas, and automobile parking areas. Southern California Edison (SCE) provides electrical power to Mammoth Lakes and surrounding areas, including to MMH. AmeriGas and Eastern Sierra Propane provide propane to the Mammoth Lakes area, which is commonly used to fuel furnaces, water heaters, and stoves. Water is supplied to the airport by two groundwater wells located east of the passenger terminal.

To protect the Airport from power instability two emergency electrical generators, and a propane tank, to provide electrical power during power failures were installed in 2020. Generator 1 is installed near the existing passenger terminal. Utility cables connect the generator through a 24-inch-deep trench that travels through a breaker shutoff at the terminal building and continues to the electrical vault. Generator 2 supplies power for the Airport's administrative office building. Each generator is designed with a steel enclosure for weather and sound attenuation resolving any need for a new structure. A 500-gallon propane tank was installed to supplement an existing 1,000-gallon propane tank.

The two electrical generators are necessary because the Eastern Sierra region experiences high winds, particularly in spring and fall, which often result in local and regional power outages. The electrical generators will serve as a backup and emergency source of power to ensure that basic airport functions will not be interrupted.

Noise and Noise Compatible Land Use: The compatibility of existing and planned land uses with proposed aviation actions is usually determined in relation to the level of aircraft noise. The closest residential area to the Airport is 1.4-miles west of MMH. Land use in the areas surrounding the Airport is managed by the Inyo National Forest, BLM, LADWP and Mono County Airport Land Use Commission.

The airport currently serves aircraft in FAA Design Groups I and II; As discussed in FAA Order 1050.1F Appendix B, no aircraft noise analysis is needed for projects involving Design Group I and II airplanes (wingspan less than 79 feet) in Approach Categories A

through D (landing speed less than 166 knots) operating at airports whose forecast operations in the period covered by the NEPA document do not exceed 90,000 annual propeller operations (247 average daily operations) or 700 annual jet operations (2 average daily operations).

Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks: MMH and the surrounding area are located in Mono County Census Tract 1.01, which represents all of southern Mono County except for the Town of Mammoth Lakes, but includes the communities of June Lake, Crowley Lake, Aspen Springs, Tom's Place and Swall Meadows. In 2017, the population for the census tract was 3,497; there are no residences on the airport.

In accordance with Presidential Executive Order (EO) 12898, the Council on Environmental Quality issued guidance for each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations."⁸ FAA Order 1050.1F, which is consistent with US Department of Transportation Order 56.10 establishes the requirements for assessing environmental justice impacts. About 12% of the population in Census Tract 1.01 lives below the federal poverty line.

EO 13045, *Protection of Children from Environmental Health and Safety Risks* (62 FR 19885) is the primary EO related to Children's Environmental Health and Safety Risks. The order directs federal agencies to identify and assess environmental health risks and safety risks that may disproportionately affect children, individuals under the age of 18. About 21% of the population in Census Tract 1.01 are below the age of 18.

Visual: There are no federal statutory or regulatory requirements for adverse effects resulting from light emissions or visual impacts. FAA Order 1050.1F describes factors to consider within light emissions and visual resources/visual character. Potential impacts of light emissions could include the annoyance or interference with normal activities and effects to the visual character of the area due to light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources.

Current MMH facilities are illuminated for safety and security by various types of landside lighting for buildings, access roadways, apron areas, and automobile parking areas, and airside lighting for runways, taxiways, and apron areas. The closest light sensitive land use, a low-density residential area, is located 1.4-miles west of MMH along Hot Creek. Buildings and aircraft hangars can be seen from several locations within the vicinity of the airport. The most common view is looking north from U.S. Highway 395.

Water Resources – Groundwater: MMH is located in the southwestern portion of the Long Valley Caldera and is within the Long Valley Groundwater Basin. Although probably isolated from the primary Long Valley Groundwater Basin by a series of volcanic flows, MMH is underlain by a thin deposit of morainal outwash from the Convict Creek Moraine, and by a series of lacustrine and stream deposits to depths of about 140 feet below the existing ground surface.

⁸ CEQ. (1997, December 10). *Environmental Justice – Guidance Under the National Environmental Policy Act*. Retrieved October 2019, from Agency Guidance Related to Environmental Justice and NEPA: https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf

Based on lithologic well log data from wells within about 1.5-miles of MMH there is a 150-foot-thick clay deposit which acts as a confining layer at a depth of about 140 feet beneath the airport. The depth to unconfined shallow groundwater varies between approximately 28 and 46 feet below ground surface. Groundwater gradient maps indicate that shallow groundwater flows are generally west to east and that buried volcanic flows west of the airport create a barrier to westerly groundwater flows towards Hot Creek.

Two groundwater wells located in the eastern portion of MMH provides potable and firefighting water. Both wells are 143-feet deep and have the capacity to pump up 500 gallons per minute.

Water Resource – Wild and Scenic Rivers: The Wild and Scenic Rivers Act of 1958, as amended, describes those river segments designated as, or eligible to be included in, the Wild and Scenic Rivers System. The closest Wild and Scenic River is the Owens River Headwaters, which is about 10 miles northwest of the Airport.⁹

Water Resource – Wetlands: The Clean Water Act defines wetlands as “...those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Wetlands have three necessary characteristics:

- Water: presence of water at or near the ground surface for a part of the year.
- Hydrophytic Plants: a preponderance of plants adapted to wet conditions.
- Hydric Soils: soil developed under wet conditions.

The potentially affected environment for wetlands consists of those areas that would be subject to ground disturbing activities or might be affected by increased or decreased water flows as a result of a Proposed Action. Given the high permeability of soils in and around the Airport, water sheet flows infiltrate into the soil very quickly. No jurisdictional waters of the U.S. (including wetlands) were identified on MMH property.

Water Resource – Floodplains: The potentially affected environment for floodplains consists of the area that would be directly or indirectly affected by the proposed project. Direct effects would consist of development in a designated floodplain. Indirect effects could include increasing impervious surfaces with an associated increase in water flowing into the floodplain. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map published for the vicinity of MMH indicates that no portion of Airport property is located within a floodplain. MMH is located about one mile from narrow 100-year floodplains (Zone A) associated with Hot Creek to the north and Convict Creek to the east.

Water Resource – Surface Waters: Surface water runoff at MMH generally flows from south to north based on the topographic geometry; however, due to highly permeable soils which consists of medium to coarse sands and gravels, most runoff infiltrates to the subsurface or evaporates and very little runoff occurs. There are no surface water bodies on Airport property.

⁹ National Wild and Scenic Rivers System, Retrieved November 2019, from <https://www.rivers.gov/california.php>.

5-3 Wildlife Hazard Management Plan

In September 2015, the FAA approved a Wildlife Hazard Management Plan (WHMP) for MMH.¹⁰ The WHMP was prepared in accordance with 14 CFR § 139.337(a), is maintained by MMH staff and is updated as needed.

¹⁰ Mammoth Yosemite Airport, Wildlife Hazard Management Plan, For Compliance with CFR Title 14 § 139.337, Prepared by Wallace Environmental Consulting and Carter Schleicher Consulting, September 2015

CHAPTER 6. ALTERNATIVES DEVELOPMENT AND EVALUATION

This chapter of the narrative evaluates feasible airport development alternatives that would enable the Airport to meet its current, short term and long-term needs.

6-1 Existing Constraints

There are several existing constraints which play an integral role in the planning for future airport development and expansion as follows:

- Highway 395 – The existing highway 395 is located south of MMH and directly adjacent to the existing Runway Object Free Area. The close proximity to the highway prohibits any airport expansion to the south of Runway 9-27 without relocation of the highway. It is not practical to consider relocation of the highway.
- Doe Ridge – Doe Ridge is a geologic feature consisting of a large hill with steep terrain sloping upward more than 300 feet in elevation. It is located directly north of Runway 27 and east of the general aviation apron and east Corporate Hangars. Doe Ridge is also archeologically significant due to the presence of Indian artifacts. The close proximity to Doe Ridge and archeological significance of the area surrounding Doe Ridge limits the airport's ability to expand facilities to the east.
- Existing Hangar Facilities – The existing east Corporate Hangars, west Executive Hangar and G hangars are located parallel to and adjacent to Taxiway A. The presence of these hangars prohibits runway access from the vacant land north of these hangars. The absence of runway access severely limits the available use of this land and the expansion of the airport.



6-2 Primary and Secondary Planning Elements

Primary elements are the planning elements which drive the primary planning analysis. These are typically elements which require large land areas and as a result have less flexibility regarding location and layout. The secondary planning elements include elements which have greater flexibility regarding location and layout. For MMH the primary planning elements are the expanded terminal facilities, expanded charter and general aviation apron and the proposed helicopter parking apron.

6-3 Alternatives

Overall Development Planning

The existing constraints listed in Section 6-1 above, severely limit the space available to accommodate required expansion of terminal and general aviation facilities. Two alternative overall development scenarios were considered.

- Overall Scenario 1 – Preserve Existing Hangars – This scenario would preserve the existing west Executive Hangars and G Hangars. This scenario limits the vacant land north of the west Executive Hangars to non-aeronautic uses which would not require runway access. This limits expansion of the terminal and general aviation facilities to the areas between the existing general aviation apron and Airport Road and the East Corporate hangars.
- Overall Scenario 2 – Remove Existing G and West Executive Hangars – This scenario would remove or relocate all of the west Executive Hangars and G Hangars to provide runway access to the vacant land behind these hangars. This greatly increases the space available for expansion of continued aeronautical use. This scenario would require planning for additional future hangar facilities to replace the hangars which would require removal or relocation.
- Overall Scenario 3 – Remove Existing G Hangars Only – The G Hangars are the oldest hangars and the closest to the end of their useful life. The West Executive Hangars are newer, in good condition and have existing lease agreements extending to ????. This scenario would remove the old G Hangars and preserve the newer West Executive Hangars. This would provide two potential runway access points to the vacant land behind the G and West Executive Hangars. This greatly increases the space available for expansion of continues aeronautical use while providing the least impact to the existing hangars. However upon full development, this would provide some taxilane congestion on the two runway access points which would be shared by all general aviation developments located behind the G and West Executive Hangars. This scenario would require planning for future hangar facilities to replace the 6 G Hangars which would require removal and relocation.

Due to the existing capacity shortfalls of terminal and general aviation facilities presented in Chapter 4, a very high priority is placed on providing adequate capacity to meet the existing and forecast demand while also providing the least impact to the existing hangars. Scenario 1 would provide adequate capacity for expansion of the terminal facilities but would fall well short of providing enough space for expansion of the general aviation facilities to meet the current and forecast demand. As a result, scenario 1 is considered inadequate. Scenario 2 is considered impractical due to the large impact to the existing West Executive Hangars who have considerable remaining life and existing lease agreements. Scenario 3 is the recommended overall planning strategy as it provide adequate capacity for expansion and the least impact to the existing hangars.

Primary Planning Elements

- Terminal Facilities – The 2017 *Terminal and Development Plan* included a detailed study of the proposed location and layout of a new terminal facility including new terminal building, aircraft gates and apron, deicing pad, access roads, parking lots and ARFF and snow equipment building. This study included evaluation of two terminal site locations and a detailed proposed layout for the terminal building and airside and landside development. The results of this study determined the location and layout of the proposed terminal facilities and have been approved by FAA.
- General Aviation and Charter Apron – As shown in Chapter 4 the general aviation and charter apron needs additional capacity. The charter aircraft are generally larger than the GA aircraft. As a result, separate parking areas should be designated for charter

and GA aircraft with layouts designed to accommodate the typical aircraft sizes and configurations. Once the new terminal building is constructed, the airport administration and charter flight support services provided by the FBO can move into the existing terminal building. This will allow for removal of the existing FBO and airport administration buildings and provide airfield access to the area which is currently an automobile parking lot. This automobile parking lot can be repurposed as an expansion of the charter aircraft parking area. The most logical expansion for the general aviation apron is north of the GA apron and east of the Town Hangars A thru F. This layout provides adequate capacity for the existing and forecast future aircraft parking capacity requirements.

- Helicopter Parking Apron – Helicopter operations are not compatible with airline, charter, or general aviation aircraft operations due to the significant impact of the helicopter rotor wash. As a result, the proposed helicopter parking area should be separated as much as possible from the terminal and general aviation facilities. The most logical location is as far west of the general aviation apron as possible to facilitate maximum separation from the general aviation facilities. The helicopter parking apron is a very high priority for the Airport. As a result, it is desired to maintain capability of constructing phase 1 without a potential delay due to negotiations with the US Forest Service for property acquisition. As a result, the phase 1 of the helicopter apron was located on airport property just east of the existing property line. Taxilane access to the proposed phase 1 helicopter parking apron will require removal of fuel storage tanks. Further development of the future large jet hangar site will require relocation of the taxilane access to the helicopter parking apron and removal of multiple G Hangars.

Secondary Planning Elements

- Large Jet Hangar – There is an unmet need for four or five large 17,000 to 18,000 square foot hangars to provide overnight parking for large jets out of the weather elements. It is desired for as many large jet hangars as possible to have south facing hangar doors to optimize the sun exposure during the winter and minimize the snow and ice accumulation immediately adjacent to the hangar doors where the snow plow cannot access without risk of damage to the building. In addition, this hangar construction is planned for the very near future. As a result, proximity to existing airfield access is desired to minimize costs. Two potential locations are shown on the Airport Layout Plan. Site one is located just north of the G hangars and provides room for four 17,000 square foot hangars, one of which would have a south facing door. This would require relocation of the existing G Hangars to provide access to the south side of the first new hangar or accept an easterly facing hangar door. The existing fuel storage tanks would also need to be relocated in order to provide a taxilane to the east side of the new hangars. Site two is located north of the existing west apron and provides room for one 18,000 square foot hangar with a south facing door. The general aviation apron would need to be expanded to the north to provide a new taxilane and apron to access the large jet hangar.
- Hangars - The airport currently has adequate capacity of existing hangars. However, due to the uncertainty of future growth, additional hangar expansion should be planned for the long term future. The construction of a new helicopter parking apron and large jet hangars in the early phases of the ALP will require removal or relocation of all of the G hangars. Relocation or replacement of the six G hangars should be planned in the early phases of the ALP development. Space was reserved adjacent to the

expanded GA Apron to accommodate these six relocated G Hangars. An alternate location for the relocated G Hangars and additional future hangar expansion is west of the row of large jet hangars and east of the proposed helicopter parking apron. This location will provide adequate hangar capacity to offset all six hangars requiring removal or relocation and some additional future expansion as demand increases.

- AWOS - As shown in Chapter 4, the existing AWOS critical area (500 feet) is clear of any existing sheltering objects. However, the future ARFF and snow equipment building is a sheltering object within the critical area with a lateral angle more than 10 degrees and a height more than 1/10 of the distance from the AWOS. In addition, aircraft taxiing to the terminal could subject the wind sensor to jet blast. For a non-precision runway, the preferred siting of the AWOS sensors is 1,000 to 3,000 feet from the primary runway end. Due to the proximity of Doe Ridge, the west Corporate Hangars and Highway 395, this is not possible without significant sheltering objects. The selected location adjacent to the existing segmented circle and wind cone provides a critical area clear of any permanent sheltering objects. Parked and taxiing aircraft will be within the critical area but only the tail will penetrate within 15 vertical feet of the wind sensor and the tail is narrow enough to result in a lateral angle less than 10 degrees. The only jet blast risk is from aircraft coasting into their final parking location at which time their engines are not throttled up.
- Fuel Relocation – The new large jet hangar development requires relocation of the existing fuel tanks. Consideration of a new fuel tank location includes maintaining a minimum clearance from existing or future buildings of 50 feet to meet building and fire code requirements, adequate access for fuel delivery trucks and proximity to the general aviation apron, charter jet apron and airline terminal to minimize fuel truck travel time and ability to accommodate up to three large fuel tanks to provide for future expansion as needed. As stated in Chapter 4, the self serve dispenser is not essential, as a result, accommodating a self serve dispenser in proximity to the fuel tanks is not required. Three alternative fuel tank locations were considered as follows. The first location is north of the existing Town Hangars on an existing vacant concrete pad adjacent to the entrance gate. The second location is north of the existing west apron and west of the existing parking lot. The third location is north of the future charter jet apron expansion and south of the future terminal parking lot. All three locations provide adequate clearance from existing buildings and the ability to accommodate up to three large fuel tanks. The first location is the most remote and provides the longest travel time for the fuel trucks to access the charter jet and airline aprons. The third location is the most convenient for the long term but not ideally located for the short term development and provides security concerns being located outside the existing airport fence. All three locations provide adequate fuel delivery access with some general aviation apron access required for turn around movements. All three locations are very viable. The first and second locations are viable for the short term. The third location is only viable for the long term. All three locations have been shown on the ALP with the first two on the short term development and the third location on the long term development in order to provide the Airport the most flexibility to select the best location according to the timing of when it is developed.
- Runway 9-27 Extension – The airport does not have sufficient runway length to accommodate existing traffic without load restrictions. A 1,200-foot runway extension was evaluated for Runway 9 and/or Runway 27.

- **Runway 27 Extension:** Extending Runway 27 is limited by the clearance requirements for a 15-foot truck on Benton Crossing Road and RSA and ROFA clearance for Benton Crossing Road. Relocating Benton Crossing Road to the east is not feasible because of the environmental concerns with crossing the existing creek east of Benton Crossing Road. The maximum feasible runway extension is 800 feet. However, with an 800-foot runway extension, the last future MALSF light would be in the middle of the creek. FAA allows a tolerance of +100', -0' for the last MALSF light. Placing the last MALSF light at the maximum +100' tolerance would move it far enough away from the creek but presents a utility challenge in providing power across or under the creek. As a result, a 700-foot extension is ideal to minimize limitation for installing a future MALSF. With a 700-foot extension there are a few obstructions which will need to be mitigated with the following suggested mitigations. There are several power poles which are recommended to be moved underground. There are several trees which are recommended to be trimmed or removed. There is a streetlight at the corner of Benton Crossing Road and Highway 395 which is recommended to be lowered.
- **Runway 9 Extension:** A 1,200-foot extension of Runway 9 provides adequate airspace clearance for a 15-foot truck on Hot Creek Hatchery Road. Due to the existing longitudinal slope of Runway 9-27 and the existing terrain west of Runway 9, this runway extension will require significant (15 feet +/-) fill material in order to maintain runway line of sight requirements. A 15 foot +/- retaining wall between the extended parallel taxiway and the adjacent hangar taxilane would also be required.
- **Recommendation:** In order to minimize the limitation of a future MALSF and mitigation of future obstructions on Runway 27 and minimize the required fill and retaining wall on Runway 9, it is recommended to obtain an additional 1,200 feet of runway length by planning a Runway 27 extension of 700 feet and a Runway 9 extension of 500 feet. Both proposed runway extensions will not introduce any new incompatible land uses within the Runway Protection Zone.

CHAPTER 7. MODIFICATIONS TO STANDARDS (NON-STANDARD CONDITIONS)

The Federal Aviation Administration has set forth standards for airport design in their Advisory Circular 150/5300-13B, *Airport Design*. There are four current conditions at the Mammoth Yosemite Airport that do not meet these standards. The Airport plans to correct the following conditions as funding becomes available:

- The soil between the Runway Safety Area (RSA) limit and U.S. Highway 395 right-of-way is within the Runway Object Free Area (ROFA) of Runway 9-27 for an RDG C II runway. It is planned to revise the grading in this area from 150 feet to 250 feet south of the runway to meet FAA Advisory Circular 150/5300-13B transverse grade limitations in the RSA and ROFA.
- The existing supplemental wind cone on the south side Runway 9 is within the ROFA. It is proposed to relocate this supplemental wind cone to the existing fence line. The existing fence is still within the ROFA but has several obstructions lights on utility poles to properly identify the ROFA obstructions.
- The taxiway fillets do not conform to FAA Standards. It is proposed to taper the fillets to Taxiway Design Group 2 meeting AC 150/5300-13B standards.
- The FAA design standard for a Taxiway Design Group 2 calls for 15-foot paved shoulders. It is proposed to construct 15-foot paved shoulders on each side of the taxiways.

There is one current conditions at the Mammoth Yosemite Airport that does not meet the AC 150/5300-13B standards that has been mitigated as follows:

- The Hot Creek hangars located in the East Corporate Hangar Area penetrate the Part 77 Transitional Surface and Runway Object Free Area (ROFA). Obstruction lights have been installed at each end of the row of hangars. For long term planning, when the land lease expires in November 2055, the East Corporate hangars can be relocated out of the ROFA.

CHAPTER 8. DEVELOPMENT SUMMARY

8-1 Airport Priorities and Phasing

The general strategy for prioritizing and phasing the future development of the airport is centered around finding a balance between maintaining the existing infrastructure, correcting items which do not meet current FAA standards and planning required future infrastructure expansion.

The timing of projects required to maintain existing infrastructure is determined based on rehabilitating existing pavements 2 to 4 years prior to predicted failure from deep seated distress as shown in the current Pavement Maintenance Management Plan. If one waits until the pavement section has failed due to deep-seated distress, then the strength of the subgrade and subsoils and the strength and quality of the existing base and pavement materials will have decreased. It will not be feasible to strengthen the section and extend the life of the section by the placement of reasonable overlays or additional thicknesses of the pavement section. Once a deep-seated failure has occurred, it will be necessary to reconstruct the entire pavement section.

The timing of the projects for expansion of airport infrastructure involves evaluation of the Airport's level of need and consequences of delaying each project to develop a project prioritization which best serves the Airport's future.

The projects required to correct items which do not meet current FAA standards are then scheduled amongst the maintenance of existing infrastructure projects and expansion of airport infrastructure projects in order to bring the airport in compliance with current FAA standards in an efficient and logical progression. Projects which are dependent upon one another are also grouped together or in logical succession.

Lastly, a financial analysis is conducted in order to find a balance between completing the projects in a timely fashion while accommodating anticipated FAA and Town funding limitations.

8-2 Development Projects Completed Since Last ALP

The last Airport Layout Plan Update for Mammoth Yosemite Airport was prepared in July 2014. Since that time the following development/planning projects have been completed or are in progress:

Project:	Design and Construction - Reconstruct General Aviation Aircraft Parking Apron A3 and Portion of Apron A2 – 2014-2015
AIP No.	3-06-0146-30 - Design 3-06-0146-31 - Construction
Cost:	Design – Total Project Cost \$120,000; FAA Funding \$108,792 Construction - Total Project Cost \$1,623,944; FAA Funding \$1,472,268

Project: Wildlife Hazard Management Plan and Biological Assessment - 2015

AIP No. 3-06-0146-33

Cost: Total Project Cost – \$55,740; FAA Funding \$50,534

Project: Disparity Study – DBE Program - 2016

AIP No. 3-06-0146-34

Cost: Total Project Cost \$50,000; FAA Funding \$45,330

Project: Design - Install Perimeter Fencing Required by 14 CFR 139 – 2016

AIP No. 3-06-0146-35

Cost: Total Project Cost \$79,190; FAA Funding \$71,794

Project: Conduct Environmental Study – Proposed New Terminal and Aircraft Parking Apron – With 25% Conceptual Design to Support Environmental Study – 2017-2021 - In Progress

AIP No. 3-06-0146-37

Cost: Grant – \$635,708; Total Project Cost \$701,200

Project: Design and Construction - Upgrade Segmented Circle and Wind Cone - 2019

AIP No. 3-06-0146-38

Cost: Total Project Cost \$557,037; FAA Funding \$504,505

Project: Design and Construction - Reconstruct Town Hangar Taxiway; Slurry Seal Taxiways – 2020

AIP No. 3-06-0146-041-2020

Cost: Total Project Cost \$1,101,583; FAA Funding Entitlement \$998,695; FAA Funding CARES Act \$102,888

Project: Design and Construction - Security Gates and Terminal Area Fencing – 2020 – Construction Complete – Awaiting Final Closeout

AIP No. 3-06-0146-042-2020

Cost: Estimated - Total Project Cost \$722,344; FAA Funding Entitlement \$654,877; FAA Funding CARES Act \$67,467

Project: Install New Emergency Generators - 2020

AIP No. Funded by Sponsor

Cost: Total Project Cost \$151,117.52

Project: Design and Construction – Reconstruct East General Aviation Apron – 2021

AIP No. 3-06-0146-044-2021

Cost: Estimated - Total Project Cost \$3,393,225; FAA Funding Entitlement \$3,076,298; FAA Funding ARPA \$316,927

Project: This Airport Layout Plan Narrative and Updated ALP Drawings are currently being funding under AIP No. 3-06-0146-40.

AIP No. 3-06-0146-040-2019

Cost: Estimated - Total Project Cost \$230,000; FAA Funding \$208,518

Project: Relocate and Upgrade Automated Weather Observation System (AWOS III P/T) – Design/Construct - 2022

AIP No. 3-06-0146-048-2022

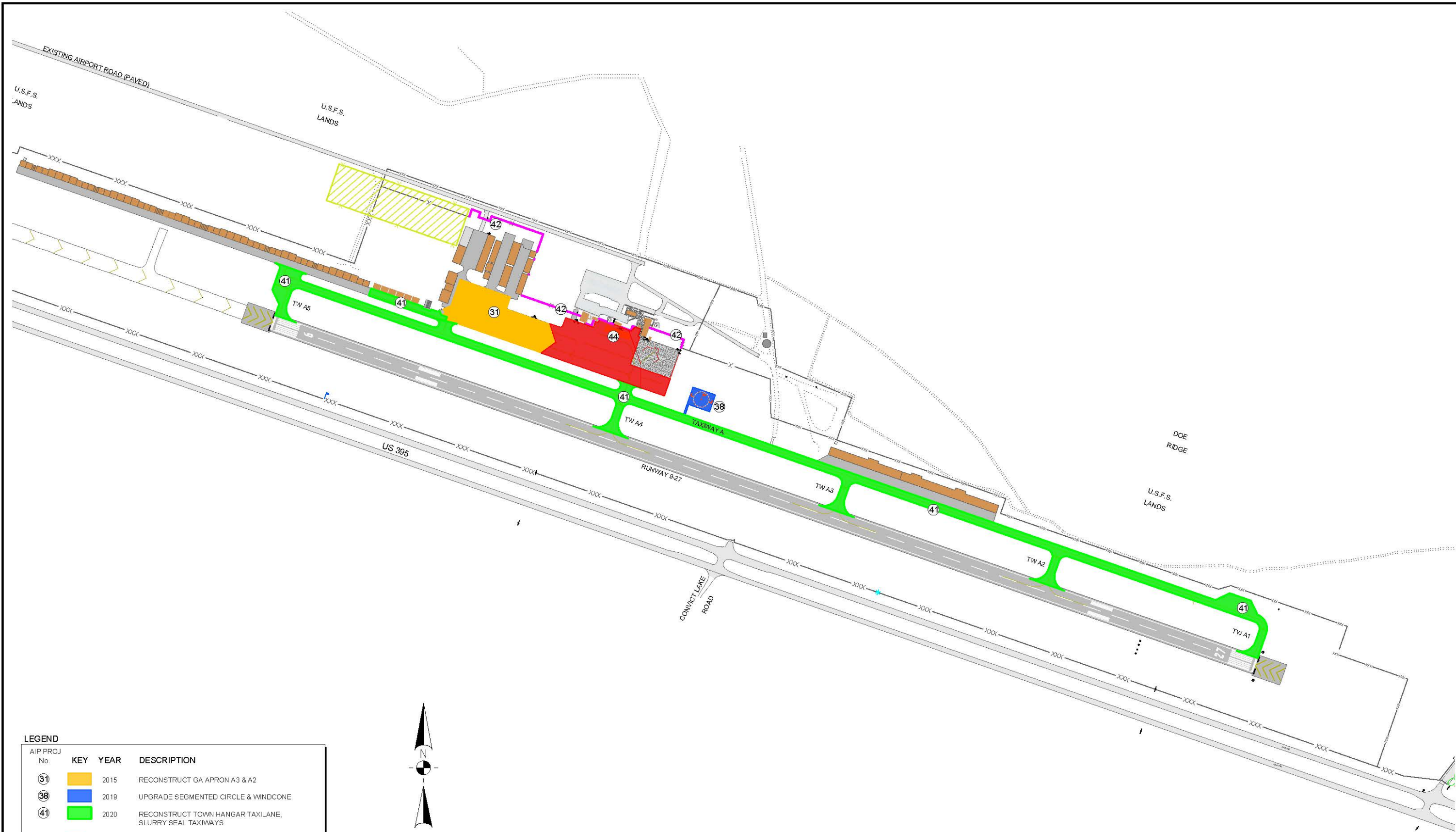
Cost: Estimated - Total Project Cost \$540,700; FAA Grant Award \$490,215

Project: ARFF/Snow Removal Facility – Site and Building - Design - 2022

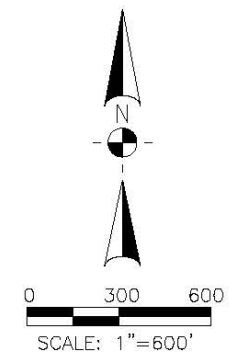
AIP No. 3-06-0146-049-2022

Cost: Estimated - Total Project Cost \$492,400; FAA Grant Award \$446,410

A sketch showing all projects completed since the last Airport Layout Plan is included as Plate No.8-1.



LEGEND				
AIP PROJ No.	KEY	YEAR	DESCRIPTION	
31	Yellow	2015	RECONSTRUCT GA APRON A3 & A2	
38	Blue	2019	UPGRADE SEGMENTED CIRCLE & WINDCONE	
41	Green	2020	RECONSTRUCT TOWN HANGAR TAXILANE, SLURRY SEAL TAXIWAYS	
42	Pink	2020	SECURITY GATES & TERMINAL AREA FENCING	
(SPONSOR)	Icon	2020	INSTALL NEW EMERGENCY GENERATORS	
44	Red	2021	RECONSTRUCT EAST GA APRON	





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MAMMOTH YOSEMITE AIRPORT
MAMMOTH LAKES, CALIFORNIA
DEVELOPMENT PROJECTS SINCE LAST ALP
2014-2020

DATE	5/9/2022
DRAWN	KDC
CHECKED	DB
PROJECT No.	75.02
FILE 7503-20 projects-prev	
PLATE No.	8-1

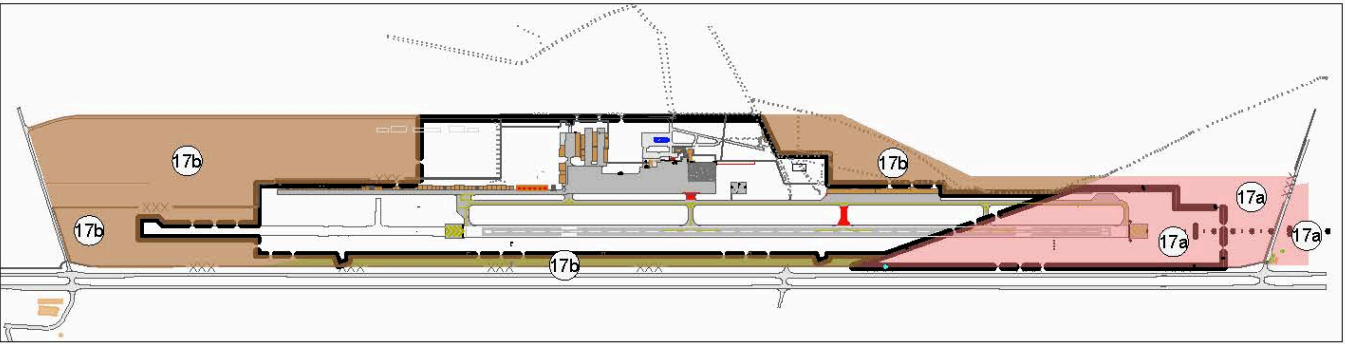
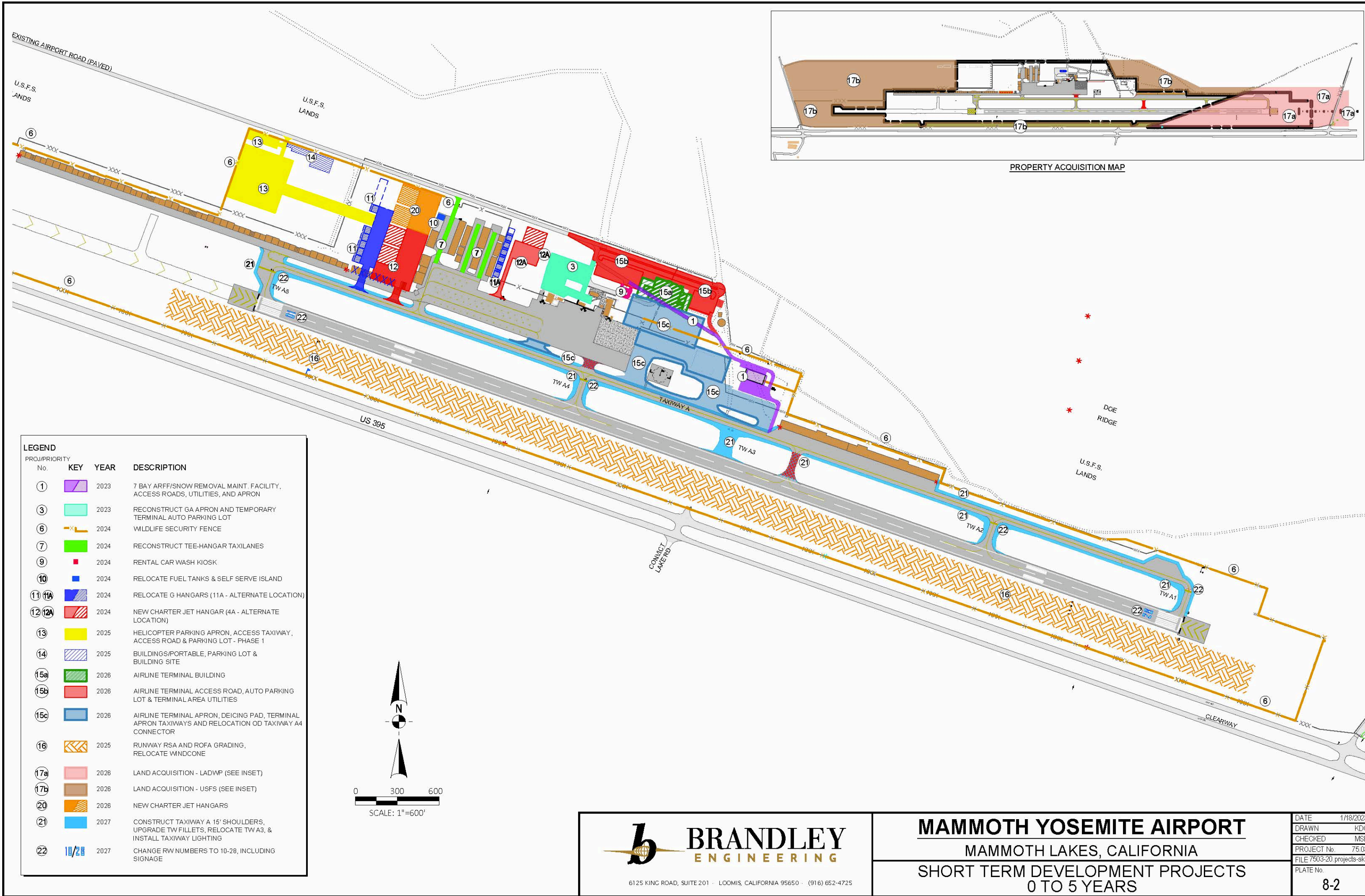
8-3 Development Projects in the Next 0 to 5 Years (2022-2026)

It is proposed to develop the projects shown in Table No. 8-1, Short-Term Development Projects – 0 to 5 Years, at Mammoth Yosemite Airport with FAA AIP entitlement/discretionary, BIL/AIG Allocated and Airport Terminal Program Competitive funds, Town of Mammoth Lakes funds or private funds. All costs are based on 2021 prices and have not been adjusted for inflation.

A sketch showing all projects proposed for development in the 0 to 5-year period is included as Plate No.8-2.

Table No. 8-1 was submitted to the FAA for consideration in October of 2022.

TABLE NO. 8-1 - SHORT TERM DEVELOPMENT PROJECTS - 0 to 5 Years											
Project No.	Description	Construction Cost	Engineering/ Administration	Total Project Cost	F.A.A. Participation				State Participation	Sponsor Participation	Privately Funded
					AIP Entitlement	AIP Discretionary	AIG Allocated	AIG Competitive ATP			
	Fiscal Year 2023										
1	Construct - 7 bay ARFF/Snow Removal Facility (10,350 Sq. Ft.), Utilities, Access Road (25'-35' x 1,650'), Apron (31,200 Sq.Ft.)	\$ 6,600,000	\$ 700,000	\$ 7,300,000	\$ 1,554,859	\$ 4,639,032	\$ -	\$ -	\$ -	\$ 1,106,109	\$ -
2	Pavement Maintenance Management Plan		\$ 130,000	\$ 130,000	-	-	\$ 117,858	-	-	\$ 12,142	-
3	Design/Construct - Reconstruct General Aviation and Temporary Terminal Auto Parking Lot (83,000 Sq.Ft.)	951,000	267,000	1,218,000	-	-	1,104,239	-	-	113,761	-
	TOTAL FY 2023	\$ 7,551,000	\$ 1,097,000	\$ 8,648,000	\$ 1,554,859	\$ 4,639,032	\$ 1,222,097	\$ -	\$ -	\$ 1,232,012	\$ -
	Fiscal Year 2024										
4	Environmental - Land Acquisition - U.S. Forest Service Land (155.61 Acres)	\$ -	\$250,000	\$250,000	\$ -	\$ -	\$226,650	\$ -	\$ -	\$23,350	\$ -
5	Environmental - Land Acquisition - LADWP Land (74.24 Acres)	-	200,000	200,000	-	-	181,320	-	-	18,680	-
6	Construct - Wildlife Security Fence (23,000 Ft.)	1,634,500	311,000	1,945,500	1,000,000	763,790	-	-	-	181,710	-
7	Reconstruct Tee-Hangar Taxilanes										
	FAA Eligible Tee-Hangart Taxilanes (25' x 1,300') (PCI in 2014 = 35)	651,500	183,000	834,500	-	-	756,558	-	-	77,942	-
	FAA Non-Eligible Tee-Hangar Taxilanes (52,400 sf)	706,500	198,000	904,500	-	-	-	-	-	904,500	-
8a	Architectural/Engineering - Airline Terminal Building	\$ -	\$ 1,750,000	\$ 1,750,000	-	-	-	1,662,500	\$ -	87,500	-
8b	Design - Airline Terminal Access Road, Automobile Parking Lot, Terminal Area Utilities	-	776,000	776,000	-	-	-	737,200	-	38,800	-
8c	Design - Airline Terminal Apron, Deicing Pad, Terminal Apron Taxiways and Relocation of T/W A4 Connector	-	670,000	670,000	-	-	-	636,500	-	33,500	-
9	Design/Construct - Rental Car Wash Kiosk	91,000	22,750	113,750	-	-	-	-	-	\$ -	113,750
10	Design/Construct - Relocate Fuel Tanks & Self Serve Island	325,000	81,250	406,250	-	-	-	-	-	-	406,250
11	Relocate G Hangars (6 Hangars)	475,000	118,750	593,750	-	-	-	-	-	-	593,750
12	Design/Construct - Two New Charter Jet Hangar (18,000 sq. ft. Each)	6,380,000	1,595,000	7,975,000	-	-	-	-	-	-	7,975,000
	TOTAL FY 2024	\$ 3,883,500	\$ 4,560,750	\$ 8,444,250	\$ 1,000,000	\$ 763,790	\$ 1,164,528	\$ 3,036,200	\$ -	\$ 1,365,982	\$ 1,113,750
	Fiscal Year 2025										
13	Design/Construct - Helicopter Parking Apron (180,925 Sq. Ft.) and Access Taxiway (1,330 x 40') and Access Road and Parking Lot (26,000 Sq. Ft.) Phase 1	3,290,000	922,000	4,212,000	1,000,000	2,818,599	-	-	-	393,401	-
14	Design/Construct - Buildings/Portables, Parking Lot and Building Site	510,000	143,000	653,000	-	-	-	-	-	653,000	
	TOTAL FY 2025	\$ 3,800,000	\$ 1,065,000	\$ 4,865,000	\$ 1,000,000	\$ 2,818,599	\$ -	\$ -	\$ -	\$ 1,046,401	\$ -
	Fiscal Year 2026										
15a	Construct - Airline Terminal Building	\$ 17,525,000	\$ 3,330,000	\$ 20,855,000	\$ -	\$ -	\$ -	\$ 19,812,250	\$ -	\$ 1,042,750	\$ -
15b	Construct - Airline Terminal Access Road, Automobile Parking Lot, Terminal Area Utilities	4,925,000	936,000	5,861,000	-	-	-	5,567,950	-	293,050	-
15c	Construct - Airline Terminal Apron, Deicing Pad, Terminal Apron Taxiways and Relocation of T/W A4 connector	10,650,000	2,024,000	12,674,000	-	-	-	12,040,300	-	633,700	-
16	Design/Construct - Runway RSA and OFA Grading (323,000 Sq.Yd.), Relocate Windcone	\$ 3,000,000	\$ 840,000	\$ 3,840,000		\$ 3,481,344	\$ -	\$ -	\$ -	\$ 358,656	\$ -
17a	Land Acquisition - LADWP Land (74.24 Acres)	47,150	15,000	62,150	56,345	-	-	-	-	5,805	-
17b	Land Acquisition - U.S. Forest Service Land - (155.61 Acres)	85,250	26,000	111,250	100,859	-	-	-	-	10,391	-
18	Environmental - Replace Doe Ridge Obstruction Lights	-	140,000	140,000	-	-	126,924	-	-	13,076	-
19	Equipment Acquisition - Replace ARRF Vehicle	900,000	135,000	1,035,000	842,796	95,535	-	-	-	96,669	-
20	Design/Construct - Two New Charter Jet Hangar (18,000 sq. ft. Each)	6,380,000	1,595,000	7,975,000	-	-	-	-	-	-	7,975,000
	TOTAL FY 2026	\$ 43,512,400	\$ 9,041,000	\$ 52,553,400	\$ 1,000,000	\$ 3,576,879	\$ 126,924	\$ 37,420,500	\$ -	\$ 2,454,097	\$ 7,975,000
	Fiscal Year 2027										
21	Design/Construct - Construct 15 Foot Taxiway A Shoulders - (15'x14,700'), Updgrade Taxiway Fillets, Relocate Taxiway A3 Connector, Install Taxiway Lights	\$ 1,117,000	\$ 280,000	\$ 1,397,000	\$ 886,675	\$ 379,845	\$ -	\$ -	\$ -	\$ 130,480	\$ -
22	Design/Construct - MAGVAR Change Runway Numbers to 10-28 including update signage	100,000	25,000	125,000	113,325	-	-	-	-	11,675	-
	TOTAL FY 2027	\$ 1,217,000	\$ 305,000	\$ 1,522,000	\$ 1,000,000	\$ 379,845	\$ -	\$ -	\$ -	\$ 142,155	\$ -
	TOTAL SHORT-TERM DEVELOPMENT	\$ 59,963,900	\$ 16,068,750	\$ 76,032,650	\$ 5,554,859	\$ 12,178,146	\$ 2,513,549	\$ 40,456,700	\$ -	\$ 6,240,646	\$ 9,088,750



LEGEND			
PROJ/PRIORITY No.	KEY	YEAR	DESCRIPTION
1		2023	7 BAY ARFF/SNOW REMOVAL MAINT. FACILITY, ACCESS ROADS, UTILITIES, AND APRON
3		2023	RECONSTRUCT GA APRON AND TEMPORARY TERMINAL AUTO PARKING LOT
6		2024	WILDLIFE SECURITY FENCE
7		2024	RECONSTRUCT TEE-HANGAR TAXILANES
9		2024	RENTAL CAR WASH KIOSK
10		2024	RELOCATE FUEL TANKS & SELF SERVE ISLAND
11 11A		2024	RELOCATE G HANGARS (11A - ALTERNATE LOCATION)
12 12A		2024	NEW CHARTER JET HANGAR (4A - ALTERNATE LOCATION)
13		2025	HELICOPTER PARKING APRON, ACCESS TAXIWAY, ACCESS ROAD & PARKING LOT - PHASE 1
14		2025	BUILDINGS/PORTABLE, PARKING LOT & BUILDING SITE
15a		2026	AIRLINE TERMINAL BUILDING
15b		2026	AIRLINE TERMINAL ACCESS ROAD, AUTO PARKING LOT & TERMINAL AREA UTILITIES
15c		2026	AIRLINE TERMINAL APRON, DEICING PAD, TERMINAL APRON TAXIWAYS AND RELOCATION OF TAXIWAY A4 CONNECTOR
16		2025	RUNWAY RSA AND ROFA GRADING, RELOCATE WINDCONE
17a		2026	LAND ACQUISITION - LADWP (SEE INSET)
17b		2026	LAND ACQUISITION - USFS (SEE INSET)
20		2026	NEW CHARTER JET HANGARS
21		2027	CONSTRUCT TAXIWAY A 15' SHOULDERS, UPGRADE TW FILLETS, RELOCATE TW A3, & INSTALL TAXIWAY LIGHTING
22		2027	CHANGE RW NUMBERS TO 10-28, INCLUDING SIGNAGE



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MAMMOTH YOSEMITE AIRPORT
MAMMOTH LAKES, CALIFORNIA
SHORT TERM DEVELOPMENT PROJECTS
0 TO 5 YEARS

DATE	1/13/2023
DRAWN	KDC
CHECKED	MSB
PROJECT No.	75.03
FILE	7503-20_projects-skic
PLATE No.	8-2

A description of each project proposed for development in the 0 to 5-year period is as follows:

8-3.1 7-bay ARFF/Snow Removal Facility (10,350 sq. ft.), Utilities, Access Road (24'x 1,650'), Apron (17,550 sq. ft.) – Construction

The Town of Mammoth Lakes proposes to construct a new 7-bay ARFF/Snow Removal Facility including utilities, parking apron, and access road at the Mammoth Yosemite Airport on airport property. This facility would be used to house the snow removal equipment and the ARFF equipment at the airport. Currently, the Town is leasing a hangar from the FBO, which does not have the capacity to hold all the airport's snow removal and ARFF equipment. Therefore, some equipment is left exposed to the elements and ages more quickly. Building this facility would meet the FAA's goal of housing ARFF vehicles and snow removal equipment indoors. To serve the new ARFF/Snow Removal Facility, it will be necessary to construct a new paved apron around the building for vehicle access and parking, a new access road extending from Airport Road to the new facility and from the new facility to Taxiway A and utilities including drainage, electrical, floodlighting, gas, water and sewer. Details, sizing, and justification of the 7-bay ARFF/Snow Removal Facility are included in Appendix C *Mammoth Yosemite Airport – 7-Bay ARFF/Snow Removal Facility Project Scope and Justification Report*. This facility is being designed in 2022 with funding from FAA AIP 049 entitlement funds and Town of Mammoth Lakes.

It is proposed to construct this facility in 2023 with funding from FAA entitlement and discretionary funds and Town of Mammoth Lakes.

8-3.2 Reconstruct General Aviation and Temporary Terminal Auto Parking Lot (83,000 sq. ft.)

The pavements on the general aviation and terminal parking lot are experiencing significant deterioration due to weathering and thermal stresses. It will be necessary to reconstruct these pavements. The reconstruction of these pavements will consist of the removal of the existing AC pavement and enough existing aggregate base to accommodate the new section, recompacting existing base course and/or subgrade, and then placing new subbase course, aggregate base course, and bituminous surface course. New marking will be painted on the reconstructed sections. It is proposed to design and construct this project in 2023 with funding from BIL/AIG Allocated funds and the Town of Mammoth Lakes.

8-3.3 Environmental Assessment – Land Acquisition – U.S. Forest Service Land (155.61 Acres)

There is currently 155.61 acres of land owned by the U.S. Forest Service on the north, west and south sides of the Airport. The Airport currently has a Special Use Permit for the U.S. Forest Service land on the south side of the Airport. It is desired to acquire this land and other adjacent U.S. Forest Service land through the Townsite Act to facilitate expansion of the existing airport facilities and protection of the ROFA and RPZ. The acquisition of this land will require an Environmental Assessment. It is proposed to conduct an Environmental Assessment study for this proposed land acquisition in 2024 with funding from BIL/AIG Allocated funds and Town of Mammoth Lakes.

8-3.4 Environmental Assessment – Land Acquisition – LADWP Land (74.24 Acres)

There is currently 74.24 acres of land owned by the Los Angeles Department of Water and Power on the east side of the Airport which includes the east portion of the runway and parallel taxiway and the existing Runway Protection Zone. The Airport currently has a 50-year lease on most of this land. It is desired to acquire this land to obtain ownership of the entire airport and provide protection of the ROFA and RPZ. The acquisition of this land will require an Environmental Assessment. It is proposed to conduct an Environmental Assessment study for this proposed land acquisition in 2024 with funding from BIL/AIG Allocated funds and Town of Mammoth Lakes.

8-3.5 Construct Wildlife Security Fence (23,000 Ft.)

Currently perimeter fencing at Mammoth Yosemite Airport consists of a short section of chain link and wrought iron fencing in the temporary terminal and general aviation FBO areas only. All other fencing consists of barbed wire fence. The Wildlife Hazard Assessment prepared for this airport recommends installing a fence around the entire airport property. A fence is also required for airport security and to prevent the incursion onto the airport by persons and animals, which present a risk to aircraft and passengers. It is proposed to furnish and install an 8-foot-high chain-link fence around the perimeter of the airport, including clearing the fence line, 12-foot-wide single swing chain link gates, 24-foot-wide double swing chain link gates, and chain link pedestrian gates. The remaining areas of fence to the north, west and south are along Forest Service land and require additional coordination. Fencing to the east is along LADWP and requires additional coordination. It is currently proposed to construct this fence in 2024 with funding from FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes.

8-3.6 Reconstruct Tee Hangar Taxilanes (25' x 1,280')

The 2014 PMMP indicated that from a subgrade strength standpoint, the pavements on the T-Hangar Taxilanes have a remaining life of 20+ years with forecast traffic. However, the bituminous surface is exhibiting significant distress with weathering, raveling and cracking. The PCI of these pavements was 35 in 2014 and the PCN was 7. It is recommended these pavements be fully reconstructed in order to meet the FAA minimum requirements for pavement thicknesses.

This project will consist of removing and recycling the existing asphalt and aggregate base course, recompacting the subgrade soils and placing 4 inches of recycled aggregate subbase course, 6 inches of aggregate base course and three inches of bituminous surface course. New permanent markings will be applied. The 25 feet wide taxilanes are AIP eligible, however the reconstruction of the pavement between the edge of the taxilane and the hangars is considered AIP ineligible. The engineering design and construction is scheduled for 2024 with funding from BIL/AIG Allocated funds and Town of Mammoth Lakes.

8-3.7 Terminal Development – Engineering Design

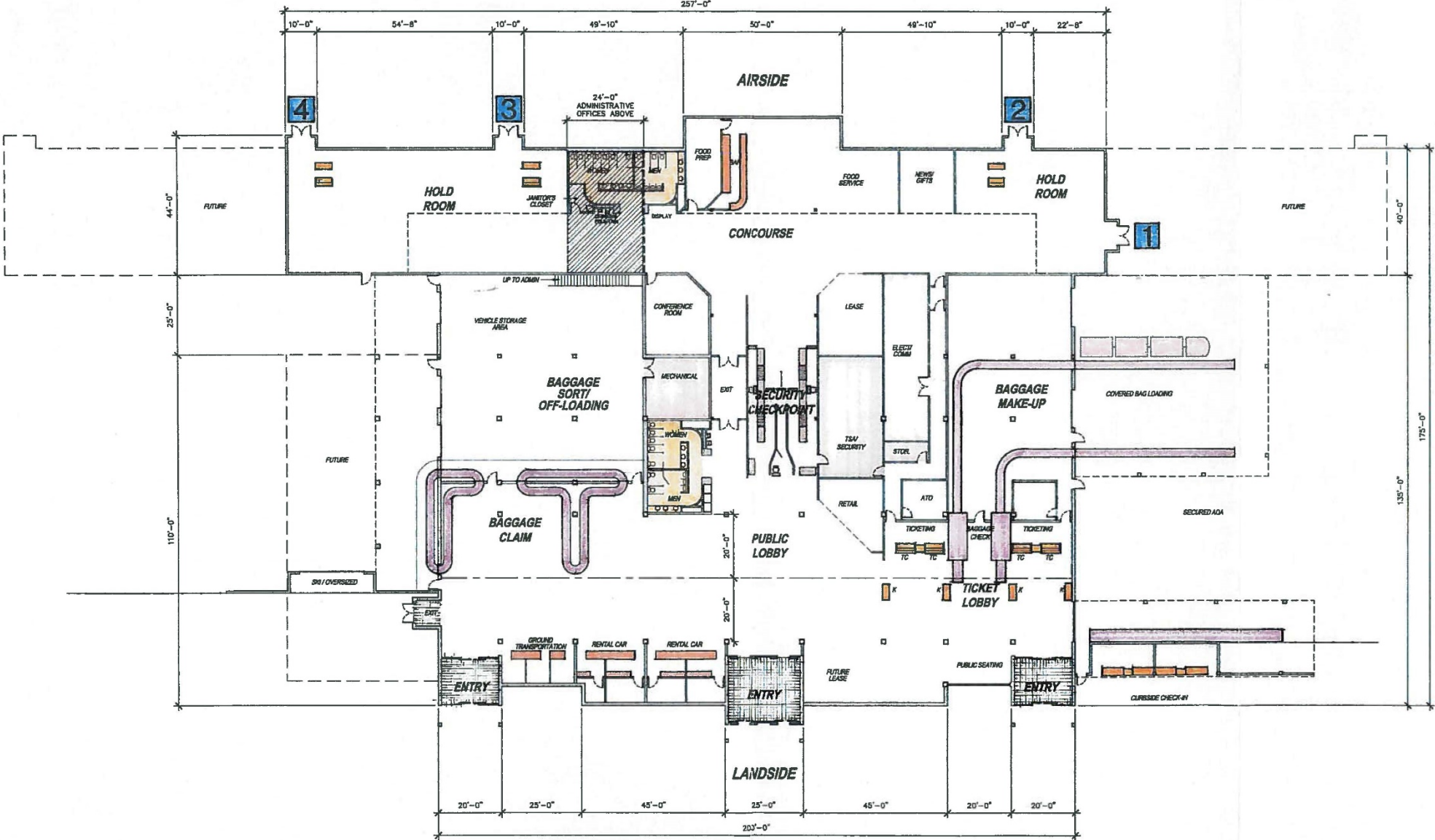
The Terminal Area Development Plan, submitted and approved by FAA in 2017, identified and established general location, size, and layout of the proposed Terminal Facilities required at MMH including the proposed terminal building, terminal apron, deicing facilities, access roads and automobile parking facilities. The Airport Layout Plan

Conditionally Approved on August 14, 2014 included the proposed new terminal facilities. The proposed terminal facilities are justified based on existing and forecast service at the airport. Currently the terminal facilities are located in a modified maintenance building, which is only 5,000 square feet. This temporary terminal has one hold room, one gate, and the baggage pick up is located outside the terminal. Due to the current number of enplanements, it is necessary to use a temporary sprung structure for the passenger overflow. The terminal development will include the following facilities:

- *Airline Terminal Building and Concourse* – It is proposed that the airline terminal building will be a 40,000 square foot structure that will consist of airline areas such as hold rooms, emergency exit concourse, ticket counter areas and kiosks, baggage sort/off-loading, baggage claim, and ski/oversized baggage areas. The building will also include concession areas for rental cars, retail, vending, news/gifts, lease/display, and a restaurant. The public space will consist of a ticket lobby, public seating areas, restrooms, security checkpoint and circulation areas. Other areas will consist of Ground Transportation, Airport Administration, Multi-purpose/Support Areas (conference rooms), mechanical/electrical/utility areas, and support and storage areas. The proposed floor plan for the terminal building is shown in Plate No. 8-3.
- *Airline Terminal Apron* - The proposed commercial terminal building has three main gate positions. The proposed apron will be capable of accommodating three CRJ 700 aircraft in a taxi-in/taxi-out type operation. This should adequately serve the proposed commercial services for the first 10 years after opening of the terminal. The terminal apron will be 20,444 square yards and will be a rigid pavement design using a 16-inch Portland cement concrete surfacing material. Space should be reserved to enlarge the concourse and apron so as not to preclude accommodation of a total of six CRJ 700 aircraft positions. Apron lighting will be provided by floodlights located along the north edge of the apron.
- *Deicing Pad* - The majority of the commercial aircraft forecast to use Mammoth Yosemite Airport will operate during the winter months, and in the winter many of these aircraft require deicing immediately prior to takeoff. From an environmental and operational standpoint, it is not appropriate to deice the aircraft in their parking positions at the gates. A separate deicing pad is proposed adjacent to the apron.

This deicing pad will also serve the business jets that frequent the airport in the winter. The deicing pad will also be constructed of a rigid pavement section with a 16-inch Portland cement concrete slab.

Storm water and/or deicing fluid from this deicing pad will be picked up in the central drop inlet and carried by pipe to an area immediately southeast of the deicing apron where a holding tank will be installed to hold the deicing fluid that washes off the aircraft until it can be pumped out and transported to a suitable disposal area.



TERMINAL BUILDING – FLOOR PLAN
MAMMOTH YOSEMITE AIRPORT
MAMMOTH, CALIFORNIA



PLAN NORTH



SCALE: 1/16" = 1'-0" FULL SHEET 24" x 36"



Van Sant Group

PLATE NO. 8-3

- *Terminal Apron Taxiways* - Two connecting taxiways, 230 and 280 feet long, will connect the new aircraft parking apron and deicing pad to Taxiway A. These taxiways will be flexible pavement sections using asphalt concrete for the surfacing.
- *Automobile Parking* - There is enough space on the existing airport property adjacent to the terminal for two automobile parking areas. The parking area to the west of the terminal will be used for rental car company vehicles and will accommodate 130 automobiles. The parking lot to the east of the terminal will be used by commercial passengers and other visitors and there is space for 60 parked automobiles. Additional existing parking lots can also be used for rental cars. If it becomes necessary to expand the rental car and/or the visitor parking facilities, provisions have been made in the Airport Layout Plan for this supplemental parking facility to be located in front of the terminal across the access road on U.S. Forest Service land. Security lighting will be provided for each parking lot.
- *Terminal Access Road* - An access road will be constructed as an extension to Airport Road. This road will have a cul-de-sac at the east end of the east automobile parking lot. There will be a 20-foot concrete sidewalk in front of the terminal building, then a 9-foot space for parallel automobile parking used for loading and unloading, two 12-foot eastbound travel lanes, a 10-foot concrete island and two 12-foot westbound travel lanes.
- *Terminal Area Utilities* - Utilities within the terminal building and 10 feet outside the building are included in the terminal building plan. Utilities serving the building and other facilities on the airport are included in the civil engineering design section of the project and consist of sewer, water, electrical, and telephone. These utilities of the size and type required for the existing and potentially expanded terminal building will be installed both in front of the terminal building and on the airside portion of the concourse. There is no natural gas available. Propane will be provided for each facility developed at the airport.
- *New Ramp Connector and Relocation of A4 Connector* – Existing Taxiway A4 provides direct access from the apron to Runway 9-27. To meet FAA design requirements it is proposed to remove a section of pavement on Taxiway A4 from Taxiway A to the ramp.

It is proposed to complete the engineering design of these facilities in 2024. An Environmental Assessment for this terminal area development was approved in the fall of 2021. This project will be funded by BIL/AIG Airport Terminal Program Competitive funds and Town of Mammoth Lakes.

8-3.8 Rental Car Wash Kiosk

With the reconstruction of the East General Aviation Apron, the rental car washing area was removed from an area inside the security fence on the existing apron. Enterprise Rent-A-Car proposes to build a self-contained carwash facility north of the existing temporary Terminal Building. This facility will incorporate an integrated water pickup wash pad, oil water separator, pressure washer and up to 100% water reclaim. This unit will be

covered for multi-seasonal use. Design and construction are proposed for 2024 and will be privately funded by Enterprise Rent-A-Car.

8-3.9 Relocate Fuel Tanks & Self-Serve Island

In conjunction with the new Charter Jet Service Hangar, the existing fuel tanks and fuel dispensing island owned by Hot Creek Aviation will need to be relocated in order to provide access to the new hangar. This project will include the removal of the existing tanks and self-serve island, including all of the existing concrete foundations, containment curbs and islands. New concrete tank foundations and containment basins will be constructed. A new self-serve island will be located south of the existing D/E hangars with new electrical service and new fuel storage tanks located just north of the existing F hangars. This project will be funded and constructed by Hot Creek Aviation in 2024.

8-3.10 Relocate G Hangars (6 Hangars)

Existing airport property that is available for future hangar development is currently blocked by Hangars G1 thru G6. This proposed project would relocate the existing G1 thru G6 hangars either east of the existing Hangar A row or west of the Existing Hangar F row. The estimated costs assume the new location is east of the existing Hangar A row. It is proposed to design and relocate these hangars in 2024 with funding from the Town of Mammoth Lakes.

8-3.11 Two New Charter Jet Hangars – 18,000 Sq. Ft. Each

Charter jet service is in need of two large hangars to shelter their aircraft during overnight service. Hot Creek Aviation is proposing to build two 18,000 sq. ft. hangars north of the existing G hangars. An alternate location for one hangar is identified north of the GA Apron. This project will include an approximately 120' x 150' hangar with a concrete floor, new electrical service and minimum 35 ft access taxiway from the existing taxiway or apron. Hot Creek Aviation proposes to fund and build this hangar in 2024.

8-3.12 Helicopter Parking Apron (180,925 Sq. Ft.) and Access Taxiway (1,330' x 40') and Access Road and Parking Lot (26,000 Sq. Ft.) – Phase 1

With the increase in numbers of helicopter flights to Mammoth Yosemite Airport, the proposed construction of a dedicated Helicopter Parking Apron will provide the necessary separation between helicopters and fixed wing aircraft on the apron and help to alleviate overcrowding of the existing general aviation apron. The proposed Phase 1 of the Helicopter Parking Apron and Access Taxiway will provide an apron of 180,925 sq. ft. to park 4 large helicopters, an access taxiway of 1,330' x 40' from Taxiway A, apron area to service helicopters, security fencing, floodlighting, 26,000 sq. ft. of parking and access roads from Airport Road. It is proposed to perform engineering design and construction of this project in 2025 with funding from FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes.

8-3.13 Buildings/Portables, Parking Lot & Building Site

The Mammoth Yosemite Airport will be acquiring four portable buildings. It is desired to install these portable buildings adjacent to the helicopter parking apron. This project will include grading, construction of the building pads and foundations, installation and

placement of the buildings, construction of two restrooms and all associated utilities including water, electrical and gas. This project will be designed and constructed in 2025 with funding from the Town of Mammoth Lakes.

8-3.14 Terminal Development – Construction

The Terminal Area Development Plan, submitted and approved by FAA in 2017, identified and established general location, size, and layout of the proposed Terminal Facilities required at MMH including the proposed terminal building, terminal apron, deicing facilities, access roads and automobile parking facilities. The Airport Layout Plan Conditionally Approved on August 14, 2014 included the proposed new terminal facilities. The proposed terminal facilities are justified based on existing and forecast service at the airport. Currently the terminal facilities are located in a modified maintenance building, which is only 5,000 square feet. This temporary terminal has one hold room, one gate, and the baggage pick up is located outside the terminal. Due to the current number of enplanements, it is necessary to use a temporary sprung structure for the passenger overflow. The terminal development facilities are described in Section 8-3.9 Terminal Development – Engineering Design.

An Environmental Assessment for this terminal area development was approved in the fall of 2021. It is proposed to complete the engineering design of these facilities in 2024. This project includes the construction of these facilities and is proposed for 2026. This project will be funded by BIL/AIG Airport Terminal Program Competitive funds and Town of Mammoth Lakes.

8-3.15 Runway RSA and OFA Grading (232,000 Sq. Yd.), Relocate Wind Cone

Some of the soil between Highway 395 and the Runway Safety Area (RSA) and Runway Object Free Area (ROFA) south of Runway 10-28 is not in compliance with FAA Advisory Circular 150/5300-13B transverse grade limitations. The RSA from 150' to 250' from the runway centerline is not graded to FAA standard grades for a C II runway. This area is on U.S. Forest Service owned land. It is proposed in this project to regrade the RSA and ROFA from 150' from the runway centerline to the Highway 395 right-of-way fence line so that the soil in this area is in compliance with the FAA Advisory Circular 150/5300-13B transverse grade limitations in the RSA and ROFA.

In addition, the existing Runway 10 wind cone is within the Runway Safety Area. It is proposed to relocate this wind cone to be outside of the runway safety area and in line with the existing fence and Highway 395 right of way. This will still be in the ROFA but will be in line with the existing utility pole obstruction lights to mitigate the ROFA obstruction. It is proposed to perform the engineering design and construction of this project in 2026 with funding from FAA AIP discretionary funds and Town of Mammoth Lakes.

8-3.16 Land Acquisition – LADWP Land (74.24 Acres) , USFS Land (155.61 Acres)

All of the land surrounding the airport belongs to the USFS or LADWP. The Airport has fee simple title to significant portions of the airport and long-term leases from LADWP and a special use permit for a portion of the USFS land on the remaining land. It is recommended that the Airport obtain ownership of additional land as shown on Exhibit A, Property Map, of the Airport Layout Plan drawings to serve any potential expansion. A summary of existing and future airport land ownership is listed below:

Existing Airport Owned Land:

Parcel A – 196.23 Acres – Airport Property – Existing – Fee Simple Title

Existing LADWP Owned Land, Future Acquisition (74.24 acres):

Parcel B – 49.60 Acres – Existing 50-year Lease LADWP – Future Acquisition

Parcel E – 18.88 Acres – RPZ Runway 27 – Future Acquisition

Parcel F – 5.76 Acres – RPZ Runway 27 – Future Acquisition

Existing USFS Owned Land, Future Acquisition (155.61 acres):

Parcel C – 17.30 Acres – Existing USFS Special Use Permit – Future Acquisition

Parcel D – 34.86 Acres – Future Auto Parking Lot and Apron – Future Acquisition

Parcel G – 103.45 Acres – RPZ Runway 9 and Future Aeronautical Use –Future Acquisition

It is proposed to acquire Parcels B, E, and F in fee simple title from LADWP. It is also proposed to acquire Parcels C, D and G in fee simple title from USFS through the Townsite Act.

An Environmental Assessment for this land acquisition is proposed to be accomplished in 2024. The land acquisition of 155.61 acres from the USFS and 74.24 acres from LADWP is proposed to be accomplished in 2026 with funding from FAA AIP entitlement funds and Town of Mammoth Lakes.

8-3.17 Environmental Assessment – Replace Doe Ridge Obstruction Lights

There is a row of three obstruction lights on Doe Ridge. These lights are on wooden poles that have deteriorated and pose significant safety issues for maintenance personnel. In addition, only one of the three Doe Ridge obstruction lights are currently functional. In order to properly light this large obstruction to air navigation, it is proposed to remove the existing three obstruction lights and poles and install three new solar powered obstruction lights on new steel poles. These lights are located off airport property and therefore will require an Environmental Assessment. It is proposed to perform an Environmental Assessment of this project in 2026 with funding from BIL/AIG Allocated funds and Town of Mammoth Lakes.

8-3.18 Replace ARFF Vehicle

The existing ARFF vehicle at the airport is 14 years old. With the increased airline activity at the airport, the replacement of the Airport Rescue and Firefighting (ARFF) Vehicle is required for safety at the airport. It is proposed to acquire a new ARFF vehicle in 2026, at which time the old ARFF vehicle will be 20 years old. This project will be funded by FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes.

8-3.19 Two New Charter Jet Hangars – 18,000 Sq. Ft. Each

Charter jet service is in need of two more large hangar to shelter their aircraft during overnight service. Hot Creek Aviation is proposing to build two 18,000 sq. ft. hangar north of the existing G hangars. An alternate location for one hangar is identified north of the GA Apron. This project will include an approximately 120' x 150' hangar with a concrete

floor, new electrical service and minimum 35 ft access taxiway from the existing taxiway or apron. Hot Creek Aviation proposes to fund and build this hangar in 2026.

8-3.20 Construct 15-foot Taxiway A Shoulders (15' x 14,700'), Upgrade Taxiway Fillets, Relocate Taxiway A3, Install Taxiway Lights

Mammoth Yosemite Airport is classified as a TDG 2 airport. Taxiway A and the cross taxiways do not have paved shoulders. In order eliminate unprotected soils near or adjacent to the taxiway and cross taxiways and to accommodate snow removal operations and the passage of maintenance and emergency equipment and the occasional passage of an aircraft veering from the taxiways, construction of new taxiway shoulders is recommended. The shoulder construction will include constructing new 15-foot-wide shoulders on each side of Taxiway A and all cross taxiways. In addition, the taxiway intersections will be upgraded to incorporate the new FAA taxiway fillet design standards.

Taxiway A3 currently provides direct access from the East Corporate Hangars to the runway. Current FAA design standards include the requirement for aircraft to make two 90 degree turns when taxiing from apron and hangar areas to the runway to minimize runway incursion events. The removal of the existing Taxiway A3 and construction of a new relocated Taxiway A3 just west of the existing Taxiway A3 location is included in this project.

In addition, the Taxiway A and associated cross taxiways do not currently have taxiway edge lights. Mammoth Yosemite Airport currently has significant night operations. The addition of taxiway edge lights is planned to improve aircraft navigation for these night operations. The taxiway lights and associated electrical duct will be located 10 feet off the edge of pavement and will be within the new shoulder pavement section. As a result, installation of new taxiway lights fits in nicely with the construction of the taxiway shoulders and will be included in this project. Airfield guidance signs will be relocated as needed to accommodate the new fillet geometry.

The engineering design and construction of this project is proposed for 2027 with funding from FAA AIP entitlement and discretionary funds and the Town of Mammoth Lakes.

8-3.21 MAGVAR Change Runway Numbers to 10-28 Including Update Signage

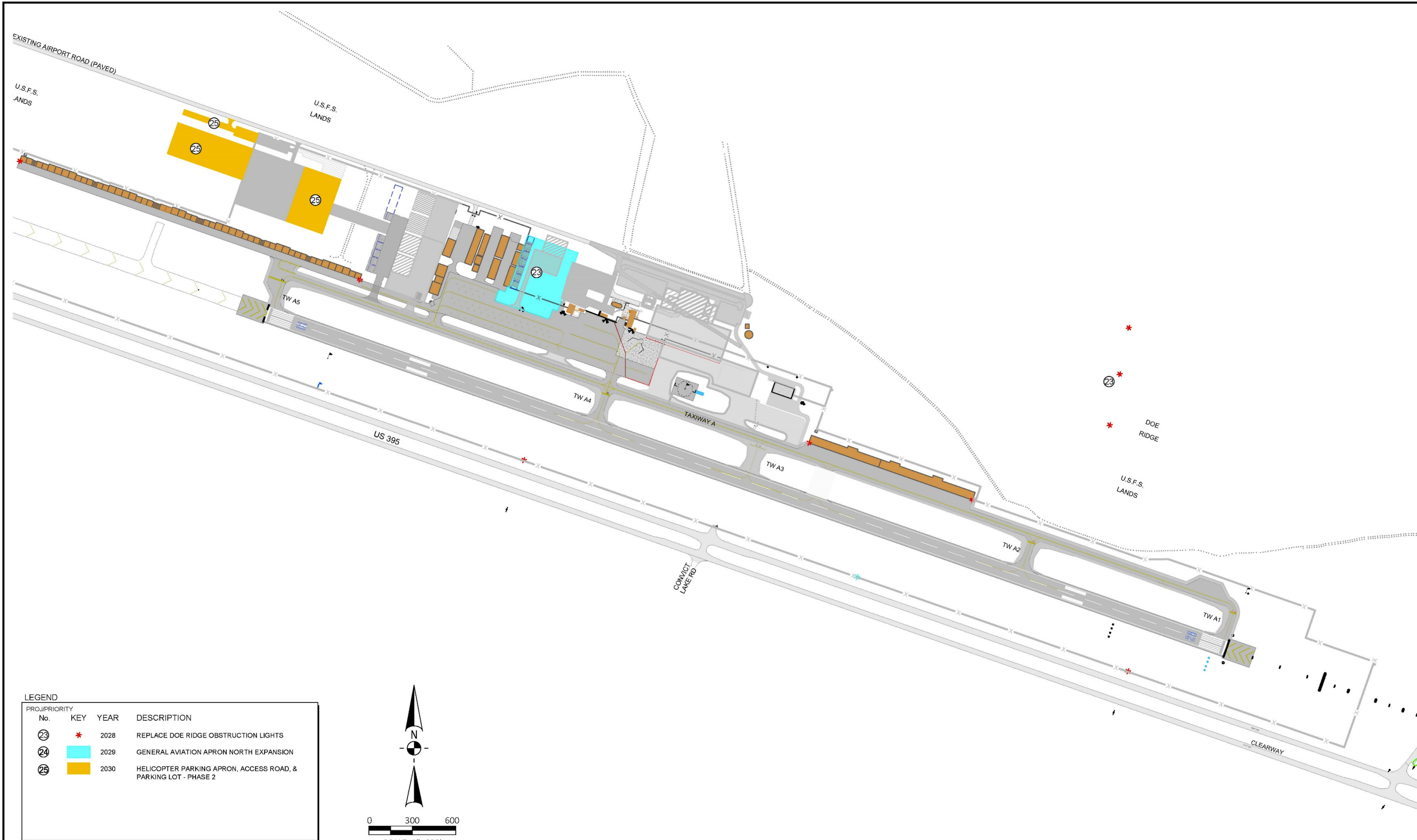
Due to changes in magnetic declination, the existing runway numbers 9 and 27 do not accurately reflect the current magnetic heading of the existing runway. It is proposed to remove the painted numbers on the runway and surface painted signs and repaint new runway numbers 10 and 28 to conform with the current magnetic heading. In addition, existing airfield guidance signs which contain runway numbers will need sign panel replacements installed with the new 10-28 runway numbers. This will require updates to the existing flight procedures which will be requested two years prior to construction. It is proposed to design and construct this project in 2027 with funding from FAA AIP entitlement funds and Town of Mammoth Lakes. (Note all subsequent runway projects refer to the future runway numbers 10-28)

8-4 Development Projects in the 6 to 10 Year Period (2027-2031)

It is proposed to develop the projects shown in Table No. 8-2, Mid Term Development Projects – 6 to 10 Years, at Mammoth Yosemite Airport with FAA AIP entitlement/discretionary, Town of Mammoth Lakes funds or private funds in the next 6 to 10 years. All costs are based on 2021 prices and have not been adjusted for inflation.

A sketch showing all projects proposed for development in the 6-to-10-year period is included as Plate No. 8-4.

TABLE NO. 8-2 - MID TERM DEVELOPMENT PROJECTS - 6 to 10 Years											
Project No.	Description	Construction Cost	Engineering/ Administration	Total Project Cost	F.A.A. Participation				State Participation	Sponsor Participation	Privately Funded
					AIP Entitlement	AIP Discretionary	AIG Allocated	AIG Competitive ATP			
	Fiscal Year 2028										
22	Replace Doe Ridge Obstruction Lights	130,000	50,000	180,000	163,188	-	-	-	-	16,812	
	TOTAL FY 2028	\$ 130,000	\$ 50,000	\$ 180,000	\$ 163,188	\$ -	\$ -	\$ -	\$ -	\$ 16,812	\$ -
	Fiscal Year 2029										
23	Design/Construct - General Aviation Apron North Expansion (142,000 Sq.Ft.)	\$ 2,325,000	\$ 581,250	\$ 2,906,250	\$ 1,836,812	\$ 797,994	\$ -	\$ -	\$ -	\$ 271,444	\$ -
	TOTAL FY 2029	\$ 2,325,000	\$ 581,250	\$ 2,906,250	\$ 1,836,812	\$ 797,994	\$ -	\$ -	\$ -	\$ 271,444	\$ -
	Fiscal Year 2030										
24	Design/Construct - Helicopter Parking Apron (202,645 Sq. Ft.) and Access Road and Parking Lot (26,000 Sq. Ft.) Phase 2	\$ 2,900,000	\$ 725,000	\$ 3,625,000	\$ 1,000,000	\$ 2,286,425	\$ -	\$ -	\$ -	\$ 338,575	\$ -
	TOTAL FY 2030	\$ 2,900,000	\$ 725,000	\$ 3,625,000	\$ 1,000,000	\$ 2,286,425	\$ -	\$ -	\$ -	\$ 338,575	\$ -
	Fiscal Year 2031										
	No Development in 2031										
	TOTAL FY 2031	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Fiscal Year 2032										
	No Development in 2032										
	TOTAL FY 2032	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	TOTAL MID-TERM DEVELOPMENT	\$ 5,355,000	\$ 1,356,250	\$ 6,711,250	\$ 3,000,000	\$ 3,084,419	\$ -	\$ -	\$ -	\$ 626,831	\$ -



LEGEND				
PROJ. No.	PRIORITY	KEY	YEAR	DESCRIPTION
23		*	2028	REPLACE DOE RIDGE OBSTRUCTION LIGHTS
24			2029	GENERAL AVIATION APRON NORTH EXPANSION
25			2030	HELICOPTER PARKING APRON, ACCESS ROAD, & PARKING LOT - PHASE 2



BRANDLEY

ENGINEERING

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MAMMOTH YOSEMITE AIRPORT

MAMMOTH LAKES, CALIFORNIA

MID TERM DEVELOPMENT PROJECTS

6 TO 10 YEARS

DATE	1/18/2023
DRAWN	KDC
CHECKED	MSB
PROJECT No.	75.02
FILE	7503-20.projects-sktc
PLATE No.	8-4

A description of each project proposed for development in the 6-to-10-year period is as follows:

8-4.1 Replace Doe Ridge Obstruction Lights

There is a row of three obstruction lights on Doe Ridge. These lights are on wooden poles that have deteriorated and pose significant safety issues for maintenance personnel. In addition, only one of the three Doe Ridge obstruction lights are currently functional. In order to properly light this large obstruction to air navigation, it is proposed to remove the existing three obstruction lights and poles and install three new solar powered obstruction lights on new steel poles. It is proposed to perform engineering design and construction of this project in 2028 with funding from AIP entitlement funds and Town of Mammoth Lakes.

8-4.2 General Aviation Apron North Expansion (142,000 sq. ft.)

The existing general aviation apron does not have sufficient capacity to handle the traffic during the peak months. The Town of Mammoth Lakes proposes to expand the existing general aviation apron to the north (142,000 sq. ft.). This additional general aviation aircraft parking would provide adequate capacity for both the charter jets and general aviation aircraft and allow separation of the small general aviation parking from large charter jet parking.

The construction of the new apron would consist of excavating to subgrade, scarifying and recompacting subgrade, and placing subbase course, aggregate base course, and bituminous surface course. New marking and tie down anchors will be installed. The project will also include the relocation of the existing fence, floodlighting, and electrical distribution panels. Removal and installation of new aircraft markings and tiedowns on the east portion of the existing general aviation apron to accommodate the charter jet parking is also included in this project. It is proposed to design and construct this project in 2029 with funding from FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes.

8-4.3 Helicopter Parking Apron (202,645 Sq. Ft.) and Access Road and Parking Lot (26,000 Sq. Ft.) – Phase 2

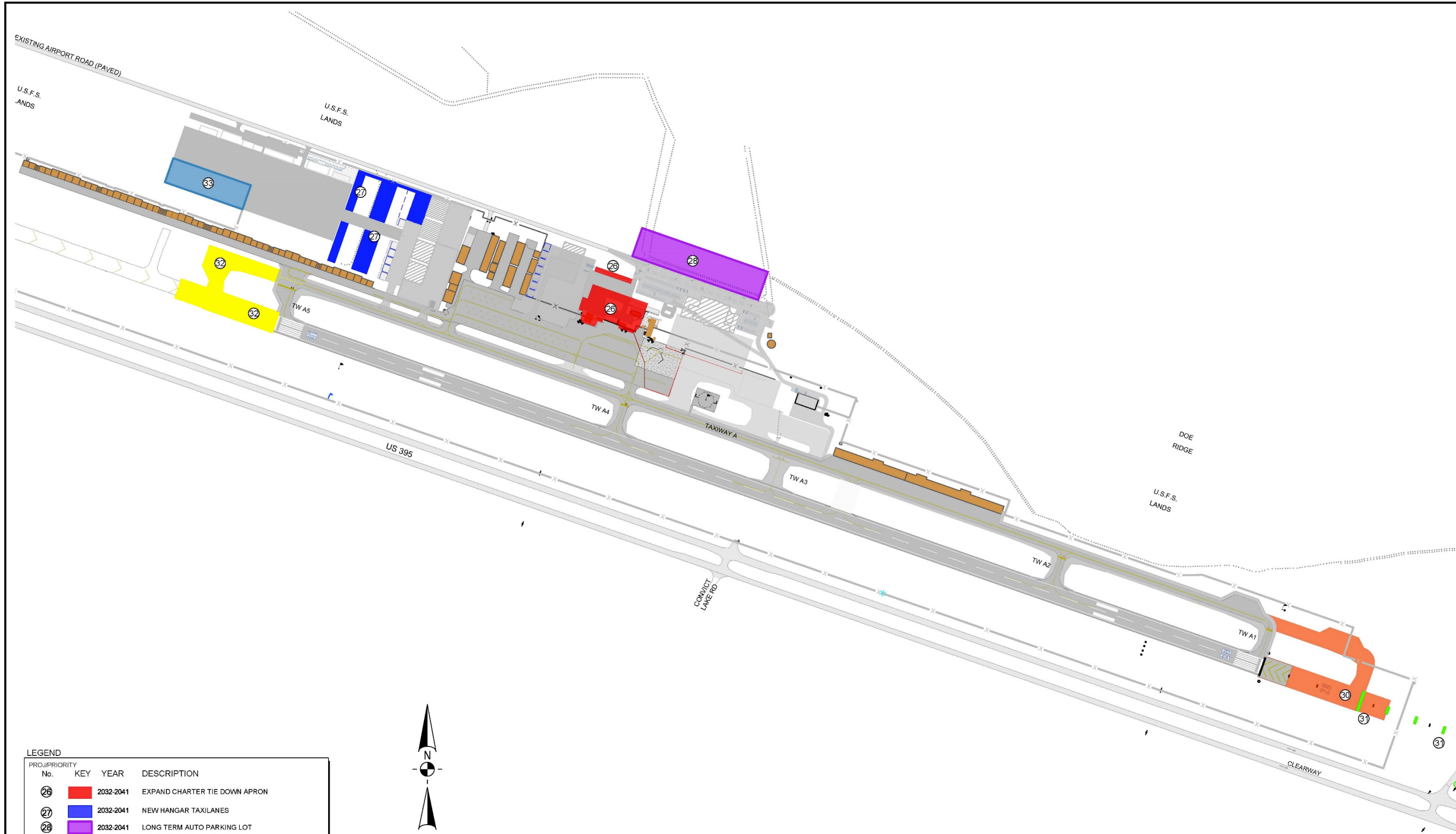
With the acquisition of USFS property, the helicopter parking and support areas can be expanded to accommodate the existing and future helicopter traffic. The proposed Phase 2 of the Helicopter Parking Apron will provide 202,645 sq. ft of additional apron to park 5 large helicopters, security fencing, floodlighting and 26,000 sq. ft. of parking and access roads from Airport Road. It is proposed to perform engineering design and construction of this project in 2030 with funding from FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes.

8-5 Development Projects in the 11 to 20 Year Period (2032-2041)

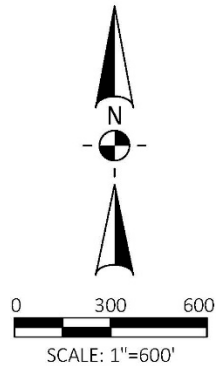
It is proposed to develop the projects shown in Table No. 8-3, Long Term Development Projects – 11 to 20 Years, at Mammoth Yosemite Airport with FAA AIP entitlement/discretionary, Town of Mammoth lakes funds or private funds in the next 11 to 20 years. All costs are based on 2021 prices and have not been adjusted for inflation.

A sketch showing all projects proposed for development in the 11 to 20-year period is included as Plate No.8-5.

TABLE NO. 8-3 - LONG TERM DEVELOPMENT PROJECTS - 11 to 20 Years											
Project No.	Description	Construction Cost	Engineering/ Administration	Total Project Cost	F.A.A. Participation				State Participation	Sponsor Participation	Privately Funded
					AIP Entitlement	AIP Discretionary	AIG Allocated	AIG Competitive ATP			
	Fiscal Years 2033-2042										
25	Design/Construct - Expand Charter Tie Down Apron (118,500 Sq.Ft.)	\$ 2,400,000	\$ 600,000	\$ 3,000,000	\$2,719,800	\$ -	\$ -	\$ -	\$ 280,200	\$ -	
26	Design/Construct - New Hangar Taxilanes (35 Ft. x 3,000 Ft.)	2,145,000	536,250	2,681,250	2,430,821	-	-	-	250,429	-	
27	Design/Construct - Long Term Automobile Parking Lot (90,000 Sq.Ft.-Privately Financed)	670,500	168,000	838,500	*	-	-	-	*	838,500	
28	Environmental Assessment - Runway 10 & 28 Extension	-	210,000	210,000	190,386	-	-	-	19,614	-	
29	Design/Construct - Runway 28 Extension (124 FT. x 700 Ft.)	3,350,000	837,500	4,187,500	3,796,388	-	-	-	391,113	-	
30	Design/Construct - MALSF Runway 28	850,000	212,500	1,062,500	963,263	-	-	-	99,238	-	
31	Design/Construct - Runway 10 Extension (124 Ft. x 500 Ft.)	3,250,000	812,500	4,062,500	3,683,063	-	-	-	379,438	-	
32	Design/Construct - Helicopter Parking Apron (66,450 Sq. Ft.) and Access Taxiway (305' x 40') Phase 3	1,165,000	325,000	1,490,000	1,350,834	-	-	-	139,166		
	TOTAL LONG-TERM DEVELOPMENT	\$ 13,830,500	\$ 3,701,750	\$ 17,532,250	\$15,134,554	\$ -	\$ -	\$ -	\$ 1,559,196	\$ 838,500	



LEGEND				
PROJ/PRIORITY No.	KEY	YEAR	DESCRIPTION	
26		2032-2041	EXPAND CHARTER TIE DOWN APRON	
27		2032-2041	NEW HANGAR TAXILANES	
28		2032-2041	LONG TERM AUTO PARKING LOT	
30		2032-2041	RUNWAY 28 EXTENSION	
31		2032-2041	MALS/RUNWAY 28	
32		2032-2041	RUNWAY 10 EXTENSION	
33		2032-2041	HELICOPTER PARKING APRON - PHASE 3	



A description of each project proposed for development in the 11 to 20-year period is as follows:

8-5.1 Expand Charter Tie Down Apron (118,500 Sq. Ft.)

Additional space for charter aircraft service will be needed in the future. This project proposes to expand the existing east Charter Tiedown apron to the north to provide 4 additional charter service parking positions. The expansion of the apron will require removal of the existing Hot Creek Aviation building and Airport Office. This project will be funded by FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes funds.

8-5.2 New Hangars and Hangar Taxilanes (35' x 3,000')

Open airport property west of the existing Hangar F row is available for multiple rows of new tee hangars and/or the relocation of the existing Corporate and Executive Hot Creek hangars. This proposed project will include 4 taxilanes approximately 35' wide and 800' long. This project will be funded by FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes funds.

8-5.3 Long Term Automobile Parking Lot (90,000 Sq. Ft.)

Expansion of the west tiedown apron will displace the existing Long Term Parking area of Hot Creek Aviation. This proposed project will provide a parking lot of approximately 90,000 sq. ft. for long term parking. The proposed project will include grading the site, aggregate base section with dust control treatment and security fencing. This project will be funded by FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes funds.

8-5.4 Environmental Assessment – Runway 10 and 28 Extension

The existing aircraft traffic is limited to load restrictions due to the length of runway. It is proposed to construct a 700-foot extension of Runway 28 and a 500-foot extension of Runway 10. Both runway extensions will require an environmental assessment to study the environmental effects of the runway extensions including detailed noise studies. This project will be funded by FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes funds.

8-5.5 Runway 28 Extension (124' x 700')

The existing aircraft traffic is limited to load restrictions due to the length of runway. The first phase to increase the runway length would be to construct a 700-foot extension of Runway 28. A new pavement section of bituminous surface course, aggregate base, aggregate subbase and recompacting the existing subgrade will be constructed. Additional runway edge and threshold lighting will be added, and the existing PAPI lighting system will be relocated. A new connecting taxiway with the extension of Taxiway A will be required to provide access to the new Runway 28 end. New marking will be added. This project will be funded by FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes funds.

8-5.6 New MALSF Runway 28

As an added enhancement to aircraft safety on approach to Runway 28, a Medium Intensity Approach Lighting System with Flashers (MALSF) is recommended. This would consist of a threshold of 18 steady burning lights, 9 light bars with 5 steady burning lights and 3 sequence flashing lights. This project will be funded by FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes funds.

8-5.7 Runway 10 Extension (124' x 500')

The existing aircraft traffic is limited to load restrictions due to the length of runway. The second phase to increase the runway length would be to construct a 500-foot extension of Runway 10 to complete the total 1200 ft runway extension. A new pavement section of bituminous surface course, aggregate base, aggregate subbase and recompacting the existing subgrade will be constructed. Additional runway edge and threshold lighting will be added. A new connecting taxiway with the extension of Taxiway A will be required to provide access to the new Runway 10 end. New marking will be added and existing nav-aids will be updated and relocated. This project will be funded by FAA AIP entitlement and discretionary funds and Town of Mammoth Lakes funds.

8-5.8 Helicopter Parking Apron (66,450 Sq. Ft.) – Phase 3

The extension of Runway 10 moves the departure OCS farther to the west which opens up the southwest corner of the planned helicopter parking apron up for additional helicopter parking. It is proposed to construct three additional helicopter parking spaced (66,450 Sq. Ft.) when demand increases enough to justify the need. This project will be funded by FAA AIP Entitlement and discretionary funds and Town of Mammoth Lakes funds.

CHAPTER 9. AIRPORT LAYOUT PLAN UPDATE

The Airport Layout Plan set of drawings has been prepared and is included with this report. Fourteen drawings are included in this set. A table of contents of the drawings is indicated below, along with a general description of information provided on the drawings.

Sheet No. 1 – Title and Index

Sheet No. 2 – Airport Layout Plan – The Airport Layout Plan shows existing facilities, short-term proposed development, and ultimate development for the existing ARC C II and future ARC C III classifications. This plan also shows recommended areas to be reserved for unanticipated growth.

Sheet No. 3 - Data Tables – The wind rose, runway data table, runway end data table, declared distance table, airport data table, and non-standard conditions table are included on this sheet. This information provides the dimensional details of items shown on the Airport Layout Plan.

Sheet No. 4 – Terminal Area Plan – Short Term Development - This sheet shows an expanded scale drawing of the terminal area facilities for the planned short-term development.

Sheet No. 5 –Terminal Layout Plan – Long Term Development - This sheet shows an expanded scale drawing of the terminal area facilities for the planned long term future development.

Sheet No. 6 – Airport Airspace Drawing – Part 77 - The Airport Airspace Plan is a drawing that depicts the critical surfaces for this airport as defined by FAR Part 77 and as they relate to existing topography. This plan also shows the areas where existing ground penetrates the Part 77 imaginary surfaces.

Sheet No. 7 – Airport Airspace Profile – Part 77 – This drawing depicts the profile along the runway centerline out to the upper edge of the transitional surfaces. The profile shows the extended runway centerline and the composite profile based on the highest terrain across the width of the approach surface.

Sheet No. 8 – Runway 9-27 Departure Plan and Profile – This drawing depicts the applicable departure surfaces set forth in Advisory Circular 150/5300-13B, Article 303, Runway End Siting Requirements. The surfaces are shown for runway end(s) designated for instrument procedures.

Sheet No. 9 – Existing Runway 9 Inner Approach Plan and Profile - This drawing shows the plan/profile of the approaches to existing Runway 9 for existing conditions. This drawing also shows all items that penetrate the imaginary surface.

Sheet No. 10 – Future Runway 10 Inner Approach Plan and Profile - This drawing shows the plan/profile of the approaches to Runway 10 for future conditions with the proposed runway extension. This drawing also shows all items that penetrate the imaginary surface.

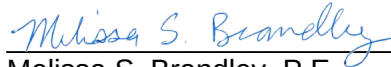
Sheet No. 11 – Existing Runway 27 Inner Approach Plan and Profile - This drawing shows the plan/profile of the approaches to existing Runway 27 for existing conditions. This drawing also shows all items that penetrate the imaginary surface.

Sheet No. 12 – Future Runway 28 Inner Approach Plan and Profile - This drawing shows the plan/profile of the approaches to Runway 28 for future conditions with the proposed runway extension. This drawing also shows all items that penetrate the imaginary surface.

Sheet No. 13 – Airport Land Use Compatibility Plan – This drawing represents the land use recommendations as developed by the State of California Department of Transportation. The plan is based on frequency of accidents that have occurred on airports throughout the state and provides recommendations for zoning to be considered by sponsors.

Sheet No. 14 – Airport Property Map – Exhibit A – The Airport Property Map includes property boundary descriptions for all land owned or leased by the Airport and indicates areas recommended to be acquired.

Prepared by:



Melissa S. Brandley, P.E.

**MAMMOTH YOSEMITE AIRPORT
AIRPORT LAYOUT PLAN UPDATE NARRATIVE**

**Appendix A
Aviation Activity Forecasts Prepared by Mead & Hunt
Dated May 15, 2019**



U.S. Department
of Transportation
**Federal Aviation
Administration**

Western-Pacific Region
Airports Division

San Francisco Airports District Office
1000 Marina Boulevard, Suite 220
Brisbane, CA 94005-1835

June 19, 2019

Mr. Brian Picken
Airport Manager
Town of Mammoth Lakes
1300 Airport Road
Mammoth Lakes, CA 93546

Dear Mr. Picken,

RE: Mammoth Yosemite Airport Aviation Activity Forecasts, 2019 Addendum

The Federal Aviation Administration (FAA) has completed its evaluation and approves the updated *Mammoth Yosemite Airport Aviation Activity Forecasts Addendum 2019* document for the Mammoth Yosemite Airport (MMH), dated May 15, 2019. This forecast is an update to the forecast approved on April 13, 2017. The San Francisco Airports District Office (SFO ADO) has the following comments about the forecast:

- Concurs with the new design aircraft of a Bombardier CRJ-700, a change from the Bombardier Q400.
- The aviation activity forecast provides adequate justification for near-term and mid-term airport planned development at MMH.
- Concur with the aviation activity forecast methodology. The forecast assumptions presented are considered reasonable. The slight variation reported in the FAA Terminal Area Forecasts (TAF) are acknowledged.

If you have any questions, please contact Katherine Kennedy at 650-827-7611.

Kind Regards,

Laurie Suttmeier
Acting Manager, San Francisco Airports District Office

Mammoth Yosemite Airport Aviation Activity Forecasts 2019 Addendum

Prepared for the Town of Mammoth Lakes



Prepared by
**Mead
& Hunt**

May 15, 2019

INTRODUCTION TO ADDENDUM

This update of the forecasts retains the structure of the previous forecasts. Section numbers and headings have been retained. One new section has been added on scheduled charter. Instead of a section number, this section is labeled *New Section 1*. Similarly, a table comparing the design standards for the old and new critical aircraft is titled *New Table A*.

Much of the information in the previous forecasts remains valid. Therefore, this Addendum provides brief notes in each section to identify any changes to that section. All tables in the prior forecasts have been updated and are imbedded in the sections where they were presented previously.

The Town of Mammoth Lakes is aware that Inyo County is actively pursuing Part 139 certification for the Bishop Airport. Regardless of whether Inyo County is successful, the Town remains committed to providing passenger service at its airport through a combination of scheduled airline and scheduled charter flights. These updated forecasts reflect this commitment.

1. INTRODUCTION

The 10-year forecast period now extends to 2028.

2. AIRPORT ROLE

2.1 CURRENT ROLES

The Airport's current roles remain unchanged.

2.2 FUTURE ROLES

The Airport is expected to retain its current roles through the 10-year planning period.

3. HISTORICAL ACTIVITY AT MMH

The general information in the text in this section remains accurate.

Table 1 has been updated through 2018.

3.1 PASSENGER ENPLANEMENTS

Alaska Airlines ended its service to Mammoth in November 2018. All service is now by United Airlines.

Due to the limited amount of lead time, the Air Partners were not able to fully recreate the service previously provided by Alaska Airlines. During the 2018-2019 ski season, United Airlines is providing service from San Francisco (SFO), Los Angeles (LAX), and Denver (DEN). DEN and SFO service are once daily during the peak ski season, which is December 18 – March 30 this year, but in the future will typically extend until mid-April (Easter holiday). LAX service is one daily flight year-round. The Air Partners were not able to reestablish the second LAX flight that had served the Airport during the ski season.

As noted in the prior forecast, service from DEN had been tried before; however, that service was once weekly. This limited service was a major constraint for potential visitors and resulted in low load factors. The current service is daily through the ski season. The average load factor for the initial 10 days of service in December 2018 was 43%.

Table 1. Historical Aviation Activity

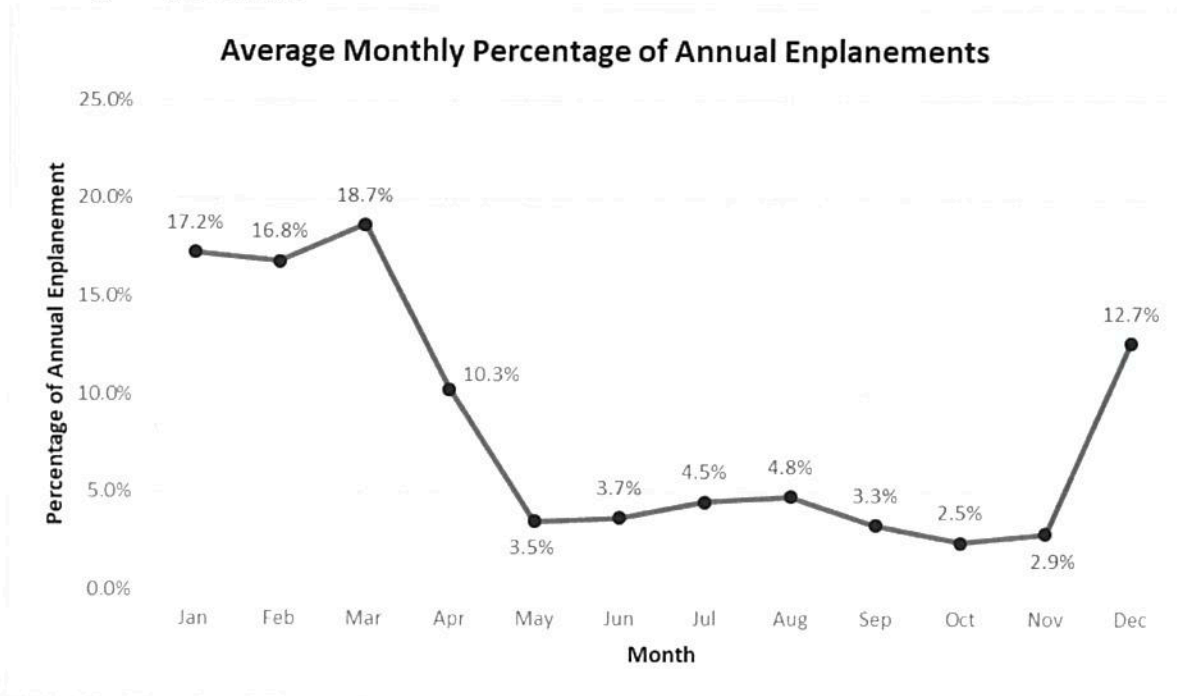
Passenger Enplanements ³				Itinerant Operations					Local Operations			Total Operations	Based Aircraft
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	General Aviation	Military	Total	Civil	Military	Total		
2009	0	6,157	6,157	312	1,628	3,730	31	5,509	1,896	0	1,896	7,599	4
2010	0	19,798	19,798	1,228	1,840	4,296	62	7,426	200	0	200	7,626	4
2011	0	26,196	26,196	1,394	1,824	4,133	38	7,389	202	0	202	7,591	3
2012	0	27,246	27,246	1,564	1,688	3,568	40	6,860	173	0	173	7,033	3
2013	0	30,858	30,858	1,530	1,784	4,108	56	7,478	199	0	199	7,677	7
2014	0	25,892	25,892	1,404	1,514	3,200	24	6,142	148	0	148	6,290	7
2015	0	23,504	23,504	1,234	1,472	3,325	22	6,053	144	0	144	6,197	7
2016	0	22,253	22,253	990	1,634	4,017	32	6,673	143	0	143	6,816	7
2017	0	21,278	21,278	970	2,976	1,514	312	5,772	1,184	0	1,184	6,956	7
2018	0	22,594	22,594	1,050	2,926	1,308	400	5,684	1,060	0	1,060	6,744	7

Source: Passenger enplanements and air carrier operations: Airport records; 2017 Itinerant and local operations: Hot Creek Aviation; all other operations and based aircraft FAA 2018 Terminal Area Forecast.

Notes:

1. 2009 air carrier operations data not available. Operations estimated by assuming same number of passengers per aircraft as 2010.
2. Airline passenger service started in 2009 and was only for part of the year.
3. Enplanement numbers do not include passengers carried on either scheduled or unscheduled charter flights.

Passenger Enplanements



Source: Data provided by the Airport. December 2018 data not included in average. Alaska Airlines ended service to MMH on 11/30.

NEW SECTION 1: SCHEDULED PASSENGER CHARTERS

Scheduled passenger charter flights were inaugurated at the Airport during the 2017-2018 ski season. Service was provided from Bob Hope Airport (BUR) four days per week. This service continued for the 2018-2019 ski season and service from John Wayne-Orange County Airport (SNA) was added. The average load factor for scheduled charter flights in the 2017-2018 ski season was 54.7%. The first four weeks of the 2018-2019 ski season are seeing average load factors of 65%. The Air Partners have indicated that they intend to evaluate the strength of passenger demand by introducing service from other airports in both southern and northern California, such as McClellan-Palomar Airport and Buchanan Field Airport.

The scheduled charter aircraft utilize the general aviation parking apron west of the commercial apron used by scheduled airlines. Special constraints have been placed upon this apron because the airfield does not provide standard clearances for larger aircraft. It would be useful if the configuration of the general aviation apron was considered during design of the proposed commercial apron serving the new passenger terminal.

One means of resolving constraints on larger charter aircraft would be to design the new commercial apron and terminal to accommodate larger charter aircraft. The new commercial apron will be located further from the runway; this will reduce congestion and increase wingtip clearances for taxiing and parked aircraft. This design would require the charter aircraft and their passengers to be segregated from the scheduled airline aircraft and their passengers. Although uncommon, this arrangement has been used at other airports, including Hector International Airport (Fargo, North Dakota) and Grand Junction Regional Airport (Grand Junction, Colorado).

3.2 BASED AIRCRAFT

The current number of based aircraft (7) remains unchanged.

3.3 AIRCRAFT OPERATIONS

3.3.1 General Aviation Operations

The general pattern of general aviation operations has not changed. Table 1 has been updated with data provided by the Airport's fixed base operator and the Airport Manager.

3.3.2 Military Operations

Military operations include helicopters, C-130 operations, and other turbine aircraft. C-130 operations are conducted at the airport for the purpose of pilots obtaining their high-altitude airport operations certificates. C-130 operations are the most frequent at the airport, with helicopters being the second most frequent to use the airport. Airport staff estimate operations to be about 400 annually.

3.3.3 Airline Operations

United Airlines is currently (January 2019) the only airline providing scheduled passenger service. Operations data for 2018 was taken from Airport records.

3.4 AIR CARGO

Text in prior forecast remains correct: no cargo is shipped through the Airport.

4. NATIONAL AVIATION INDUSTRY TRENDS

4.1 PASSENGER ENPLANEMENTS

The 2018 Aerospace Forecast projects that domestic passenger enplanements for all carriers will grow 1.7 percent annually through 2038. This is the same as projected in the 2016 Aerospace Forecast; however, the short-term, 10-year domestic passenger enplanement is projected to grow at 1.6 percent in the 2018 Aerospace Forecast compared to 1.5 percent projected in the 2016 Aerospace Forecast. The combined domestic and international passenger enplanements for all carriers are projected to grow 1.9 percent in the 2018 Aerospace Forecast, the same growth rate projected in the 2016 Aerospace Forecast.

Table 2.
Comparison of Forecast Passenger Enplanement Growth Rates

	Domestic + International Flights	Domestic Flights		
	2018-2038	2018-2028	2028-2038	2018-2038
Mainline Carriers	2.0%	1.6%	1.8%	1.7%
Regional Carriers	1.6%	1.5%	1.8%	1.6%
All Carriers	1.9%	1.6%	1.8%	1.7%

Source: FAA Aerospace Forecast Fiscal Years 2018-2038

4.2 GENERAL AVIATION AIRCRAFT FLEET

The total number of aircraft has increased from the 2016 to 2018 Aerospace Forecasts except for multi-engine piston aircraft. However, the compound annual growth rate (CAGR) for the total fleet has decreased due to the lower CAGR for all aircraft types except Other. The greatest differences in the 20-year CAGR

from 2016 to 2018 Aerospace Forecasts are that of Light Sport (difference of -0.74 percent), Rotorcraft (difference of -0.69 percent), and Experimental (difference of -0.58 percent).

Table 3.
Comparison of Forecast Growth Rates by Aircraft Type

	Total Fleet	Rotorcraft	Fixed Wing					
			Turbine	Multi-Engine Piston	Single-Engine Piston	Light Sport	Experimental	Other
2018*	213,905	11,030	23,585	12,895	130,500	2,705	28,140	5,050
2038	214,090	15,785	35,050	11,845	107,800	5,440	33,105	5,065
CAGR	0.0%	1.8%	2.0%	-0.4%	-1.0%	3.6%	0.8%	0.0%

*Source: FAA Aerospace Forecast Fiscal Years 2018-2038 *Estimate from Aerospace Forecast*
CAGR = Compound Annual Growth Rate

4.3 AIRCRAFT OPERATIONS

The 2018 Aerospace Forecast projects total aircraft operations to increase an average 0.9 percent annually from 2018 to 2038. This is the same growth rate projected in the 2016 Aerospace Forecast. There is a 0.4 percent decrease for Air Carrier operations and a 0.5 percent decrease for Air Taxi/Commuter operations for the 20-year CAGR when comparing the 2018 Aerospace Forecast to the 2016 Aerospace Forecast.

4.4 AIR CARGO VOLUMES

The 2018 Aerospace Forecast projects air cargo revenue ton miles (RTMS) to increase an average 3.8 percent annually from 2018 to 2038. This is 0.2 percent higher than the 3.6 percent 20-year CAGR projected in the 2016 Aerospace Forecast. Overall, both all-cargo and passenger carrier air cargo RTMS 20-year CAGRs have increased in the 2018 Aerospace Forecast compared to the 2016 Aerospace Forecast.

5. FORECASTING METHODOLOGIES

5.1 MARKET SHARE METHODOLOGIES

Description remains correct.

5.2 TIME-SERIES METHODOLOGIES

Description remains correct.

5.3 SOCIOECONOMIC METHODOLOGIES

Description remains correct.

5.4 COMPARISON WITH OTHER AIRPORTS

Description remains correct.

5.5 JUDGEMENTAL FORECASTING

Description remains correct.

6. FORECASTS

6.1 PASSENGER ENPLANEMENTS

6.1.1 Factors Affecting Forecasts

The Airport has now had 10 years of scheduled passenger service. The end of service by Alaska Airlines eliminates the availability of the Required Navigational Performance (RNP) instrument procedures. These procedures were privately developed for Alaska Airlines; they enabled that airline to operate with lower visibility minimums than other airlines or general aviation aircraft. The RNP approaches allowed landings with ceilings as low as 250 feet to both runways. The CRJ-700 aircraft are not equipped to utilize an RNP approach; however, the RNP approaches developed by Alaska Airlines provide a proof of concept in that future air carriers could expect to duplicate.

6.1.2 Methodologies Considered and Rejected

Text remains correct as written.

6.1.3 Selected Forecasting Methodologies

Ten years of enplanement data is now available. Judgmental forecasting includes consideration of the effects of the loss of service by Alaska Airlines and the expansion of service by United Airlines. The effects of introduction of scheduled charter service were considered in enplanement forecasts.

6.1.4 Forecasting Assumptions

Three important changes occurred in 2018 that have resulted in changes to the forecasting assumptions:

- Loss of scheduled service by Alaska Airlines
- Expansion of service by United Airlines, including introduction of daily service from Denver during the ski season
- Scheduled charter service will continue and expand over the next 10 years. For the 2018-2019 ski season, service continues for the second year from Bob Hope Airport (BUR) four days per week. Four weekly flights from John Wayne-Orange County Airport (SNA) were added for the 2018-2019 ski season. Passengers on charter flights are processed through the fixed base operator's facility, not the passenger terminal. Therefore, charter passenger enplanements are not included in the forecast of enplanements.

Because of these changes in the circumstances at the Airport, the pattern of incremental growth will follow three paths:

- Expansion of service from LAX during the ski season.
- Incremental increases in load factors.
- Servicing of the San Diego market solely with scheduled charter flights for four years and then reintroduction of scheduled airline service.

Forecasting assumptions in the prior forecasts are modified as follows:

- **Forecasting Assumption No. 1** – The statements about the existing terminal constraining when flights can be scheduled continues to be correct; however, incremental growth in passenger volumes will be due to both incremental growth in load factors of existing flights, expansion of flights from existing airports, and addition of service from San Diego.
- **Forecasting Assumption No. 2** – This assumption is modified to indicate that there will be a drop in passenger volumes in the first year following loss of service by Alaska Airlines (i.e. 2019). Enplanements will begin growing in 2020 and follow a pattern of slow growth through 2028. The growth will be due to incremental increases in load factors and the addition of scheduled airline service from San Diego in 2023.
- **Forecasting Assumption No. 3** – This assumption states that when the replacement terminal becomes operational, flights are expected to shift to the early evening period due to strong passenger preference. This remains valid.
- **Forecasting Assumption No. 4** – With the elimination of service by Alaska Airlines, this assumption is no longer valid. United Airlines has indicated that it will only provide daily service and will not consider providing flights only four days per week.
- **Forecasting Assumption No. 5** – The general statement that the Air Partners will continue to investigate service from additional airports remains valid. It will use scheduled charter flights to test markets. As anticipated in the prior forecasts, scheduled charter flights from Bob Hope Airport and John Wayne Airport have been introduced for this ski season.
- **Forecasting Assumption No. 6** – This assumption is no longer valid. United Airlines has indicated that it will not provide less than daily service. The strategy of starting with four flights per week and incrementally expanding to daily service cannot be used.
- **Forecasting Assumption No. 7** – This assumption has been modified to state that the only out-of-state service that will occur will be the daily service to Denver during the ski season.
- **Forecasting Assumption No. 8** – The assumption regarding continuation of seasonal service from San Francisco remains valid.

Additional forecasting assumptions have been added:

- **Forecasting Assumption No. 9** – Passenger enplanements for LAX will decrease by one-third in 2019 due to the loss of the second flight during the ski season. This seasonal, second daily flight will be resumed in 2020. The addition of this second flight will result in LAX enplanements returning to 90% of 2018 levels. They will then grow at 1% compounded annual growth rate (CAGR) through the end of the 10-year forecast period.
- **Forecasting Assumption No. 10** – In the first two weeks of service, the DEN flight had an average load factor of 33%. It is expected that this rate will decrease after the peak holiday ski weeks in December and January; therefore, for 2019, an average load factor of 25% has been selected. This is forecast to grow incrementally, reaching 40% in 2028.

- **Forecasting Assumption No. 11** – The ski season flight from SFO has been served by United since its inception. This is a mature market that will see load factors increase slowly over time. A 1% CAGR has been selected for use in this forecast.
- **Forecasting Assumption No. 12** – Although SAN had historically been a good ski season market for the Airport, it is not clear that United Airlines will be willing to provide service from this airport in the near term. In this forecast, it is assumed that passengers from the San Diego area will be served by scheduled charter aircraft until 2023. In 2023, scheduled airline service will be reestablished. In the initial year, enplanements will be 60% of the volume in 2018. This is equivalent to a 54% load factor in a 70-passenger CRJ-700. Passenger volumes will then grow by 1% CAGR through the balance of the 10-year forecast period.

6.1.5 Other Forecast Assumptions

Actual Departures – In this forecast it is assumed that the current average of 12% cancellations will continue. It is assumed that the Required Navigation Performance instrument approaches developed by Alaska Airlines will not be reintroduced by United Airlines or another airline serving the Airport in the near future.

Total Seats – It is assumed that all scheduled airline passenger service will be in 70-seat CRJ 700's or similarly sized aircraft throughout the 10-year forecast period.

Load Factor – Although ski season load factors have climbed into the 70% range, year-round average load factors are expected to remain below 50%. This will be lower than in the previous forecast. Several factors will affect the average:

- Load factors for the DEN service are expected to remain lower than for other routes.
- United Airlines will only provide daily service. Alaska Airlines was willing to provide service four times per week. This allowed the Airport to capture the peak demand days. Daily service will result in higher total enplanements but will have a lower average load factors due to the inclusion of low-demand days.
- A portion of the passengers using scheduled charter flights would have used scheduled airline flights.

Summer-Fall Season – This forecast retains the assumption that passenger volumes outside of the ski season will remain static. There are ongoing efforts to develop and market cultural events outside of the ski season; however, the impacts of these efforts are too recent to be used in forecasting trends.

6.1.6 Enplanement Forecasts

The updated enplanement forecasts shifts the base year to fiscal year 2018 and assumes all future service to be flown in 70-passenger CRJ-700 aircraft. Ski-seasons are also assumed to be a consistent 102 days per fiscal year.

The following assumptions were used for each airport when calculating the forecasted enplanements:

- Flights to DEN will have a 25% load factor in 2019. This load factor increases to 40% by 2028.
- There will be one daily flight through the ski season to SFO during the forecast period. Enplanements will grow at 1% CAGR.
- Service to LAX will decrease in 2019 with loss of service by Alaska Airlines. This will reduce enplanements in 2019 by one-third. The daily year-round service will remain throughout the forecast period. A second daily flight during the ski season will be added in 2020. This will increase LAX enplanements to 90% of the 2019 load factor. Enplanements will grow at 1% CAGR from 2021 to 2028.
- Flights from SAN will not resume until 2023. In this first year of service, passenger volumes will be 60% of 2018 volumes. They will then increase 1% CAGR through the balance of the forecast period.

Table 4. Passenger Enplanement Forecast		
	Year	Enplanements
Base Year	2018	22,594
	2019	15,953
	2020	19,734
	2021	20,020
	2022	20,307
	2023	22,824
	2024	23,138
	2025	23,453
	2026	23,770
	2027	24,067
	2028	24,387
Note: neither scheduled nor unscheduled charter are included in these figures. Source: Mead & Hunt		

6.2 PEAK PASSENGER ACTIVITY

The description of how peak passenger activity is calculated remains correct. The time period has shifted to include 2018 data.

6.2.1 Peak Month Passenger Activity Forecasts

Monthly passenger enplanement data in Table 5 has been updated to extend through 2018. The average percentage of the peak month over the last 5 years (204-2018) is 19.1%. In four of the last eight years, the peak month was March. In three of the last eight years, it was January. The variation is likely due to snow conditions.

In forecasting peak passenger activity, it has been assumed that the peak month will remain at 19.1% of the total. Applying this percentage to the forecasts in Table 4 above yields a peak month enplanement for 2023 of 4,359 and for 2028 of 4,658.

**Table 5.
Peak Month Enplanements**

Month	2011	2012	2013	2014	2015	2016	2017	2018
January	4,211	4,336	5,766	4,540	4,299	3,928	2,458	4,144
February	3,653	4,865	5,657	4,017	3,841	4,569	2,738	3,869
March	4,161	4,897	5,652	4,735	4,622	3,659	4,059	3,907
April	3,379	3,821	3,025	2,741	1,663	1,341	1,935	2,395
May	1,051	1,061	1,149	1,031	749	629	1,089	810
June	1,165	931	1,117	1,022	975	991	834	920
July	1,189	1,277	1,259	1,330	1,226	1,278	1,223	1,192
August	1,419	1,478	1,378	1,294	1,228	1,306	1,225	1,166
September	1,004	851	1,171	1,002	1,015	718	700	846
October	807	566	579	717	712	538	595	661
November	882	562	799	827	773	810	645	819
December	3,275	2,601	3,306	2,636	2,401	2,486	3,777	1,865
TOTAL	26,196	27,246	30,858	25,892	23,504	22,253	21,278	2,594
Peak Month % Annual	16.1%	18.0%	18.7%	18.3%	19.7%	20.5%	19.1%	17.8%

6.2.2 Peak Month Average Day Passenger Activity Forecasts

As in the prior forecast, the average day number of passengers on the average day of the peak month will equal 3.2% of the peak month's passengers.

**Table 6.
Winter-Spring 2018-2019 Peak Day Flight Schedule**

	Time*	Origin / Destination	Aircraft Type	Seats
Arrival	1023	SFO	CRJ 700	70
Departure	1100	SFO	CRJ 700	70
Arrival	1236	DEN	CRJ 700	70
Departure	1312	DEN	CRJ 700	70
Arrival	1556	LAX	CRJ 700	70
Departure	1640	LAX	CRJ 700	70

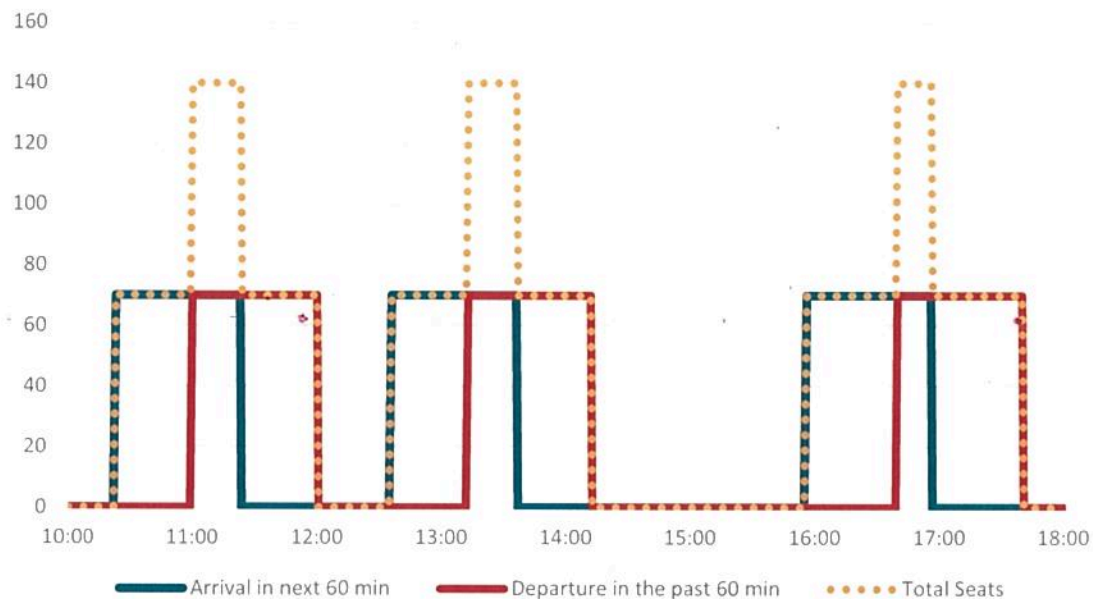
* Time is expressed as a 24-hour clock. LAX flight times will change between January 7 to February 13, 2019.
Source: Schedule - Airport

6.2.3 Peak Hour Passenger Forecast

Figure 2 presents the peak hour seats during the 2018-2019 ski season peak. The peak hour consisted of one arrival and one departure in the 70-seat CRJ 700, or 140 seats. The peak hour is between 3:55 p.m. and 4:55 p.m. (1555 to 1655); however, the current pattern of flights is atypical of the historical pattern. The current schedule lacks a second LAX flight and one from SAN. This is due to the inability to replace Alaska Airline's flights with comparable United Airline flights in the limited lead time available following Alaska Airline's announced elimination of service.

A more typical pattern would be two arrivals and two departures. This was the pattern of flights presented in the prior forecasts. With the CRJ 700 providing service, this would total 280 seats during the peak hour. This volume will be used in forecasting peak hour passengers

Figure 2.
2018-2019 Ski Season Peak Hour Seats



Source: DEO data base

Table 7.
Forecast Peak Hour Passengers

Year	Peak Month Enplanements + Deplanements	Average Day Peak Month Enplanements + Deplanements	Peak Hour Passengers		
			Enplanements	Deplanements	Total
2023	8,833	285	86	81	167
2028	9,284	299	105	98	203

Source: Mead & Hunt

6.3 TERMINAL GATE REQUIREMENTS

The prior forecasts stated:

The winter schedule has been developed over time to reflect passenger preferences, which show mid-to-late afternoon departures from originating cities with arrivals at Mammoth Yosemite occurring about 5:00 p.m. to 6:00 p.m. generally. The airlines have attempted to schedule arrivals away from this late afternoon period with little success, noting that passengers generally prefer a mid-afternoon departure from the major [California] cities.

This general situation has not changed. The current schedule varies from this pattern due to the necessity of the Air Partners negotiating new routes with United Airlines on short notice. If a second seasonal LAX flight is added for 2019-2020 as anticipated, it is expected to be scheduled for the late afternoon-early evening slot preferred by passengers. Within five years (2023) market forces are expected to shape the flight schedule so that it resembles the historical pattern. The expected reintroduction of the SAN flight by 2023 reinforces the likelihood of the historical pattern of peak use being replicated. Discussions with Airport staff suggest that the desired window for arrivals should be more broadly defined as between 4:00 p.m. and 6:00 p.m.

Two gates are the minimum needed to accommodate short-term (five year) demand. By the end of the 10-year forecast period, three gates will be needed to fully accommodate forecast demand. These gates are in addition to hardstand positions provided to accommodate irregular operations. As noted in the prior forecasts:

At MMH the most common irregular operations are associated with weather delays. During the winter-spring season weather delays occur regularly. This results in three airline aircraft being parked at the Airport about 20 times per winter-spring season (about 18%) with rarer occurrences when four aircraft are parked at the Airport. In 2013, when the Airport had seven flights on five days a week, it proved difficult to schedule flights to reduce peak hour passengers to the terminal's capacity and there were three or more planes on the ground more frequently.

It is anticipated that by the end of the forecast period the Airport will again have at least three aircraft on the ground at the same time. Due to constraints on the ramp, noted earlier, this would result in inadequate clearance between parked aircraft and movement areas. It would increase the potential of conflicts between aircraft moving on the ramp. Without new facilities, it is anticipated that special markings and airport/aircraft specific operating procedures will be required to maintain Part 139 certification at the Airport.

6.4 BASED AIRCRAFT FORECASTING METHODOLOGY

No increase in the number of based aircraft has occurred. Only piston-powered aircraft continue to be based at the Airport.

6.4.1 Methodologies Considered and Rejected

This text remains relevant; no changes are required.

6.4.2 Methodology Selected

Comparisons with area airports remains the appropriate forecasting method. No additional aircraft are forecast to be based at the Airport during the forecast period.

6.5 AIRCRAFT OPERATIONS

6.5.1 Methodologies Considered and Rejected

The four methodologies considered and rejected in the prior forecasts continue to be inappropriate.

6.5.2 Methodology Selected

Judgmental forecasting remains appropriate for commercial and military operations. Socioeconomic analysis continues to be appropriate for general aviation operations.

6.5.3 Scheduled Passenger Airlines

- Operations by scheduled passenger airlines were based upon the number of annual flights for each route serving the Airport.
- Service from LAX was assumed to grow from the current daily service with the addition of a second flight during the ski season. This would increase the number of flights from 365 to 467 annually.
- SFO flights are forecast to remain constant at 102 flights annually.
- Flights from DEN are assumed to remain constant at 102 flights annually.
- When flights from SAN resume in 2023, they are assumed to remain constant at 58 flights annually (four times a week).
- Each flight consists of one arrival and one departure; this counts as two operations. Therefore, airline operations will total 1,458 in 2023 and remain at that level through 2028.

6.5.4 General Aviation Operations

As in the prior forecast, general aviation operations in this update were developed by utilizing the projected population growth rate for Mono County. The January 2018 projection prepared by the California Department of Finance's Demographic Research Unit provides updated population numbers and growth rate. The previous projection estimated a compound annual growth rate of 0.69% between 2015 to 2035; the updated forecast estimates a 0.37% compound annual growth rate for the same period. Therefore, 0.37% has been used to forecast general aviation operations. Applying this growth rate to the 2018 estimated noncommercial operations (minus military operations) yields:

- 5,753 operations in 2029
- 5,897 operations in 2039

Air taxi operations are forecast to continue to account for 52.4% of total general aviation operations. Itinerant general aviation operations are projected to remain at 26.7% of general aviation operations. Local operations are expected to remain at 20.9% of general aviation operations.

6.5.5 Military Operations

Airport staff estimates that military operations are averaging about 400 per year. The average number of operations is expected to remain at this level through the 10-year forecast period.

6.5.6 Operations Forecasts

Table 8. Operations Forecast									
Year	Itinerant Operations					Local Operations			Total Operations
	Air Carrier	Air Taxi & Commuter	General Aviation	Military	Total	Civil	Military	Total	
2018	1,050	2,926	1,308	400	5,684	1,060	0	1,060	6,744
2023	1,458	3,017	1,535	400	6,410	1,200	0	1,200	7,611
2028	1,458	3,093	1,574	400	6,525	1,231	0	1,231	7,755

6.5.7 Peak Hour Operations Forecasts

The methodology presented in the prior forecasts remains valid. The peak hour will be in the late afternoon or early evening during the ski season. Based on historical patterns, March is likely to see the highest number of operations.

As noted in Section 6.2.2, peak hour airline operations are forecast to reach four by 2023 and remain at that level through 2028.

Based upon information from the Airport's fixed base operator, peak hour general aviation operations have remained at five for the last several years. As shown in Section 6.5.4, total general aviation operations are expected to grow 5% over the next 10 years. This growth is judged to be too small to result in an increase in peak hour general aviation operations by itself; however, scheduled charter flights are expected to grow to from two to five daily during the ski season. Currently two scheduled charter operations occur during the desirable 5:00 p.m. to 6:00 p.m. time slot. These are forecast to overlap with the peak hour airline and other general aviation operations in 2023. The growth in scheduled charter operations is forecast to result in an additional peak hour operation by 2028. Therefore, total peak operations will be 11 in 2023 and 12 in 2028.

6.5.8 IFR Operations Forecasts

Based upon the FAA Traffic Flow Management System Counts (TFMSC) Instrument Flight Rule (IFR) operations averaged 52% of total operation for the last four years (2015-2018). Applying this percentage to the previous forecasts of total operations yields:

- 3,958 IFR operations in 2023
- 4,033 IFR operations in 2028

6.5.9 Cargo Forecasts

The update retains the conclusion that no air cargo will be shipped through the Airport.

7. DESIGN AIRCRAFT

The approved Airport Layout Plan for the Airport designates the Bombardier Q400 as the design aircraft. Alaska Airlines is the principal user of this aircraft. With the loss of service an alternate aircraft needs to be selected.

United Airlines is utilizing the Bombardier CRJ-700 to provide service to the Airport. Based upon the current schedule, there will be about 1,138 operations by this aircraft in 2019. This is well over the 500 annual operations threshold to be designated the design aircraft. Therefore, the CRJ-700 will be designated as the new design aircraft for the Airport.

New Table A below compares the FAA's airfield design standards for the Q400 to those of the CRJ-700. It also shows how the Airport's current facilities compare to these standards.

New Table A Changes in Airfield Design Standards				
	Prior Standard B-III*	New Standard C-II	Existing Condition	Notes
Runway Design				
Runway Width	100'	100'	100'	
Shoulder Width	20'	10'	12'	
Blast Pad Width	140'	120'	144'	
Blast Pad Length	200'	150'	200'	
Runway Protection				
Runway Safety Area				
Length beyond departure end	600'	1,000'	1,000'	
Length prior to threshold	600'	600'	600'	
Width	300'	500'	475'	1
Runway Object Free Area				
Length beyond runway end	600'	1,000'	1,000'	
Length prior to threshold	600'	600'	600'	
Width	800'	800'	764	2
Runway Obstacle Free Zone				
Length	200'	200'	200'	
Width	400'	400'	400'	
Precision Obstacle Free Zone				
Length	n/a	n/a	n/a	
Width	n/a	n/a	n/a	
Approach Runway Protection Zone				
Length	1,000	1,700	1,700	3
Inner Width	500'	500'	500'	
Outer Width	700'	1,010'	1,010'	
Departure Runway Protection Zone				
Length	1,000'	1,700	1,700	4
Inner Width	500'	500'	500'	
Outer Width	700'	1,010'	1,010'	
Runway Separation				
Runway centerline to:				
Parallel runway centerline	n/a	n/a	n/a	
Holding position	220'	250'	220'	5
Parallel Taxiway/Taxilane centerline	300'	300'	300'	
Aircraft parking area	400'	400'	400	
	TDG-5	TDG-2		
Taxiway Standards				
Taxiway Width	75'	35'	50'	
Shoulder Width	30'	10'	0'	
Taxiway safety area width	118'	79'	118'	
Taxiway object free area width from centerline	93'	65.5	90.5	6

* For historical reasons the Airport is classified B-III. However, the Q400 aircraft is classified by the FAA as C-III.

Notes

1. Grading needed on south side of runway
2. Fence south of runway and hangars north of runway intrude
3. Portions located off airport
4. Portions located off airport
5. Could be relocated
6. Easterly row of hangars are the critical objects

Source: Mead & Hunt

8. SUMMARY

Table 9. Summary of Forecasts			
	2018	2023	2028
Passenger Enplanements *			
Air Carrier	22,594	22,824	24,387
Commuter	0	0	0
TOTAL	23,289	22,824	24,387
Operations			
<u>Itinerant</u>			
Air Carrier	1,050	1,458	1,458
Commuter/Air taxi	2,926	3,017	3,093
Total Commercial Operations	3,993	4,565	4,551
<u>General Aviation</u>			
General Aviation	5,684	5,753	5,897
<u>Military</u>			
Military	400	400	400
<u>Local</u>			
General Aviation	1,184	1,200	1,231
Military	0	0	0
TOTAL OPERATIONS	7,062	7,611	7,755
Instrument Operations	3,672	3,958	4,033
Peak Hour Operations	6	11	12
Cargo (enplaned + deplaned pounds)	0	0	0
Based Aircraft			
Single Engine (Non-jet)	4	4	4
Multi Engine (Non-jet)	3	3	3
Jet Engine	0	0	0
Helicopter	0	0	0
Other	0	0	0
TOTAL	7	7	7

*Note: enplanement numbers do not include either scheduled or nonscheduled charter.



U.S. Department
of Transportation
**Federal Aviation
Administration**

Western-Pacific Region
Airports Division

San Francisco Airports District Office
1000 Marina Boulevard, Suite 220
Brisbane, CA 94005-1835

April 13, 2017

Mr. Brian Picken
Airport Manager
Town of Mammoth Lakes
1300 Airport Road
Mammoth Lakes, CA 93546

Dear Mr. Picken,

RE: FAA Approval of Activity Forecast; Mammoth Yosemite Airport,
Airport Improvement Program (AIP) Project No. 3-06-0146-023-2010

The Federal Aviation Administration (FAA) has completed its evaluation and approves the updated *Aviation Activity Forecast* document for the Mammoth Yosemite Airport (MMH), dated March 31, 2017. The San Francisco Airports District Office (SFO ADO) has the following comments about the forecast and the Terminal Area Development Plan (TADP):

- There are variations in operations projections when comparing your forecast to the FAA Terminal Area Forecast (TAF). We have determined the variance is because the TAF projection for 2016 air carrier operations was too high when compared to the number of air carrier operations actually performed.
- The aviation activity forecast provides adequate justification for near-term and mid-term airport planned development at MMH.
- The TADP should be updated as required based on the approved forecast prior to moving forward to the environmental phase of the proposed project.

To finalize AIP Project No. 23, please submit two (2) copies of the updated Draft Final TADP including approved forecast.

If you have any questions, please contact Katherine Kennedy at 650-827-7611.

Kind Regards,

James W. Lomen
Manager, San Francisco Airports District Office

Mammoth Yosemite Airport Aviation Activity Forecasts

Prepared for the Town of Mammoth Lakes



Prepared by



March 31, 2017

1. INTRODUCTION

Forecasts of aviation demand are used to identify future facility needs. In planning for the future growth of any airport, it is important to understand the context within which potential increases in aviation activity are likely to occur. Aviation forecasting is not an “exact science,” so professional judgment and practical considerations will influence the level of detail and effort required to establish reasonable forecasts and subsequent airport development decisions.

This chapter includes forecasts of the following aviation activities: scheduled passenger enplanements, peak passenger activity, aircraft operations and fleet mix, based aircraft, and air cargo volumes. Because this forecast will be principally used in the assessment of facility requirements for a proposed replacement passenger terminal, it focuses on the next 10 years (i.e., through 2026). The aviation forecasts must be approved by the Federal Aviation Administration (FAA) in order to provide justification for FAA funding participation in eligible airport improvement projects.

Several indicators of aviation activity including regional and local trends for both commercial and general aviation were used to develop an aviation activity forecast for Mammoth Yosemite Airport (MMH or “the Airport”). These trends provide one element that shapes the projections of aviation activity developed for the Airport. However, the unique characteristics of an airport serving a resort destination that is remote from metropolitan areas have a profound effect on forecasting. Particularly important are the revenue guarantees provided to the scheduled passenger airlines.

This chapter is organized into the following sections:

- 1. Introduction
- 2. Airport Role
- 3. Historical Activity at MMH
- 4. National Aviation Industry Trends
- 5. Forecasting Methodologies
- 6. Forecasts
- 7. Design Aircraft
- 8. Summary

2. AIRPORT ROLE

An airport’s role is defined by the mix of aviation uses that exist, or are anticipated to exist, at the facility. Each use is defined by the type of aircraft involved and its mission. Aircraft can be used for multiple missions. A medium-sized turboprop may be used by an airline for scheduled passenger service, an air charter operator for on-demand air taxi service, an air cargo airline for transporting express packages, and the military for transport. It is critical to know both the aircraft type and mission in order to identify the necessary airport support facilities. A key part of the forecasting effort is to identify how the current mix of aircraft types and missions will evolve over the 10-year forecast period. This information will be used to identify needed modifications to the airfield and airport facilities.

2.1 CURRENT ROLES

Mammoth Yosemite Airport is classified by the FAA as a primary, non-hub commercial airport which provides scheduled passenger service to the Mammoth Lakes area and surrounding areas. As of January 2016, the Airport is served by two airlines with non-stop service to three destinations. As of 2016, the aviation activities at the Airport are:

- Passenger Service.
- Recreational Aviation.
- Business Aviation.
- Medical Transport.
- Military Aviation.

The Airport also has limited flight training activity and air cargo has been delivered via scheduled airline aircraft in past years. Information about these uses is presented in the paragraphs that follow.

The Airport is home to one fixed-base operator (FBO) that serves general aviation aircraft. The FBO operates from the general aviation terminal located west of the commercial passenger terminal. The FBO provides:

- Aviation fuels: Jet A and 100LL.
- Aircraft parking and hangar storage.
- Oxygen service and pilot supplies.
- A crew car available for pilots.

The Airport's role can also be defined in operational terms. The mission-related roles defined above can also be grouped into three operational groups:

- Commercial service – scheduled and charter passenger service.
- General aviation – aviation activities other than scheduled service and military.
- Military – transient military aircraft.

2.2 FUTURE ROLES

The Airport is anticipated to maintain existing roles throughout the 10-year planning period. No significant changes to the mix of aircraft types or uses is anticipated.

3. HISTORICAL ACTIVITY AT MMH

This section provides background on historical aviation activity at MMH. The many uncommon aspects of aviation uses at the Airport make familiarity with this background information necessary to understand the approaches used in forecasting. **Table 1** presents historical activity data for the years 2009-2016. Data was taken from several sources to provide the most accurate data for forecasting. Enplanement data was obtained from the Airport from records provided by United and Alaska Airlines. Operations counts were obtained from Hot Creek Aviation, the fixed base operator at the Airport. Based aircraft counts were taken from the FAA's 2016 Terminal Area Forecast, except that the 2016 is an estimate provided by Airport staff.

It should be noted that the FAA defines *air carrier* differently for passenger enplanements and aircraft operations. For enplanements, the FAA divides the passenger airline industry into two categories of airlines: *air carrier* and *commuter* (also called *regional airlines*). The primary difference between the two is the role that the airline plays relative to the other. Regional airlines carry passengers to the hub cities of the air carrier airlines, and may feed passengers onto air carrier service at the hub cities. Regional airlines may operate aircraft painted like air carrier airlines, and may have their tickets sold by the air carrier operator. Air carrier airlines typically fly aircraft with more passenger seats than regional airlines and serve larger markets. However, the difference between air carrier and regional airlines is generally indistinguishable to a passenger with the exception of aircraft size. All of the enplanements at MMH are counted in the *commuter* category.

Airline operations are categorized based on aircraft seating capacity. Aircraft with 60 or more seats are *air carrier*, and aircraft with fewer than 60 seats that are operated by airlines are included in *air taxi/commuter*. All of the airline operations at MMH are counted as *air carrier* operations. The only *air taxi/commuter* operations at the Airport are charter operations that are classified as air taxi. One example of charter activity at MMH is the service recently started by JetSuiteX under contract with the Air Partners group (see page 5 for a discussion of the Air Partners group). JetSuiteX started providing service between Burbank and Mammoth in mid-December 2016. Service was offered four times weekly through the end of 2016 and is scheduled to continue until early April 2017. However, charter activity has always been a significant component of general aviation operations. The Airport's FBO, Hot Creek Aviation, estimates that charter operations account for more than half of all general aviation operations by turbine aircraft.

Table 1. Historical Aviation Activity

Passenger Enplanements				Itinerant Operations					Local Operations			Total Operations	Based Aircraft
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	General Aviation	Military	Total	Civil	Military	Total		
2009	0	5,021	5,021	314	1,570	4,568	106	6,558	214	0	214	6,772	4
2010	0	19,798	19,798	1,228	1,840	4,296	62	7,426	200	0	200	7,626	4
2011	0	26,196	26,196	1,394	1,824	4,133	38	7,389	202	0	202	7,591	3
2012	0	27,246	27,246	1,564	1,688	3,568	40	6,860	173	0	173	7,033	3
2013	0	30,858	30,858	1,530	1,784	4,108	56	7,478	199	0	199	7,677	7
2014	0	25,892	25,892	1,404	1,514	3,200	24	6,142	148	0	148	6,290	7
2015	0	23,504	23,504	1,234	1,472	3,325	22	6,053	144	0	144	6,197	7
2016	0	22,253	22,253	990	1,634	4,017	32	6,673	143	0	143	6,816	7

Source: Passenger enplanements and air carrier operations: Airport records; all other operations: Hot Creek Aviation; based aircraft FAA 2016 Terminal Area Forecast.

Notes:

1. 2009 air carrier operations data not available. Operations estimated by assuming same number of passengers per aircraft as 2010.
2. Airline passenger service started in 2009 and was only for part of the year.

3.1 PASSENGER ENPLANEMENTS

After an 11 year hiatus, scheduled passenger service resumed at MMH in December 2008 with the introduction of service by Alaska Airlines. Service by United Airlines was added in December 2010. Initially service was only provided during winter months. In 2010, year-round service began and continues as of 2017.

Passengers at MMH are predominantly associated with leisure travel which is concentrated during the ski season. Skiing typically starts by mid-November and some years skiing will continue until July. However, the prime ski season lasts from mid-December through mid-April (usually Easter) and accounts for over 70% of annual passengers. For this reason there are distinct winter-spring (i.e. ski season) and summer-fall airline schedules. Winter-spring schedules commonly include service from Los Angeles (LAX), San Diego (SAN), and San Francisco International Airports (SFO). The summer-fall schedule typically includes only flights from LAX. **Figure 1** shows the average monthly distribution of enplanements from 2010 to 2016.

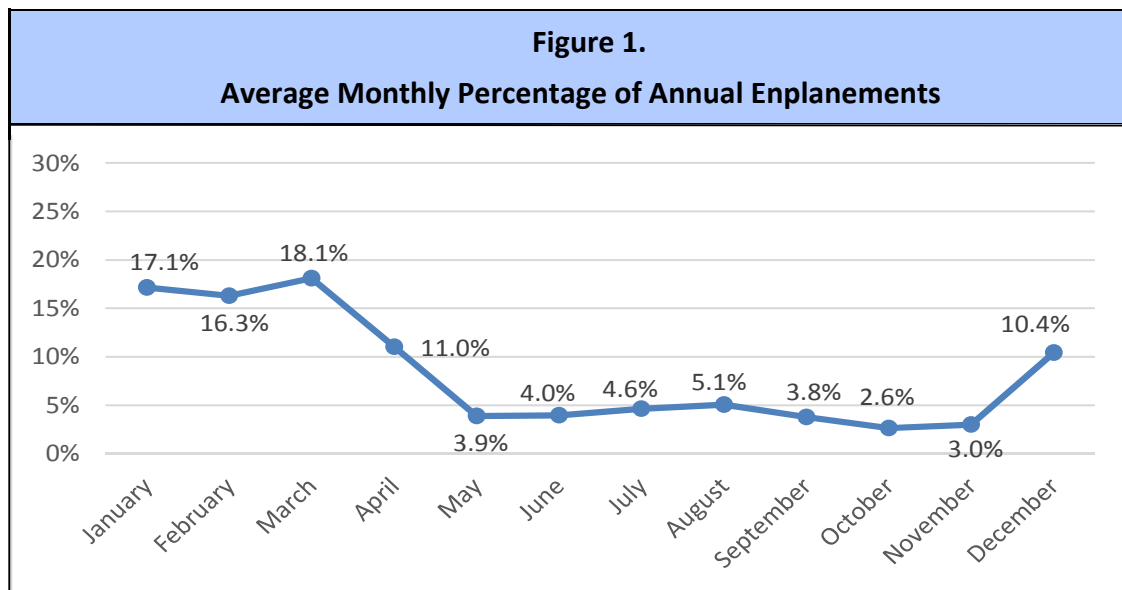
The passenger service offered at MMH is arranged through Minimum Revenue Guarantee Contracts (MRGCs) with airlines. A local partnership (the Air Partners) was established to implement the MRGC program for service to MMH. The Air Partners consist of the Town of Mammoth Lakes, Mammoth Lakes Tourism, and Mammoth Mountain Ski Area (MMSA). An important change occurred in 2014 with the creation of a new revenue guarantee funding mechanism, the Mammoth Lakes Tourism Business Improvement District (MLTBID). MLTBID was formed by public referendum in which local businesses agreed to a special tax on themselves for the purpose of marketing the town as a resort destination with a unique brand. The MLTBID tax raises between \$4.7 and \$5 million annually. Up to about \$2.3 million is available annually, if needed, to support commercial air service by funding MRGCs. About \$2.4 million from the MLTBID fund is available for marketing programs to support tourism.

The Air Partners' air service strategy is designed to attract visitors from four markets: southern California, western states, east coast and international. Since the beginning of the program the Air Partners have tried and discontinued flights from five markets. The rationale for initiating and ultimately cancelling service from each destination is summarized below:

- **Reno** – Intent was to pull skiers from the Tahoe-area market. Load factors remained low because the driving distance was too short to make a flight to MMH attractive to many visitors.
- **Denver** – Purpose was to gain access to east coast market by using United Airlines flights from its hub in Denver. The ski clubs on the east coast were specifically targeted. Four drought winters and ski seasons with poor snow resulted in low load factors.
- **San Jose** – Purpose was to attract skiers from the San Francisco Bay Area, particularly the eastern portion. The only available departure time slot was mid-morning with an early afternoon return flight. This proved unattractive to skiers because the mid-morning departure did not allow skiers to begin skiing on the first day and the early afternoon return flight did not permit time for skiing on the last day, while also not allowing for a full work day on either end.

- **Orange County** – This departure location was intended to serve this geographic region within the southern California market. As with the San Jose flights, this service was unsuccessful because of a mid-morning departure and early afternoon return flight.
- **Las Vegas** – Service was started from this location to gain access to the southern Nevada market. Flights were scheduled for a Thursday departure from Las Vegas with a Monday return flight. After the first season it appeared that the choice of days of the week were not appropriate for this market. When it appeared that the aircraft used for this flight was going to be reallocated by the airline, the flight was cancelled by Alaska Airlines.

Over the last three seasons, including the partially completed 2016-2017 ski season, the Air Partners have fine-tuned the schedules for service from Los Angeles, San Diego and San Francisco to increase load factors. This involved reduction or cancellation of service during the shoulder season and reduction in the frequency of service on some routes during the prime winter season. The purpose was to increase load factors to the point where little or no subsidies were required for service from these locations. The load factor is the percentage of filled passenger seats. These schedule modifications were intended to eliminate flights where load factors were in the 20% and 30% ranges. During the 2015-2016 ski season this new strategy reduced flights by 19% while only reducing enplanements by about 6%. This strategy frees-up funds for use in marketing and testing service from new cities.



Source: Airport

Annual enplanements grew from 19,798 in 2010 to 30,858 in 2013 and decreased to 22,253 in 2016 (see **Table 1**). Enplanements declined in between 2013 and 2016. Initially the decline was due to the “right sizing” strategy noted above which eliminated flights with low load factors. Based upon ticket sales, calendar year 2016 would have had higher enplanements than 2015 except for the severe weather in December 2016. The blizzard conditions resulted in flight cancellations that exceeded 50% in some weeks of this peak holiday season.

As a resort destination, visitors come to Mammoth Lakes and the surrounding area for recreation. According to Mammoth Lakes Tourism staff, most travelers are coming in for three- to five-day stays. Flights into Mammoth Lakes during later afternoon hours allow visitors to work half a day, arrive around dinner time and plan on beginning skiing, hiking, biking, fishing and sightseeing the following morning. This also allows them to ski for half a day before their departure (ski lifts close at 4:00 p.m.). The Air Partners have found through experience that flights at other times during the day have not been successful. A late-morning or mid-afternoon flight is often considered a “wasted” day travelling. This flight schedule also allows visitors time during the day to make flight connections from East Coast cities and other locations more conveniently. Early morning flights are not as desirable as late afternoon and early evening flights. An early morning flight would also poorly serve visitors connecting from other cities. The year-round mid-morning flight from LAX exists only because it was the only year-round time slot that Alaska was willing to make available.

The preference for later afternoon or early evening flights is the key factor driving demand for terminal gates at MMH. Currently the terminal has only one gate. During the ski season weather delays occur regularly. This can result in three commercial aircraft being parked at the Airport concurrently approximately 20 times per ski season (about 18%), with rarer occurrences when four aircraft are parked at the Airport concurrently. In 2013, when the Airport had seven flights on five days each week during the ski season, airline scheduling pushed peak hour passengers well past the terminal's capacity. This resulted in three or more planes on the ground more frequently. Some flights had to be scheduled earlier in the day, which reduced their load factor as people chose not to fly due to the inconvenient timing of the flights. By requiring some origination markets to fly during the middle of the day their viability was reduced as enplanements fell and subsidy money was increased. This ultimately led to the cancellation of some of these routes, due to low load factors.

3.2 BASED AIRCRAFT

Based aircraft are defined as those stored at an airport on a long term basis. These aircraft owners buy or lease hangar and parking space from the Airport or a third-party developer. The forecast of based aircraft will be used to determine whether additional hangar spaces are needed. MMH is unusual in that most hangars are used by transient aircraft, that is, aircraft based at another airport. The dominance of hangars used for transient aircraft is due to two factors: aircraft owners who have second homes in the Mammoth Lakes area, and the desire to shield aircraft from the weather (particularly snow) when parked at the Airport. This information will also be used to assess the need for new or expanded supporting facilities or services. The counts of based aircraft from 2009-2016 are shown in **Table 1**.

3.3 AIRCRAFT OPERATIONS

An aircraft operation is either a landing or a take-off. A touch-and-go is a common training activity where the pilot lands and then takes off without leaving the runway. A touch-and-go is counted as two operations.

3.3.1 General Aviation Operations

The Airport does not have an airport traffic control tower, so there is no official count of aircraft operations. However, the Airport's sole FBO is required by contract to keep a record of all landings. The FBO's staff monitors the Airport's Unicom radio frequency and records the aircraft numbers of arriving aircraft. FBO

counts include landings that occur during business hours: Saturday-Thursday 8:00 a.m. to 6:00 p.m. and Friday 8:00 a.m. to 8:00 p.m. The counts also include aircraft that arrive at night and are still parked on the transient apron in the morning. Local operations, such as touch and goes, are not included in the count. FBO staff estimate that local operations are about 5% of total piston operations. Based upon a two-month sample of their aircraft logs, the FBO estimates that about 54% of turbine operations are charters (i.e., air taxi). The counts of operations by general aviation aircraft from 2009-2016 are shown in **Table 1**. Aircraft operations include both landings and take-offs. Therefore, the FBO's counts of landings have been doubled.

3.3.2 Military Operations

The FBO's operation counts include military operations. **Table 1** presents the annual counts of operations from 2009-2016. All military operations are transient operations. Most are by helicopters.

3.3.3 Airline Operations

Alaska and United Airlines provide Airport staff with documentation of both their scheduled and actual operations. Records available from the Airport extend back to 2010. The operations estimate for 2009 was calculated from available records of passenger enplanements. It was assumed that the ratio of enplanements to operations was the same as in 2010.

3.4 AIR CARGO

Air cargo activity at MMH does not include any type of scheduled cargo service. According to DOT T100 data, in the first few years following reintroduction of scheduled passenger service small quantities of cargo were carried by the scheduled airlines as belly-haul (i.e., included with passenger baggage). However, in recent years no significant amounts of cargo have been shipped through MMH.

4. NATIONAL AVIATION INDUSTRY TRENDS

Aviation industry trends are based upon data available through April 2016. Separate sections will discuss: passenger enplanements, the general aviation fleet, aircraft operations, and air cargo. Most forecast material is extracted from the FAA's *Aerospace Forecast Fiscal Years 2016-2036* (hereafter *Aerospace Forecast*). The *Aerospace Forecast* presents FAA expectation for the aviation industry at a national level for the next 20 years and is updated annually. This information will provide a context for review of historical activity levels at MMH and development of forecasts. However, as is explained in the individual sections that follow, broad national trends have limited applicability to forecasting for the Airport.

4.1 PASSENGER ENPLANEMENTS

The foremost challenges facing the airline industry are the volatility of fuel prices and global economic uncertainty. Nationally, passenger enplanements have returned to levels achieved prior to the recession that began in 2008. Economic recovery, airline consolidation, and capacity constraints have restored airline profitability. Airlines have increased load factors, the percentage of seats occupied, by reducing flight frequencies. This practice has reduced consumer choice, effectively consolidating a growing number of

passengers on to fewer flights. Airlines are also adding aircraft with more seats, which has further necessitated the need to cut frequencies in order to operate the flights profitably.

The *Aerospace Forecast* projects that national passenger enplanements (domestic plus international) will increase an average of 1.9% per year through 2035. Air carrier airlines, called “mainline carriers” in the *Aerospace Forecast*, are expected to grow at 2% a year. This is higher than regional airlines, which are projected to grow at 1.6% a year. This section of the *Aerospace Forecast* is summarized in **Table 2**.

Because commercial carrier capacity is expected to grow at a slightly slower rate than enplanements, most airliners will remain crowded. Domestic commercial carrier capacity (i.e., total number of passenger seats) is expected to grow slowly at an average of 1.8% per year, with mainline carriers growing slower than regional carriers, 1.8% versus 2.0%. Because of subsidies and revenue guarantees, load factors (i.e., percent of seats occupied) for airlines serving ski resorts are commonly lower than for other destinations. Nationally, load factors for domestic mainline airlines are currently around 85% and 80% for domestic regional airlines. It is common to have average load factors on airlines serving ski resorts in the 60% to 70% range and lower on specific routes. It is these low load factors that necessitate having subsidies to make the flights economically viable.

Table 2.				
Comparison of Forecast Passenger Enplanement Growth Rates				
	Domestic + International Flights 2016-2035	Domestic Flights		
		2016-2025	2026-2035	2016-2035
Mainline Carriers	2.0%	1.5%	1.8%	1.7%
Regional Carriers	1.6%	1.5%	1.8%	1.7%
All Carriers	1.9%	1.5%	1.8%	1.7%
<i>Source: FAA Aerospace Forecast Fiscal Years 2015-2035</i>				

Forecasts of national trends in enplanements have limited applicability to the Airport. The airline revenue guarantee program (discussed in Section 1.4) allows scheduled passenger service to be offered that is largely independent of national trends. As long as forecast national economic trends are broadly positive (which they are), it can be assumed that the disposable income necessary for the recreational pursuits (mainly skiing) that are the principal purpose of the Airport’s passengers will be available.

4.2 GENERAL AVIATION AIRCRAFT FLEET

The total number of aircraft in a given area or organization is referred to as a *fleet*. The *Aerospace Forecast* indicates that the national general aviation fleet decreased by 3.2% annually from 2010 to 2013. This decline is partially due to aging aircraft requiring expensive repairs to remain airworthy, the aging pilot community struggling to meet medical requirements, the rising cost associated with aircraft ownership, and fewer new pilots overall. Fewer pilots results in reduced demand for new aircraft, particularly those purchased by individuals who would fly for recreation. The *Aerospace Forecast* expects the number of private pilots in the US to decrease at 0.35% per year through 2035.

The *Aerospace Forecast* projects that the number of piston fixed wing aircraft will continue to decline through 2035. Multi-engine piston aircraft are projected to decline by 0.4% per year and single-engine

aircraft are forecast to decline at a rate of 0.6% per year. However, within the single-engine group, the light sport aircraft segment is forecast to experience 4.3% annual growth, although this user class makes up less than 2% of the national fleet.

Although the general trend has been one of decline, there are areas of growth for certain segments of the national fleet. Continued concerns about safety, security, and flight delays keep business aviation attractive relative to commercial air travel. For these reasons, the turbine aircraft fleet (jets, turboprops and turbine-powered helicopters) is forecast to grow from 14.3% of the general aviation fleet to 21.5% by 2035. **Table 3** shows that it is the growth of turbine aircraft that supports the projection that the total general aviation fleet will grow at an average annual rate of 0.4% through 2035.

Table 3. Comparison of Forecast Growth Rates by Aircraft Type								
	Total Fleet	Rotorcraft	Fixed Wing					
			Turbine	Multi-Engine Piston	Single-Engine Piston	Light Sport	Experimental	Other
2015*	198,780	10,440	21,305	13,175	122,435	2,355	24,880	4,190
2035	214,260	17,110	33,785	12,135	108,810	5,360	33,040	4,020
CAGR	0.4%	2.5%	2.2%	-0.4%	-0.6%	4.3%	1.4%	-0.2%
<i>Source: FAA Aerospace Forecast Fiscal Years 2015-2035 *Estimate from Aerospace Forecast</i> <i>CAGR = Compound Annual Growth Rate</i>								

National trends have limited applicability in forecasting based aircraft at the Airport. With only seven based aircraft, the unique factors shaping decisions by individual aircraft owners will more profoundly affect changes in based aircraft than broad national trends.

4.3 AIRCRAFT OPERATIONS

The number of annual aircraft operations at towered airports in the United States has declined steadily from 2001-2015 (from 66.2 million to 49.6 million). The sharpest drop in all segments of the aviation industry occurred in 2009, the year following the beginning of the recession. From 2013 to 2014, the number of operations by commercial aircraft (air carrier and regional) grew, reflecting improvement in the national economy. Unlike passenger enplanements, which are categorized as air carrier or regional based on the airlines role, operations are categorized based on aircraft seating capacity. Aircraft with more than 60 seats are *air carrier*, and aircraft with 60 seats or fewer are operated by airlines are *air taxi/commuter*. Charter operations, such as the scheduled charter by JetSuiteX introduced in the December 2016, are included in the air taxi category.

General aviation operations grew from 2011 to 2012, before declining again in subsequent years. Segments of the general aviation market, namely aircraft used for business purposes, are operating more frequently while flight training and leisure and hobby flying are contracting. Business general aviation is growing in response to airline consolidation – it is simply less convenient to fly commercially than it used to be. Flight training is growing among students interested in the airline career track, but fewer are learning to fly as a hobby. This has led to the decline in leisure pilots. Reasons for this decline include the increased cost of

aircraft ownership, the expense associated with learning to fly, and competing financial needs. Younger generations are saving for a home and repaying student loans, which limits discretionary income.

The *Aerospace Forecast* projects total operations by all segments of the aviation industry to increase at an average rate of 0.9% per year through 2035 at towered airports. Most of the growth is expected to be from increased commercial aircraft activity (up 1.5% annually). The air carrier component is projected to increase an average of 2.7% per year. The increase in air carrier activity is expected to occur due to a combination of air carrier airlines increasing frequencies on select routes, and a switch by regional airlines from 50 seat aircraft to 70-90 seat aircraft, which are counted in the air carrier category by the Terminal Area Forecast (TAF). Air taxi/commuter operations were forecast to fall 4.9% in 2015 and decrease 1% a year through 2035. This reduction in the air taxi/commuter component will be driven by the retirement of passenger jets with fewer than 60 seats. Nationally, at small and non-hub airports such as MMH, total operations are projected to increase at an average annual rate of 0.5% a year. The *Aerospace Forecast* projects that general aviation activity at towered airports will increase an average of 0.4% annually through 2035.

The national trends forecast for aircraft operations have broad applicability to forecasts for the Airport. Although the forecast percentage changes in operations at the national level are not directly used in the Airport's forecasts, several trends support assumptions used in the Airport's forecasts:

- Increase in operations by air carrier aircraft.
- Growth in use of general aviation aircraft for transportation in lieu of using scheduled commercial flights.
- Decline in flight training for individuals interested in flying as a hobby.

4.4 AIR CARGO VOLUMES

The *Aerospace Forecast* concludes that the national volume of air cargo follows trends in the gross domestic product, with secondary influencers of airline fuel costs and the need for just-in-time logistics chains. Air cargo volumes have grown since the post-recession low point in 2009, although there has been some year-to-year variability. Significant structural changes in the air cargo industry have occurred over the last decade and have affected air cargo volumes, including: FAA and TSA air cargo screening requirements, maturation of the domestic express package market, a shift from air to other transportation modes (especially truck), use of all-cargo carriers by the US Postal Service, and the increased use of internet-based mail substitutes. Another key change is the continuing reduction in the amount of air cargo carried on passenger airliners.

The *Aerospace Forecast* projects that air cargo volumes will increase at an average annual rate of 0.5%. The all-cargo carriers' share of the air cargo market are forecast to grow to 90.2% by 2035 as airlines take less and less cargo.

The national trends forecast for air cargo have limited applicability to forecasts for the Airport. Although the forecast percentage changes in air cargo at the national level are not used in the Airport's forecast, the forecasts do reflect the national trend in reduction in cargo carried by airlines.

5. FORECASTING METHODOLOGIES

A variety of forecasting techniques may be used to project aviation activity range from subjective judgment to sophisticated mathematical modeling. These techniques may utilize local or national industry trends in assessing current and future demand. Socioeconomic factors such as local population, retail sales, employment, and per capita income can be analyzed for the relationship they have had, and may have, with activity levels. This section presents a range of methodologies that were considered for use in forecasting aviation activity at MMH. The applicability of these methodologies to each activity forecast (e.g., enplanements, operations) is addressed in the forecast section (Section 6).

5.1 MARKET SHARE METHODOLOGIES

The market share methodology compares local levels of activity with those of a larger market (e.g. state, nation, or world). This methodology implies that the proportion of activity that can be assigned to the local level is a fixed percentage of the larger entity. Most commonly this involves assuming a ratio between activities at an airport with FAA national forecasts.

5.2 TIME-SERIES METHODOLOGIES

Trend lines and regression analyses are widely used methods of forecasting based on historical activity levels at an airport. Trend line analyses can be linearly or nonlinearly extrapolated and are commonly created using the least squares method. Regression analyses can be linear or nonlinear. In time-series methodologies it is common to have only one variable.

Time-series methodologies are only appropriate when the activity being forecast has a sufficiently long history for trends to be established. At least 10 years is normally required although longer periods are desirable. These methodologies are most robust when the underlying factors that establish the activity levels have not fundamentally changed.

5.3 SOCIOECONOMIC METHODOLOGIES

Though trend line extrapolation and regression analyses may provide mathematical and formulaic justification for demand projections, there are many factors beyond historical levels of activity that may identify trends in aviation and its impact on local aviation demand. Socioeconomic and correlation analyses examine the direct relationship between two or more sets of historical data. Socioeconomic data can include: total employment, total earnings, net earnings, total personal income, and gross regional product. Historical and forecasted socioeconomic statistics are commonly obtained from Federal Agencies, such as the Census Bureau, or private firms, such as Woods & Poole Economics.

In these types of analyses the correlation coefficient, denoted as r , is used to measure the strength of the relationship between two variables. An r can range from -1.00 (one variable increases, the other decreases proportionally) to +1.00 (both variables grow or decline proportionally at the same time). A score close to ± 1.00 suggests a stronger correlation, and a score closer to zero suggests that the two variables are not correlated. Typically an r of at least ± 0.70 is needed to conclude that there is a substantial correlation between the two factors. It is important to understand that correlation does not necessarily imply causality. It could be possible that the two factors are jointly being influenced by another factor. Additionally, it is not

sufficient that there is a high correlation between the variables. There must be a logical basis to believe that there is relationship between the two variables.

5.4 COMPARISON WITH OTHER AIRPORTS

Using comparisons with other airports can be valuable when there is a lack of historical data or when a major change has occurred. The airports selected should be of the same relative size and possess relevant characteristics. Activity data from the comparison airports can be used as a source of trends. For example, growth rates when a low-cost carrier is first introduced to an airport. Activity data from comparison airports can also be used as benchmarks to assess the reasonableness of forecasts. These comparison airports are often referred to as peer airports.

5.5 JUDGMENTAL FORECASTING

Judgmental forecasting is used when there is a lack of historical data or where circumstances have changed so significantly that historical trends no longer apply. Judgmental forecasts must be formulated based upon a clear understanding of the factors that shape the activity being forecast. Forecasts prepared with this methodology are strongest when growth rates can be related to the experiences of similar airports or regional or national trends.

6. FORECASTS

6.1 PASSENGER ENPLANEMENTS

Forecasts of passenger enplanements are used to anticipate facility needs, such as expansion of the passenger terminal or modification of gates to accommodate different classes of aircraft. A passenger enplanement is defined as the act of one passenger boarding a commercial service aircraft. Passenger enplanements include scheduled and non-scheduled flights of over nine passenger seats, and do not include airline crew.

6.1.1 Factors Affecting Forecasts

Several factors made forecasting enplanements at MMH particularly challenging:

- Limited historical data (eight years) after 11 years without service.
- Variability in the amount of snowfall in Mammoth Lakes and the timing of storm/snowfall events.
- Minimum revenue guarantee contracts support scheduled service with load factors lower than is common on flights without revenue guarantees.
- The strategy of the Air Partners group in managing the revenue guarantee program and its associated marketing campaign continues to evolve. Section 3.1 provides a history of refinements to the strategy. Although refinement of the strategy has succeeded in increasing load factors, it has contributed to the decline in annual enplanements for the last three years.
- Flight cancellations due to weather are a seasonal issue, although the percentage varies year to year. Both low visibility and crosswinds have resulted in cancelled flights at MMH. Recent improvements to

instrument departure procedures (available to all aircraft) and instrument approach procedures (currently only available to Alaska Airlines) are expected to reduce cancellations due to low visibility. Future improvements to instrument procedures may further reduce cancellations. However, weather-related cancellations are expected to remain an issue.

- Passengers have shown a strong preference for flights that arrive in the late afternoon or early evening. Because the passenger terminal has only one gate, the ability to serve multiple flights during the preferred time period is constrained.

6.1.2 Methodologies Considered and Rejected

Three common forecasting methodologies were considered and rejected based upon the specific circumstances of MMH. These methodologies are identified in two common forecasting reference documents: *Forecasting Aviation Activity by Airport (July 2001)* which was prepared for the FAA and *ACRP Report 25, Airport Passenger Terminal Planning and Design, Volume 1: Guidebook*.

- **Historical trend lines and regression analyses** are widely used methods of forecasting based on historical performance. With only six years of year-round enplanement data, the legitimacy of forecasts based upon this brief period is questionable. Additionally, the evolving strategy of the Air Partners added another dimension of volatility to normal year-to-year variation.
- **Socioeconomic and correlation analyses** examine the direct relationship between two or more sets of historical data. Because enplanements are predominantly generated by passengers from outside the Mammoth Lakes Area, the socioeconomic variables would need to come from another geographic area. While the strongest economic link is to Southern California, it appears unlikely that socioeconomic factors in that region drive passenger volumes to MMH. Rather it is more likely that the relative attractiveness of Mammoth Lakes as a tourist destination compared to other destinations is driving demand; thus, this methodology is judged to be inappropriate.
- **Market share analysis** assumes a relationship between activities at an individual airport with activity forecast for a larger geographic area. Most commonly this involves assuming a ratio between activities at an airport with FAA national forecasts. This is judged not to be an appropriate methodology for MMH because enplanements at MMH are tied to its competitive position relative to other ski resorts rather than general national trends in passenger volumes.
- **Comparison with other airports** would be a potentially viable methodology if it were possible to identify airports with sufficiently similar characteristics. Given that aviation activities at MMH are strongly linked to skiing, it is appropriate to consider whether there are airports serving ski resorts that have characteristics similar to Mammoth Mountain Ski Resort. While there are ski resorts with comparable facilities, the nature of the ski market makes it infeasible to draw links between facilities and passenger enplanements. Skiing in the United States is a mature market; the number of skier days is not growing. Growth in the number of skier days at one resort comes at the expense of a competing resort. This competitive situation makes it infeasible to draw comparisons between MMH and other airports.

6.1.3 Selected Forecasting Methodologies

MMH's circumstances make using the common statistical methodologies described above inappropriate. Therefore, judgmental forecasts have been prepared. The judgmental forecasts include consideration of:

- Seven years of enplanement data.
- The history of successful and unsuccessful introduction of service to MMH.
- An emphasis in growing the service to fully serve the Southern California market and passengers using Southern California airports as a connection to reach MMH.
- The availability of \$2.4 to \$3 million to spend on marketing and revenue guarantees annually.
- The growth in airline ticket sales from 2015 to 2016 that did not result in an increase in enplanements due to weather-related flight cancellations.

6.1.4 Forecasting Assumptions

In these forecasts, the pattern of incremental growth will follow three paths:

- Expansion of service from LAX and SAN during the ski season when sufficient demand exists.
- Addition of service from one additional Southern California airport during the ski season and then gradual expansion of the number of weekly flights.
- Addition of limited service from an out-of-state airport.

The specifics of the forecasting assumptions are presented in the paragraphs that follow.

Forecasting Assumption No. 1

The undersized passenger terminal will continue to constrain passenger volumes until a replacement terminal with additional gates is added. The replacement terminal is assumed to become operational in 2021. Until that time, incremental growth in enplanements will be principally due to increasing load factors of existing flights and expansion of the number of flights per week with the existing daily schedule. There may be one or more new flights added to the schedule outside of the peak hour.

Forecasting Assumption No. 2

The Airport had 19,798 enplanements in 2010 and since that time has had over 22,000 annual enplanements each year, despite variations in snow conditions and reduction in flights due to refinements in the Air Partner's marketing strategy. It is forecast that enplanement volumes will continue to be at least this high through the 10-year forecast period.

Forecasting Assumption No. 3

When the replacement terminal becomes operational some existing flights will be rescheduled to occur during the peak early evening period due to strong passenger preference. The addition of terminal peak capacity will increase the ability to successfully add service from southern California and an out-of-state airport by enabling this service to meet passenger schedule preferences.

Forecasting Assumption No. 4

Beginning in mid-December daily service from LAX and SAN is offered in the late afternoon or early evening. There is also a daily mid-morning flight from LAX. After the three-week Christmas-New Year's holiday season is over, the late afternoon/early evening service is cut back to four days per week. The forecasts assume that the marketing campaign will increase awareness of the Mammoth Lakes region and MMSA and expand demand for passenger service. That will permit the four times weekly service to be incrementally expanded until the afternoon flight would be made daily throughout the ski season.

Forecasting Assumption No. 5

By its very nature, the passenger service program managed by the Air Partners will involve investigating the viability of service from additional airports. These forecasts assume that the Air Service Partners will follow their plan to test air service from various airports in the Southern California market over the next three years. This may include scheduled charters originating at general aviation airports to test some markets. However, ultimately the vast majority of scheduled service will originate at commercial (i.e., Part 139 certified) airports. Candidate airports include Burbank Bob Hope Airport (BUR), John Wayne Airport (SNA), and Santa Barbara Airport (SBA).

Forecasting Assumption No. 6

It is expected that initially, the service from a new Southern California airport would start with daily service during the first three weeks of the ski season and four times weekly service the balance of the ski season. If demand increased, this service would be incrementally increased by one additional day per week. When demand was sufficient service would be offered daily throughout the ski season.

Forecasting Assumption No. 7

Both the Seattle and Phoenix areas are being considered for service. Residents from these two areas currently purchase season passes to MMSA and/or own a second home in the Mammoth Lakes area. For forecasting purposes it is assumed that it will take five years of experimentation to establish service from an out-of-state airport. Due to competition, it is assumed that service will be limited to three flights per week during the ski season.

Forecasting Assumption No. 8

Service to the San Francisco Bay Area will continue indefinitely. These flights have historically had lower load factors than flights from Los Angeles and San Diego. However, about 50% of the passengers on these flights originate from outside of California. These connecting passengers are a market segment that the Air Partners strongly desires to grow. Additionally, without these flights Mammoth Lakes would receive very few visitors from the San Francisco Bay Area during the ski season due to the long drive time.

6.1.5 Other Forecast Assumptions

Actual Departures

The forecasts assume that the current average of 12% cancellations due to weather will be reduced to at least 10% due to new instrument approaches. In 2015, instrument departures were established for both runways that are available both day and night. New Required Navigation Performance (RNP) instrument approaches were also established that lowered ceiling minimums from 1,300 feet for both runways to 250 feet for Runway 27 and 265 feet for Runway 9. The forecasts assume a three-year phase of use of new departure and approach procedures. Currently the RNP approaches are available only to Alaska; however, Alaska is responsible for 77% of flights at MMH. The instrument departure procedures are available to all aircraft. The RNP approaches will allow Alaska to make approaches with the cloud ceiling about 1,000 feet lower than possible today. This will reduce the number of flights cancelled due to low ceilings. The instrument departure procedures will allow departures under instrument weather conditions

Total Seats

It is assumed that the CRJ700 with 70 seats remains in service through 2021 and then is replaced with a regional jet with 76 seats. Similarly it is assumed that the 76-seat Q-400 is eventually replaced by a 76-seat regional jet.

Load Factor

The right-sizing of the schedule has resulted in ski season load factors of over 70%. The load factor is forecast to grow over 10 years to provide year-round load factors over 60%.

Summer-Fall Season

These forecasts assume that passenger volumes outside of the ski season will remain static. There are ongoing efforts to increase visitors (including airline passengers) during this summer-fall season through the development of cultural events. Examples include the Mammoth Lakes Film Festival held annually in May and the Half Marathon held in June. However, the introduction of these cultural events is too recent to form the basis of a forecast for a change in summer-fall passenger volumes.

6.1.6 Enplanement Forecasts

Based upon the preceding assumptions, annual enplanement forecasts were prepared for MMH (see **Table 4**). A compounded average growth rate of 1% has been used in this forecast. This relatively low growth rate reflects the variability associated with weather/snow conditions and uncertainty associated with introduction of service from new locations. These forecasts project that enplanements will reach 23,388 in 5 years (2021) and 24,581 in 10 years (2026).

Table 4. Passenger Enplanement Forecast		
	Year	Enplanements
Base Year	2016	22,253
77Forecast Years	2017	22,476
	2018	22,700
	2019	22,927
	2020	23,157
	2021	23,388
	2022	23,622
	2023	23,858
	2024	24,097
	2025	24,338
	2026	24,581
Source: Mead & Hunt		

6.2 PEAK PASSENGER ACTIVITY

Some elements of terminal planning are based upon peak passenger activity. To support these analyses, the peak monthly, daily, and hourly activity levels for passengers for the most recent five calendar years (2011-2015) are first calculated. This data is then used to project these activity levels for the 10-year forecast period.

6.2.1 Peak Month Passenger Activity Forecasts

Monthly passenger enplanement data for the period 2011-2015 is presented in **Table 5**. The peak month has an average of 18.7% of total annual enplanements. In three of the five years, the peak month was March, in two of the five years it was January. The variation is likely due to snow conditions. In forecasting peak passenger activity, it will be assumed that peak month enplanements for this month will remain at 18.7% of the annual total. Applying this percentage to the preferred annual enplanement forecast above yields a peak month enplanement forecast for 2021 of 4,417 and for 2026 of 4,642.

Table 5. Peak Month Enplanements					
Month	2015	2014	2013	2012	2011
January	4,299	4,540	5,766	4,336	4,211
February	3,841	4,017	5,657	4,865	3,653
March	4,622	4,735	5,652	4,897	4,161
April	1,663	2,741	3,025	3,821	3,379
May	749	1,031	1,149	1,061	1,051
June	975	1,022	1,117	931	1,165
July	1,226	1,330	1,259	1,277	1,189
August	1,228	1,294	1,378	1,478	1,419
September	1,015	1,002	1,171	851	1,004
October	712	717	579	566	807
November	773	827	799	562	882
December	2,401	2,636	3,306	2,601	3,275
TOTAL	23,504	25,892	30,858	27,246	26,196
Peak Month % Annual	19.7%	18.3%	18.7%	18.0%	16.1%
5-year Average	18.7%				

MMH has distinct winter-spring and summer-fall flight schedules with winter-spring being the busier. This prime ski season typically starts on December 15 and runs through Easter. This schedule can vary by a few weeks depending upon snow depths and other factors. **Table 6** shows the schedule for the peak days of the 2015-2016 winter-spring season. Scheduled service from SFO is by United Airlines, while service from LAX and SAN is by Alaska Airlines.

The schedule shows that flights are concentrated in the early evening hours (4:35 p.m. to 6:45 p.m.). Arriving in the evening allows skiers to conduct travel during non-skiing hours to maximize the time available to spend skiing during a vacation. The peak hour is between 5:10 p.m. and 6:11 p.m. (1710 and 1811 in international time). This is graphically shown in **Figure 4**. The peak hour passenger volume was calculated using average enplanement and deplanement load factors for each airline. The average is calculated from flights that occurred from 2010-2015. The peak hour for the most recent (2015-2016) winter-spring season is 163 passengers. This includes passengers associated with an additional arrival that occurs one minute after the calculated peak hour. It should be understood that the Airport has had to negotiate with airlines to ensure that flight schedules will not lead to more than two aircraft on the ground at the same time whenever possible. This constraint has an impact on scheduling which reduces peak hour passengers below that which would otherwise occur. The right-sizing strategy has increased load factors over the last two years (2015-2016). Higher load factors increase the number of peak hour passengers.

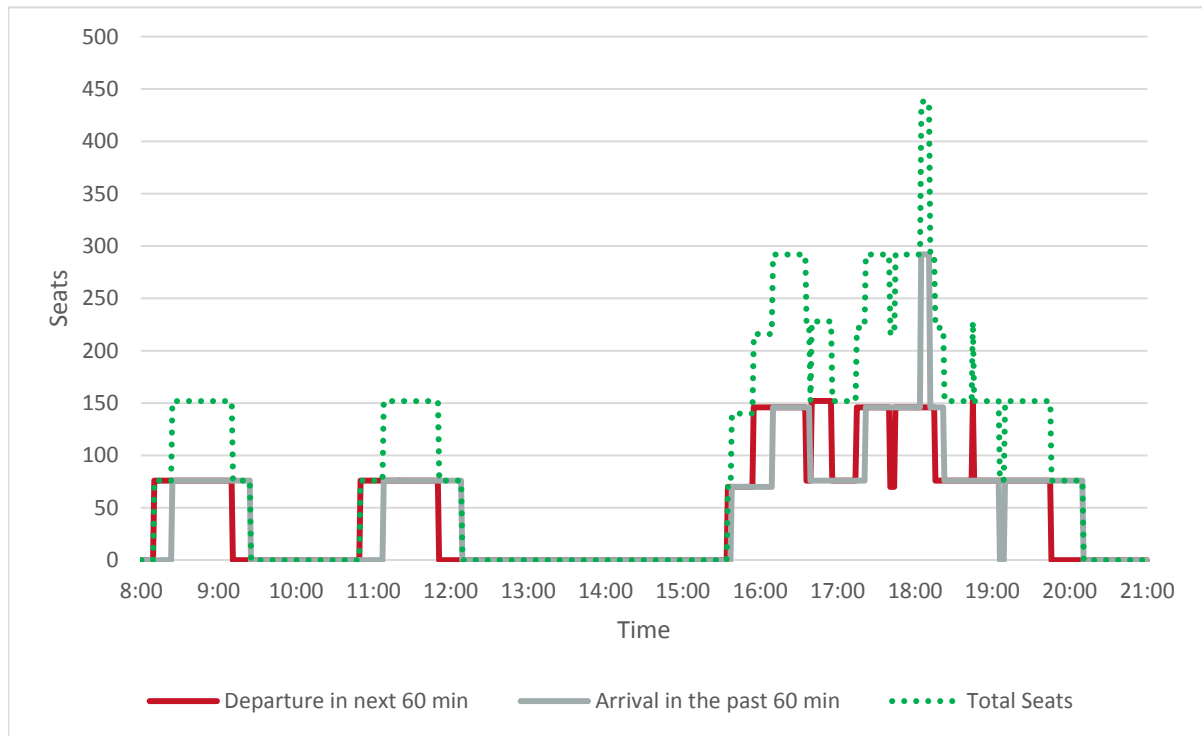
6.2.2 Peak Month Average Day Passenger Activity Forecasts

Daily peak activity figures are based on a regularly occurring level of daily activity during the peak, or busiest, month. A review of airline activity schedules for the peak months of March and December indicates that activity is concentrated in the Thursday-Monday block of days. Although some scheduled service

changes from daily to four times weekly service during these peak months, the schedule on peak days remains constant. Therefore, the seat total shown in **Table 6** (596) will be used as the peak day seats. The average passengers on the average day in the peak month equals 3.2% of the peak month's passengers.

Table 6. Winter-Spring 2015-2016 Peak Day Flight Schedule				
	Time*	Origin / Destination	Aircraft Type	Seats
Arrival	924	LAX	Bombardier Q-400	76
Departure	1050	LAX	Bombardier Q-400	76
Arrival	1638	SFO	Bombardier CRJ700	70
Arrival	1710	LAX	Bombardier Q-400	76
Departure	1715	SFO	Bombardier CRJ700	70
Departure	1745	LAX	Bombardier Q-400	76
Arrival	1811	SAN	Bombardier Q-400	76
Departure	1845	SAN	Bombardier Q-400	76
* Time is expressed as a 24-hour clock Source: Schedule - Airport				

Figure 2.
2015-2016 Ski Season Peak Hour Seats



Source: DEO data base

Peak Hour Passenger Forecast

The number of hourly arriving and departing seats during a typical day in the latter half of the peak month (December) is shown in **Table 5**. Peak hour departing seats currently occur between 5:45 p.m. to 6:45 p.m. (1745 to 1845). Peak hour arriving seats occur between 5:10 p.m. to 6:11 p.m. (1710 to 1811). The peak total arriving and departing seats occurs between 5:10 p.m. to 6:11 p.m. (1710 to 1811).

Peak hour passenger volumes through 2026 were calculated by applying the current peak hour percentages (described above) to the annual passenger volumes previously projected. It is presumed that one additional departure will occur by 2026. These projected peak hour passenger volumes are presented in **Table 7**.

Table 7.					
Forecast Peak Hour Passengers					
Year	Peak Month Enplanements + Deplanements	Average Day Peak Month Enplanements + Deplanements	Peak Hour Passengers		
			Enplanements	Deplanements	Total
2021	8,833	285	89	81	171
2026	9,284	299	94	131	204
<i>Source: Mead & Hunt</i>					

6.3 TERMINAL GATE REQUIREMENTS

An airport's gate requirements are typically examined in terms of the ability of both the airside and terminal building facilities to meet current and projected aviation demand. Commercial airline operations are quantified in peaking characteristics which comprise the "design hour" demand for passengers and aircraft. This approach provides sufficient facility capacity for most days of the year but recognizes that facilities should be neither underbuilt nor overbuilt. Aircraft gate capacity is determined using a design day flight schedule (DDFS), the peak hour of which is the "design hour." For most airports, an average day of the peak month's operations is used to develop a DDFS. The design hour is typically not the absolute peak level activity scheduled throughout a year, nor does it usually represent the total number of people occupying the terminal at a given time. It is a level of activity that is driven by flight schedule and quantified in terms of scheduled aircraft size. For MMH, historical data show the peak hour to be consistent at late afternoon for arrivals and departures during peak winter season travel.

For the peak winter season, Alaska has scheduled a morning arrival and departure at the Airport (see **Table 6**). Alaska and United's next arrivals into the Airport are scheduled between 4:30 p.m. and 5:30 p.m., with corresponding departures between 5:00 p.m. and 6:00 p.m., which constitute the Airport's peak hour for departures. These operations overlap one other with Alaska's Los Angeles flight arriving five minutes before United's San Francisco departure. This requires two gates to accommodate these current operations.

The winter schedule has been developed over time to reflect passenger preferences, which show mid-to-late afternoon departures from originating cities with arrivals at Mammoth Yosemite occurring about 5:00 p.m. to 6:00 p.m. generally. The airlines have attempted to schedule arrivals away from this late afternoon period with little success, noting that passengers generally prefer a mid-afternoon departure from the major

cities. This allows them sufficient time to work in the morning, travel to the airport to catch their flight and still arrive at Mammoth Yosemite with time to enjoy the evening and be ready for a full day of recreation the following day. It also allows time for recreation prior to their departure, it should be noted that the ski lifts at MMSA close at 4:00 p.m. It also allows time for weather events in Mammoth Lakes to clear if their flight is delayed.

Given current passenger preferences for travel from destinations within the state, service to a new market will most likely be scheduled into the peak hour. In order to allow for this as well as provide flexibility for operations generally, an additional aircraft gate will be required (for a total of three). MMH currently has one terminal gate and two aircraft parking positions. To accommodate current and future peak hour enplanements forecast in **Table 7**, two gates will not be adequate. Three gates will allow the Airport and carriers to provide a high level of service to their customers. While on a smaller scale at MMH, air carrier service is generally in line with other resort airports in the west, such as Eagle/Vail in Colorado and Friedman Memorial/Sun Valley in Utah.

Three gates would be in addition to hardstand positions provided to accommodate irregular operations. At MMH the most common irregular operations are associated with weather delays. During the winter-spring season weather delays occur regularly. This results in three airline aircraft being parked at the Airport about 20 times per winter-spring season (about 18%) with rarer occurrences when four aircraft are parked at the Airport. In 2013, when the Airport had seven flights on five days a week, it proved difficult to schedule flights to reduce peak hour passengers to the terminal's capacity and had three or more planes on the ground more frequently.

Advisory Circular 5360-9, *Planning and Design of Airport Terminal Building Facilities at Nonhub Locations*, contains the FAA's general guidance on terminal planning. Paragraph 25.a. states:

The initial stage of construction of airport terminal facilities should be designed to accommodate, comfortably, the forecast demands 5 years from the proposed date for occupancy.

The currently adopted Airport Layout Plan includes development of a replacement passenger terminal. It is anticipated that it would take about five years to complete the process leading to occupancy of the replacement terminal (2021). This time would be needed to complete state and federal environmental review, design, and then build the replacement terminal and associated facilities. Therefore, the likely date of occupancy plus five years is approximately nine years from now (2026). As noted in the paragraph above, three gates are needed to accommodate peak hour departures in 2026.

6.4 BASED AIRCRAFT FORECASTING METHODOLOGY

All of the aircraft based at the Airport are piston-driven. Nationally this segment of the general aviation fleet is expected to decline in numbers. The *Aerospace Forecasts* states that "the largest segment of the fleet, fixed wing piston aircraft is predicted to shrink over the forecast period at an average annual rate of 0.6 percent." As noted in Section 3, records of based aircraft at MMH are not sufficiently complete to be used to establish a trend. The most that can be said with confidence is that the number of based aircraft appears to have been stable for the last three years.

With only seven based aircraft, the decisions by individual aircraft owners profoundly effects the number of aircraft that will actually be based at the Airport in the future. Decisions by aircraft owners will be based upon economic factors, such as disposable income and changes in aircraft operating costs, as well the mobility value of owning an aircraft to access a somewhat remote location. Small populations are inherently less stable than larger ones and, therefore, likely to have higher variation.

No local factors have been identified that would suggest that growth in the number of based aircraft will occur. Neither Airport nor FBO staff anticipate turboprop or jet aircraft will be based at the Airport. These aircraft have historically been associated with visitors and owners of vacation homes in the Mammoth Lakes area. Neither group is likely to base an aircraft at the Airport.

6.4.1 Methodologies Considered and Rejected

Four of methodologies presented earlier in this document have been rejected as inappropriate for forecasting based aircraft.

- **Historical trend lines and regression analyses** has been rejected due to the lack of reliable historical data.
- **Socioeconomic and correlation analyses** is rejected because no clear link between the number of based aircraft and available socioeconomic data.
- **Market share analysis** is rejected because poor historical data makes it infeasible to evaluate the relationship between the number of based aircraft at MMH and state or national trends.
- **Judgmental forecasting** is rejected because the comparison with other airports provides a less subjective methodology.

6.4.2 Methodology Selected

Comparison with other airports is the methodology that was used to forecast based aircraft at MMH. Three airports were selected: Bishop Airport, Lone Pine/Death Valley Airport and Independence Airport. As with MMH all of these airports are located in valleys east of the Sierra Nevada Mountains along Highway 395. Bishop Airport is located 35 miles from MMH, Independence 66 miles and Lone Pine 83 miles. In 2015 Bishop had 45 based aircraft, Lone Pine had five and Independence had two. The 2016 TAF forecasts anticipates no change in the number of based aircraft at these airports. Therefore, the forecast of based aircraft for MMH is for the number of aircraft to remain at its current level of seven aircraft. Based upon this forecast, no new hangars are needed to accommodate based aircraft.

6.5 AIRCRAFT OPERATIONS

The forecast of operations will be used to determine whether the airfield will need capacity improvements during the next 10 years to accommodate expected demand. Forecasts for total operations are a composite of individual forecasts by operation type. Individual forecasts were prepared for: scheduled passenger airlines, general aviation aircraft, and military aircraft. General aviation operations forecasts include air taxi. The results are then totaled to produce a forecast of annual operations. Operations are also classified as either itinerant, meaning they originate and depart from different airports; and local, meaning that the flight

remains near the Airport. Local operations are normally only conducted by general aviation and military aircraft for purposes of flight training.

6.5.1 Methodologies Considered and Rejected

Four of methodologies presented earlier in this document have been rejected as inappropriate for forecasting aircraft operations.

- **Historical trend lines and regression analyses** has been rejected for commercial and general aviation operations due to limited available historical data.
- **Socioeconomic and correlation analyses** is rejected for use in forecasting all operations because no clear link exists between the number of commercial or military operations and socioeconomic factors.
- **Market share analysis** is rejected because, as an airport serving a resort/recreational destination, there is not a strong link between operations at MMH and state or national trends.
- **Comparison with other airports** is rejected for general aviation operations because MMH is an isolated airport that cannot be expected to follow operations trends at other airports. It is rejected for commercial and military operations because there is a stronger link between forecast enplanements and operations than operations at other airports.

6.5.2 Methodology Selected

- **Judgmental forecasting** has been used for commercial and military operations. Previously forecast enplanements have been used to forecast commercial operations using assumptions on aircraft seating capacity and load factors. The low number of military operations have been forecast to remain constant due to a lack of data suggesting and change in past activity levels.
- **Socioeconomic analysis** has been used for general aviation operations. Population growth in the Mammoth Lakes area is believed to be the best available indicator of future general aviation operations.

6.5.3 Scheduled Passenger Airlines

Operations by scheduled passenger airlines was calculated by applying assumed load factors and average seats per departure to the enplanement forecast. The current (2016) load factor is 60.9%. The Air Partners group has indicated that the right-sizing strategy is fully in place and no changes are currently planned to boost load factors. For forecasting purposes it was assumed that this percentage will continue through the 10-year forecast period. Similarly the current (2016) number of average seats per departure, 74.5 seats, is presumed to remain unchanged. This reflects the assumption that the current mix of Q-400 aircraft with 76 seats and the CRJ700 aircraft with 70 seats, will remain unchanged through the forecasting period.

Applying the load factor and average seats per departure to the previously presented enplanement forecast would yield the following forecasts of operations:

- 1,040 air carrier operations in 2021.
- 1,094 air carrier operations in 2026.

6.5.4 General Aviation Operations

With only seven based aircraft and no flight school based at the Airport, the majority of general aviation operations are by transient aircraft. The FBO estimates that about 20% of the transient operations are by aircraft owners who own hangars at the Airport because they also own second homes in the Mammoth Lakes area. Because of this link between second home ownership and transient use, the forecast of general aviation operations has been developed by utilizing the rate of population growth projected for Mono County. Mono County includes the Mammoth Lakes area.

Population forecasts for Mono County were taken from the California Department of Finance, Demographic Research Unit Report P-1, *State and County Population Projections: July 1, 2010-2060*. These projections anticipate that Mono County will grow from 14,525 residents in 2015 to 16,671 residents in 2035. The increase represents a compound annual growth rate of 0.69%. Applying this growth rate to the preceding estimate of 2016 noncommercial operations (minus military operations) yields:

- 6,215 operations in 2021.
- 6,432 operations in 2026.

Air taxi operations are forecast to continue to account for 28.2% of total general aviation operations. Itinerant general aviation operations are assumed to remain 69.3% of general aviation operations. Local operation will remain 2.5% of operations

6.5.5 Military Operations

Military operations have averaged about 35 operations annually over the last 5 years. Therefore, for forecasting purposes, annual military activity has been assumed to remain at 35 operations.

6.5.6 Operations Forecasts

A summary of operations forecasts is presented in **Table 8** below.

Table 8. Operations Forecast									
Year	Itinerant Operations					Local Operations			Total Operations
	Air Carrier	Air Taxi & Commuter	General Aviation	Military	Total	Civil	Military	Total	
2016	990	1,634	4,017	32	6,673	143	0	143	6,816
2021	1,040	1,186	1,753	35	7,137	155	0	155	7,292
2026	1,094	1,314	1,814	35	7,403	161	0	161	7,564

6.5.7 Peak Hour Operations Forecasts

There are no sources that directly provide peak hour operations information for the Airport. However, available data for both scheduled airlines and general aviation activity both indicate that March is the peak month. The attraction is the high quality of snow and good weather for skiing that commonly exists in this month. Airport data on actual airline operations indicate that March has accounted for about 20% of total annual operations in 2013-2015. Counts of noncommercial operations (i.e., all nonairline operations) by the FBO show that March 2013-2015 also accounted for about 20% of annual operations for these aircraft. Where peak day counts are not directly available industry practice is to assume equal division of operations during the peak month. The peak day in March would then equal the monthly total divided by 31. Therefore,

the peak day at Mammoth Yosemite Airport would be $20\% / 31 = 0.65\%$ of total annual operations. The peak day's percentage of annual operations (0.65%) equated to 44 operations in 2016.

No generic distribution of operations during a peak day is available. Every airport is unique. During the ski season at Mammoth Lakes visitors arriving by air commonly seek to arrive by civil twilight (i.e., sundown). During March this occurs between 6:15 p.m. and 7:45 p.m. During the 2015-2016 ski season three of the four scheduled daily arrivals occur between 4:35 p.m. and 6:45 p.m. General aviation arrivals follow a similar pattern. Based upon FBO landing records, an average peak day in March would see five arrivals by general aviation aircraft during the peak hour. The peak hour is typically 4:30 p.m. to 5:30 p.m. As noted earlier in this report the 2016 peak hour saw three operations by scheduled passenger aircraft. Adding commercial and general aviation peak hour data yields a total peak hour in 2016 of eight operations. In 2016, eight operations would equal 0.12% of total annual operations. Applying this percentage (0.12%) to the 2026 operations forecast yields 9 operations.

6.5.8 IFR Operations Forecasts

Instrument Flight Rule (IFR) operations are recorded in the FAA Traffic Flow Management System Counts (TFMSC). TFMSC operations data for the last four years (2013-2015) ranged from a high of 4,409 in 2013 to a low of 3,699 in 2016. Air carrier operations accounted for about 33% of IFR operations during this four-year period. Total IFR operations accounted for 62% of total operations. Introduction of the RNP instrument approach in the fall of 2016 is expected to increase the total number of air carrier IFR operations by about at least 2%. If air carrier IFR operations increase as projected, the percentage of total IFR operations would increase to 63%. At this rate in 2026 the number of IFR operations will total 4,765.

6.5.9 Cargo Forecasts

Nationally the trend has been a decline in cargo carried as belly-haul in scheduled passenger airline aircraft. The trend at the Airport has followed a declining trend since it started in 2010. Based upon these two trends it is forecast that no air cargo will be handled at the Airport in the future.

7. DESIGN AIRCRAFT

Plans for airport facilities must conform to FAA design standards. Design standards accommodate the physical and operational characteristics of the most demanding 'design aircraft.' The design aircraft must have or reasonably be forecast to conduct 500 annual operations at the Airport. In some cases the design aircraft will actually be a composite of the characteristics of the most demanding aircraft. According to the adopted Airport Layout Plan the current design aircraft for MMH is the Bombardier Q-400 turboprop. The operations counts for the Q-400 for the last four calendar years were:

- 882 operations in 2013
- 1,014 operations in 2014
- 952 operations in 2015
- 796 operations in 2016

The key characteristics of the Q-400 are:

- Aircraft Approach Category: C.

- Airplane Design Group: III.
- Taxiway Design Group: 5.

The Aircraft Approach Category (AAC) relates to aircraft approach speed and is classified by a letter (from A – E). The Airplane Design Group (ADG) component, depicted by a Roman numeral (from I – VI), relates to the aircraft's wingspan and tail height. The Taxiway Design Group (TDG) is based upon the undercarriage (i.e., wheel) spacing of the design aircraft.

The Q-400 is expected to remain the critical aircraft throughout the 10-year forecast period. It should be used as the design aircraft for facility planning.

8. SUMMARY

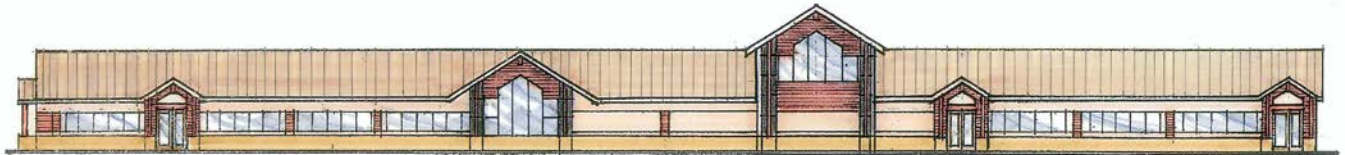
A summary of the forecasts are shown below in **Table 9**.

Table 9. Summary of Forecasts			
	2016	2021	2026
Passenger Enplanements			
Air Carrier	22,253	23,388	24,581
Commuter	0	0	0
TOTAL	22,253	23,388	24,581
Operations			
<u>Itinerant</u>			
Air Carrier	990	1,040	1,094
Commuter/Air taxi	1,634	1,753	1,814
Total Commercial Operations	2,624	2,793	2,908
General Aviation	4,017	4,309	4,460
Military	32	35	35
<u>Local</u>			
General Aviation	143	155	161
Military	0	0	0
TOTAL OPERATIONS	6,816	7,292	7,564
Instrument Operations	3,699	4,594	4,765
Peak Hour Operations	8	8	9
Cargo (enplaned+deplaned pounds)	0	0	0
Based Aircraft			
Single Engine (Nonjet)	4	4	4
Multi Engine (Nonjet)	3	3	3
Jet Engine	0	0	0
Helicopter	0	0	0
Other	0	0	0
TOTAL	7	7	7

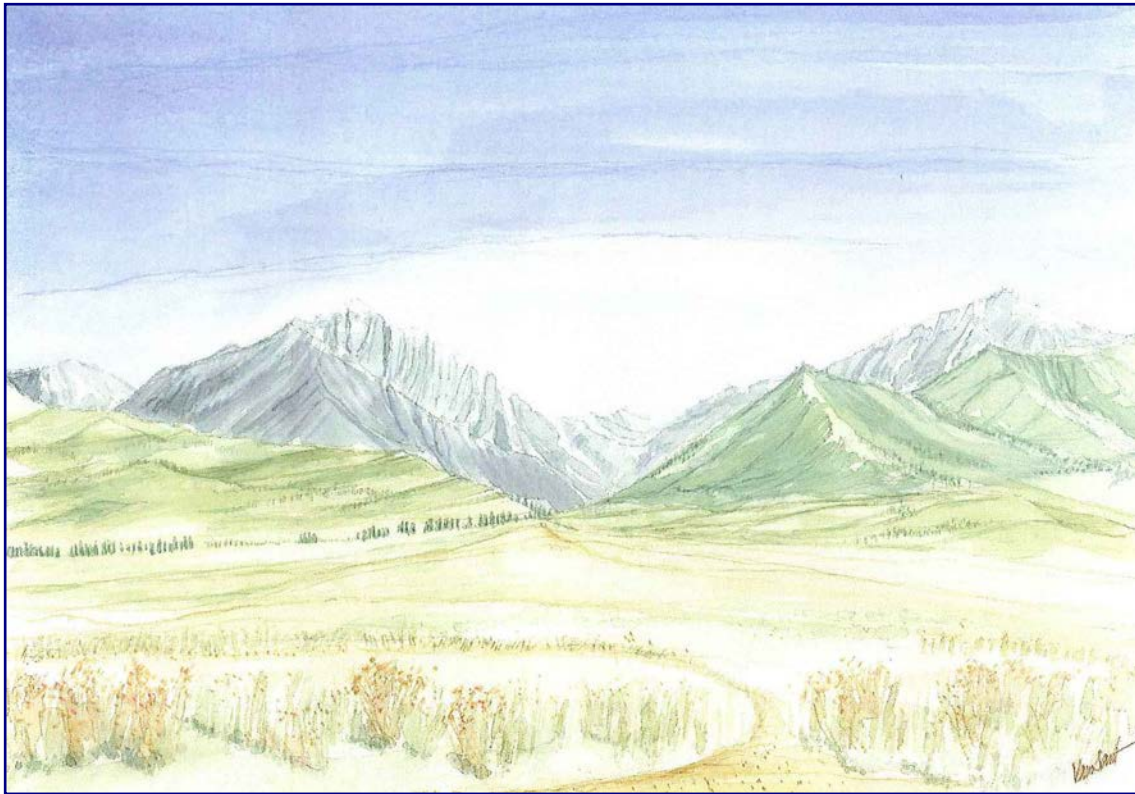
**MAMMOTH YOSEMITE AIRPORT
AIRPORT LAYOUT PLAN UPDATE NARRATIVE**

**Appendix B
Terminal Area Development Plan by
Brandley Engineering and Van Sant Group Architects**

MAMMOTH YOSEMITE AIRPORT TERMINAL AREA DEVELOPMENT PLAN TOWN OF MAMMOTH LAKES, CALIFORNIA



AIRSIDE ELEVATION



LANDSIDE ELEVATION

April 2017

Reinard W. Brandley

CONSULTING AIRPORT ENGINEER

VAN SANT GROUP

Architects □ Interiors □ Planners

MAMMOTH YOSEMITE AIRPORT TERMINAL AREA DEVELOPMENT PLAN

*Prepared for
Town of Mammoth Lakes, California*

*Prepared by:
Reinard W. Brandley
Consulting Airport Engineer*

*Van Sant Group
Architects*

April 2017

**MAMMOTH YOSEMITE AIRPORT
TERMINAL AIRPORT DEVELOPMENT PLAN
TOWN OF MAMMOTH LAKES, MONO COUNTY, CALIFORNIA**

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CHAPTER 1. INTRODUCTION

1-1 General

Mammoth Yosemite Airport (MMH) is located in the Sierra Nevada mountain range east of the divide in a moderately broad valley. It is located 7 miles east of the Town of Mammoth Lakes (Town) adjacent to U.S. Highway 395. Up until 2008 the airport served the general aviation fleet with mostly itinerant operations bringing in visitors to enjoy the recreation facilities in and around Mammoth Lakes including the Mammoth Mountain Ski Area (MMSA), Devils Postpile National Monument, fishing, boating, hiking, biking, mountain recreation, festivals, and other arts and cultural events. It is near the east entrance to Yosemite National Park, the Inyo National Forest, and several wilderness areas. Some modest commercial airline service was provided prior to 2008. Beginning in December of 2008, scheduled commercial airline service has been provided to MMH.

1-2 History

World War II through 1965: MMH was originally constructed by the United States (U.S.) Army for use as an auxiliary landing strip during World War II. The original dimensions of the landing strip were less than 4,000 feet in length by 30 feet in width. Mono County acquired part of the airfield from the U.S. Army after the war and renamed it Long Valley Field. The runway was an unpaved dirt strip and the airport was a seasonal facility closed by winter snows until it was paved in 1959. The airport was operated as an unattended landing strip until the early 1960s.

1965 to 1978: In 1965 the runway was relocated 300 feet to the north on USFS land to accommodate the future widening of U.S. Highway 395, which runs adjacent to the airport. Also at this time the runway was extended to 5,000 feet and widened to 100 feet. The airport was renamed Mammoth Lakes Airport and private interests operated the airfield. Mammoth Sky Lodge Corporation, then the airport operator, extended the runway to 6,500 feet in 1971. A terminal building and an airport office, currently used as an FBO office and pilots' lounge, were constructed in 1972. During this time the airport became formally known as Mammoth-June Lakes Airport. In 1973 Sierra Pacific Airlines initiated service using Convair 440 aircraft and served Mammoth Lakes until 1980.

1978 to 1992: Mono County entered into an agreement with Mammoth Sky Lodge Corporation to acquire all airport property in 1978 from the USFS; however, the acquisition of the airport was not consummated until 1980. Mono County reestablished public operation of the airport in 1980. Mono County began an airfield improvement program in 1983. Using funds received under the Airport Improvement Program (AIP) a new runway, 7,000 feet by 100 feet, was constructed.

1992 to 1995: The Town of Mammoth Lakes acquired the airport from Mono County in September 1992. United Express operated flights from Mammoth Lakes to Fresno, using 19-seat Jetstream 31 turboprop aircraft for the winter seasons of 1993 and 1994. Service reliability problems associated with overbooking and the 19-seat Jetstream aircraft led to passenger dissatisfaction, causing United Express to discontinue service. Additionally, Trans World Express terminated flight operations in 1995 due to reorganization of its major code share partner, Trans World Airlines. This reorganization of Trans World Airlines was required under Chapter 11 of the Federal Bankruptcy Code.

1997 to 2008: In 1997 new airport development was proposed for the airfield. Previous plans for the crosswind runway and supporting taxiways and golf course were abandoned. An extension of the current Runway 9-27 from 7,000 to 9,000 feet was proposed, as was the construction of a hotel/condominium complex.

The new airport development, reviewed in the 1997 EIR, included both airside and landside developments by a private developer. Airside improvements included the proposed building of up to 94 private and public use hangars, an aviation fuel storage complex, and facilities for the operation of a fixed base operator (FBO). Landside development consisted of a hotel and residential condominium complex, retail development, a restaurant complex, and a recreational vehicle park. Eventually 94 hangars and the airport water system were constructed but, for a variety of reasons, the bulk of the development was never constructed. Eventually, the developer sued the Town for breach of contract and prevailed. A settlement was reached in September of 2012, which dissolved the development agreement and returned development rights back to the airport.

In the late 1990's the Town and American Airlines proposed a large development project for MMH. The project included a longer and wider runway, a new terminal building, and related infrastructure to support Boeing 757 service from Dallas and Chicago and was based on a forecast of 330,000 annual passenger enplanements after 20 years. This project was enjoined in Federal Court in 2003. This project was abandoned, and the injunction was lifted in May of 2016 which will allow new development at the airport.

In the years prior to the lifting of the injunction the Town worked to initiate commercial service at the airport. In 2005 an Environmental Impact Statement (EIS) was prepared to accommodate the Town's scaled-back vision for the airport. The EIS provided for regional commercial air service using aircraft of 80 seats or less, 8 flights daily in the winter, and summer service, all to regional markets. The EIS also approved the remodel of an existing airport structure, which is now the interim terminal building.

In 2000 the Town changed the name of the airport to Mammoth Yosemite Airport.

2008 – Present: In 2008 the entire runway/taxiway complex at the airport was reconstructed.

Air service began in December of 2008 with one flight from Los Angeles International Airport (LAX) flown by Alaska Airlines using the 76 seat Bombardier Q400 (Q400). In 2010 United Airlines using the 70 seat Bombardier CRJ700 began service from San Francisco International Airport (SFO). Summer air service started in 2010 with Alaska Airlines from LAX. In the winter of 2016-17 the airport had up to four flights a day from LAX, SFO, and San Diego International Airport (SAN) with Alaska Airlines and United Airlines serving the airport. In 2016 the airport had 22,253 enplanements. The existing terminal is inadequate to meet current demand. The terminal experiences weekly and daily peaking of operations, which the existing terminal is not capable of adequately serving.

Air service at MMH would not be possible without a revenue guarantee program (RGP). The RGP at MMH is funded with a Tourism Business Improvement District (TBID) in which business are assessed a small fee for the purpose of marketing the Town and providing the revenue guarantee to the airlines.. The TBID is managed by Mammoth Lakes Tourism (MLT) which is part of the local Air Alliance. The Town and MMSA are the other two members of the Air Alliance and together provide airport: operational funding (Town), revenue guarantee funding (MLT), airline contracts, and financial backing (MMSA). The Air Alliance is discussed in greater detail in the Aviation Activity Forecasts (Appendix A).

With daily flights and peaking, passenger overcrowding in the existing interim terminal building is a major problem. Issues include passengers waiting at the security boarding gate and outside the building with minimal waiting areas away from inclement weather. Flight delays at other airports can exacerbate the capacity problems both in the terminal area and the commercial ramp area. Issues include crowding of the ticket counters, TSA security checkpoints, hold rooms, rest rooms, baggage handling facilities, and space on the ramp for aircraft parking.

With six flights daily and the peaking of commercial operations required to attract the skiers, daily passenger overcrowding in the existing interim terminal building is a major problem, particularly during the winter ski season. All sections of the existing terminal are overcrowded. The hold room size was such a major problem that the Airport erected a temporary sprung structure as a temporary hold room, and the hold room capacity is still inadequate.

1-3 Need for Study

MMH is used by itinerant general aviation aircraft ranging in size from the small single-engine and twin-engine aircraft to large turbojet aircraft such as the Gulfstream GV. These aircraft are used to bring visitors to the Town to enjoy the recreation facilities and venues available in the area. This general aviation activity

is expected to continue and increase over time. Airline service began in December of 2008 and immediately outgrew the temporary terminal building.

1-4 Existing Facilities

When the recent commercial operations began in 2008, there were no appropriate terminal facilities at the airport to handle these operations. At that time various constraints would not allow the construction of a new terminal and it was required that the terminal be constructed inside an existing building such that there would be no increase in the footprint of the building. The only suitable building available was the existing maintenance garage which had a floor area of 5,060 square feet. In 2008 the temporary commercial airline terminal was constructed within the walls of this building.

Because the temporary terminal was of insufficient size to accommodate passengers for more than one flight at a time a temporary terminal annex (sprung structure) of 2,250 square feet was added in 2011. This facility is not connected to the terminal and is outside of the secure passenger holding area. Passengers of flights not ready for boarding are held here and when called for boarding must still pass through the TSA screening area.

1-5 Required Action

To accommodate existing and forecast traffic it is necessary to construct a larger commercial terminal facility at the airport. It is not economically or operationally feasible to expand the existing temporary terminal. It is recommended that an entirely new terminal facility be constructed at an appropriate site on the airport. The new terminal facilities will include a new terminal building, commercial aircraft parking apron, a deicing apron, access roads, automobile parking facilities, maintenance facilities, and airport offices. The facilities need to be sized to accommodate forecast traffic for the next 10 years and have the capability of expanding to accommodate possible growth outside the planning period with minimal interference with airport operations.

A detailed Terminal Area Development study and plan has been developed and the results of this study are included in this report. This study and report was conducted by the Mammoth Yosemite Airport Terminal Design Team consisting of Reinard W. Brandley, Consulting Airport Engineer, and the Van Sant Group, Architects. Terry Van Sant is the principal for the Van Sant Group working on this project and Reinard W. Brandley is the principal for Brandley Engineering. The Aviation Activity Forecasts (Appendix A) was prepared by Mead & Hunt.

CHAPTER 2. AVIATION FORECASTS

Detailed Aviation Activity Forecasts were prepared by Mead and Hunt and have been approved by FAA for forecast aviation activity at Mammoth Yosemite Airport. These forecasts are important to establish and justify the proposed development. The detailed Aviation Activity Forecasts are included as Appendix A to this report.

A Summary of Forecasts included in the Mead and Hunt report are reproduced as Tables 2-1, 2-2, 2-3, and 2-4. Based on these forecasts, Mead and Hunt recommended that the initial terminal development include three hardstand positions and three holding rooms (see Appendix A). The proposed development includes three hardstands and three holding rooms.

Table 2-1
Peak Month Enplanements (Mead & Hunt Table 5)

<i>Month</i>	2015	2014	2013	2012	2011
January	4,299	4,540	5,766	4,336	4,211
February	3,841	4,017	5,657	4,865	3,653
March	4,622	4,735	5,652	4,897	4,161
April	1,663	2,741	3,025	3,821	3,379
May	749	1,031	1,149	1,061	1,051
June	975	1,022	1,117	931	1,165
July	1,226	1,330	1,259	1,277	1,189
August	1,228	1,294	1,378	1,478	1,419
September	1,015	1,002	1,171	851	1,004
October	712	717	579	566	807
November	773	827	799	562	882
December	2,401	2,636	3,306	2,601	3,275
TOTAL	23,504	25,892	30,858	27,246	26,196
Peak Month % Annual	19.7%	18.3%	18.7%	18.0%	16.1%
5-year Average	18.7%				

Table 2-2
Winter-Spring 2015-2016 Peak Day Flight Schedule (Mead & Hunt Table 6)

	Time*	Origin / Destination	Aircraft Type	Seats
Arrival	924	LAX	Bombardier Q-400	76
Departure	1050	LAX	Bombardier Q-400	76
Arrival	1638	SFO	Bombardier CRJ700	70
Arrival	1710	LAX	Bombardier Q-400	76
Departure	1715	SFO	Bombardier CRJ700	70
Departure	1745	LAX	Bombardier Q-400	76
Arrival	1811	SAN	Bombardier Q-400	76
Departure	1845	SAN	Bombardier Q-400	76
* Time is expressed as a 24-hour clock				
Source: Schedule - Airport				

Table 2-3
Forecast Peak Hour Passengers (Mead & Hunt Table 7)

Year	Peak Month Enplanements + Deplanements	Average Day Peak Month Enplanements + Deplanements	Peak Hour Passengers		
			Enplanements	Deplanements	Total
2021	8,833	285	89	81	171
2026	9,284	299	94	131	204
Source: Mead & Hunt					

**Table 2-4
Summary of Forecasts (Mead & Hunt Table 9)**

	2016	2021	2026
Passenger Enplanements			
Air Carrier	22,253	23,388	24,581
Commuter	0	0	0
TOTAL	22,253	23,388	24,581
Operations			
<u>Itinerant</u>			
Air Carrier	990	1,040	1,094
Commuter/Air taxi	1,634	1,753	1,814
Total Commercial Operations	2,624	2,793	2,908
General Aviation	4,017	4,309	4,460
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General Aviation	143	155	161
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TOTAL OPERATIONS	6,816	7,292	7,564
Instrument Operations	3,699	4,594	4,765
Peak Hour Operations	8	8	9
Cargo (enplaned+deplaned pounds)	0	0	0
Based Aircraft			
Single Engine (Nonjet)	4	4	4
Multi Engine (Nonjet)	3	3	3
Jet Engine	0	0	0
Helicopter	0	0	0
Other	0	0	0
TOTAL	7	7	7

CHAPTER 3. PURPOSE AND NEED

The purpose of this study is to evaluate and prepare recommendations for the required new commercial terminal development at Mammoth Yosemite Airport. The following factors were included in the study:

- Terminal Area Location
- Terminal Area Size and Configuration
- Terminal Building Configuration and Size
- Aircraft Parking Apron
- Aircraft Deicing Facilities
- Automobile Parking
- Access and Service Roads
- Terminal Area Support Facilities, Baggage Handling, Delivery and Maintenance Access
- Maintenance Facilities

CHAPTER 4. SITE SELECTION

There are many constraints to the location available for terminal area development on the airport without major disruption to existing facilities. The airport is further constrained from growth for development of terminal facilities by the location of U.S. Highway 395 on the entire south side of the airport, the location of Doe Ridge on the northeast side of the airport, and the existence of U.S. Forest Service land surrounding the airport. As a result, it was determined that the only area available for a major terminal development would be that area between the existing temporary terminal building and Doe Ridge to the east. This location would accommodate the new facility and keep all development on airport property.

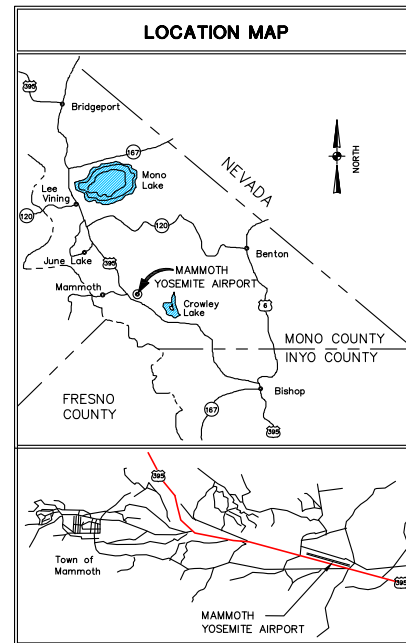
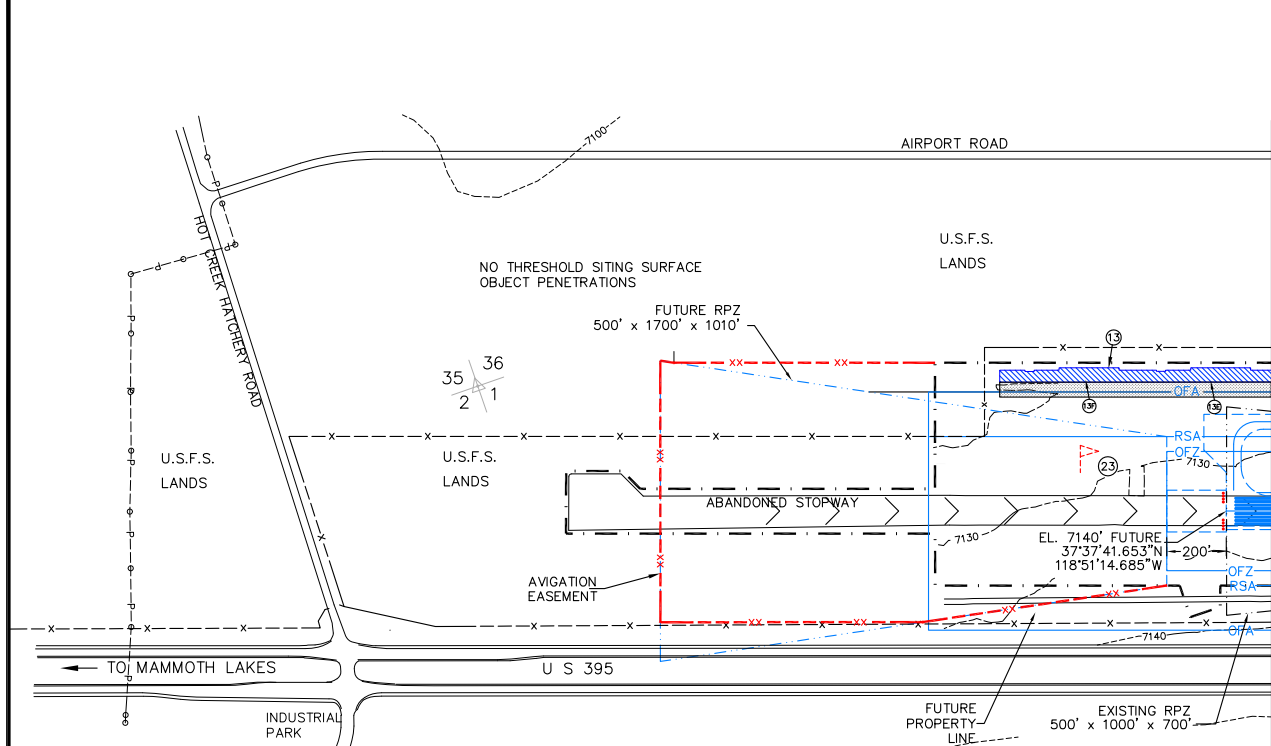
Two terminal area sites on the existing airport site were considered as shown on Plate No. 4-1. These sites are designated Terminal Area Site A and Terminal Area Site B. Terminal Area Site A proposes locating the outer edge of the commercial terminal apron parallel with the south edge of the existing tie down apron, which is at the building restriction line and OFA of the runway. This location provides good access to the taxiways and runway. The existing runway and taxiway do not meet all requirements for an F.A.A. Airport Reference Code (ARC) C III airport, which is anticipated to be required in the future as commercial service increases and larger aircraft of the C III class are introduced. If at some time in the future it is required to modify the runway/taxiway configuration to conform to all standards, then the proposed location of Terminal Area Site A would not allow these changes and the terminal would, therefore, need to be relocated.

Terminal Area Site B moves the terminal to the northwest of Site A, which provides room for any airfield modification as necessary, and the terminal building itself is located

adjacent to the current and future access roads. Automobile parking facilities on the airport property would be limited to parking on both sides of the terminal, as well as the existing airport parking lots. The access road only serves the airport and, therefore, it is appropriate to have the terminal building facing the access road. If necessary, there is significant land north of the Terminal Area on U.S. Forest Service land that could be acquired and used for future expanded automobile parking facilities.

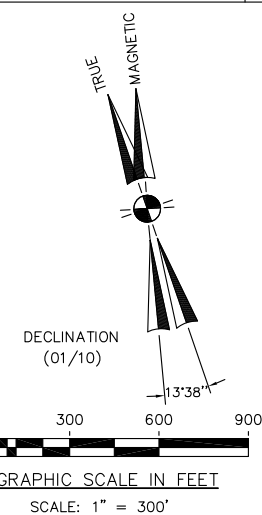
The selected preferred site is Terminal Site B. All additional studies were conducted using the Site B development area.

A detailed layout showing the proposed Terminal Area Site B development is presented on Plate 4-2. On this drawing the proposed terminal building is shown located so as not to preclude future expansion, except for future automobile parking north of the access road if necessary. The sizing and location of these facilities were developed from the detailed terminal area studies presented in the following chapters of this report. In this plan, space is available to double the length of the concourse and the capacity of the aircraft parking apron. Area is also available to double the size of the terminal. With the acquisition of USFS land located north of the proposed Terminal Building, provision can be made for major increases in the size of the automobile parking lot.

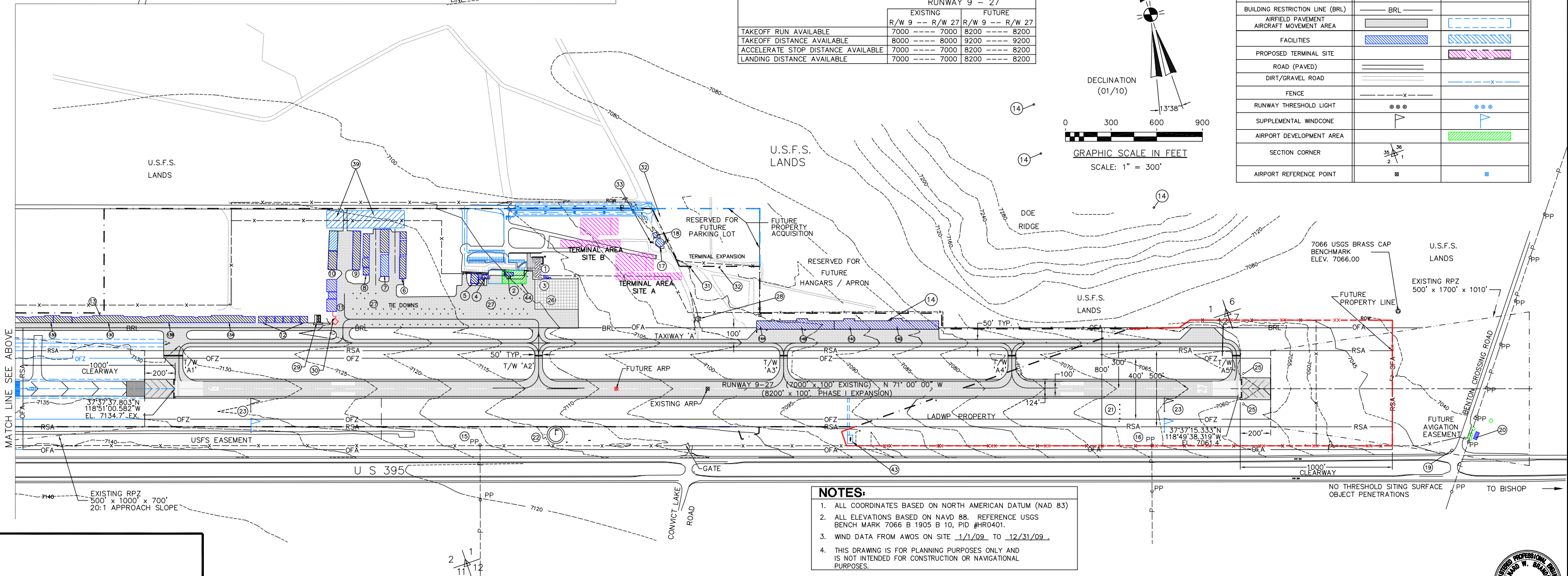


BUILDING INVENTORY					
No.	FACILITY	TOP ELEV.	No.	FACILITY	TOP ELEV.
1	EXISTING TEMPORARY TERMINAL BUILDING & BEACON	7144.4	18	WATER STORAGE PUMP HOUSE	7119.4
	FUTURE ADMINISTRATION BUILDING		19	EXISTING STREET LIGHT	7086.3
2	AIRPORT OFFICE	7122.2	20	EXISTING CHURCH STEEPLE	7074.8
3	ELECTRICAL & TELEPHONE VAULT	7120.3	21	P.A.P.I.	
4	EXISTING PILOTS LOUNGE	7121.9	22	WIND CONE AND SEGMENTED CIRCLE	
5	EXISTING FBO OFFICE	7125.8	23	SUPPLEMENTAL WIND CONES	
6	AIRCRAFT HANGARS A1 THRU A6	7138.9	24	DOE RIDGE OBSTRUCTION LIGHT	
7	AIRCRAFT HANGARS B1 THRU B6	7136.8	25	REIL	
8	AIRCRAFT HANGARS C1 THRU C6	7140.0	26	TERMINAL APRON	
9	AIRCRAFT HANGARS D1 THRU D5	7142.3	27	TIEDOWN APRON	
10	AIRCRAFT HANGARS E1 THRU E4	7141.6	28	AWOS TOWER	
11	AIRCRAFT HANGARS F1 THRU F4	7158.1	29	FUEL STORAGE TANKS	
12	AIRCRAFT HANGARS G1 THRU G6	7145.7	30	AV. GAS STORAGE. SELF SERVICE	
13	WEST EXECUTIVE HANGARS		31	WELL #99-1 GRND. ELEV. 7095.4'	
13A	HANGAR 3 THRU 6	7153.4	32	WELL #99-2 GRND. ELEV. 7094'	
13B	HANGAR 15 THRU 16	7154.4	33	AIRPORT WELL	
13C	HANGAR 25 THRU 28	7154.0	34	FUTURE TERMINAL BUILDING SITE	
13D	HANGAR 38 THRU 39	7153.8	35	FUTURE TERMINAL APRON	
13E	HANGAR 50 THRU 53	7153.7	36	FUTURE DEICING RAMP	
13F	HANGAR 62 THRU 65	7151.5	37	FUTURE AUTOMOBILE PARKING	
14	EAST CORPORATE HANGARS		38	FUTURE RENTAL CAR PARKING LOT	
14A	CORPORATE HANGAR 1	7134.9	39	FUTURE SEWAGE TREATMENT PLANT AND LEACHING FIELD	
14B	CORPORATE HANGAR 5	7131.1	40	FUTURE APRON & PARKING LOT STORM WATER LEACHING FIELD	
14C	CORPORATE HANGAR 10	7128.0	41	FUTURE ARFF / SNOW EQUIPMENT BUILDING	
14D	CORPORATE HANGAR 15	7123.2	42	FUTURE AIRCRAFT HANGARS	
15	EXISTING POWER POLE WITH OBSTRUCTION LIGHT	7157.0	43	FUTURE AWOS	
16	EXISTING TELEPHONE POLE WITH OBSTRUCTION LIGHT	7096.0	44	AVIATION DEVELOPMENT AREA (HANGARS & FBO BUILDINGS)	
17	WATER STORAGE TANK	7123.6			

DECLARED DISTANCES			
RUNWAY 9 - 27			
	EXISTING	FUTURE	
	R/W 9 -- R/W 27	R/W 9 -- R/W 27	R/W 9 -- R/W 27
TAKEOFF RUN AVAILABLE	7000 ---- 7000	8200 ----	8200
TAKEOFF DISTANCE AVAILABLE	8000 ---- 8000	9200 ----	9200
ACCELERATE STOP DISTANCE AVAILABLE	7000 ---- 7000	8200 ----	8200
LANDING DISTANCE AVAILABLE	7000 ---- 7000	8200 ----	8200



LEGEND	EXISTING	FUTURE (0-5 YRS)
GROUND CONTOUR	-----7070-----	
AIRPORT PROPERTY LINE	-----XX-----	-----XX-----
RUNWAY SAFETY AREA (RSA)	-----RSA-----	-----RSA-----
RUNWAY OBJECT FREE AREA (OFA)	-----OFA-----	-----OFA-----
RUNWAY OBJECT FREE ZONE (OFZ)	-----OFZ-----	-----OFZ-----
BUILDING RESTRICTION LINE (BRL)	-----BRL-----	
AIRFIELD PAVEMENT		
AIRCRAFT MOVEMENT AREA		
FACILITIES		
PROPOSED TERMINAL SITE		
ROAD (PAVED)		
DIRT/GRAVEL ROAD		
FENCE		
RUNWAY THRESHOLD LIGHT		
SUPPLEMENTAL WINDCONE		
AIRPORT DEVELOPMENT AREA		
SECTION CORNER		
AIRPORT REFERENCE POINT		



- NOTES:**
- ALL COORDINATES BASED ON NORTH AMERICAN DATUM (NAD 83)
 - ALL ELEVATIONS BASED ON NAVD 88. REFERENCE USGS BENCH MARK 7066 B 1905 B 10, PID #HR0401.
 - WIND DATA FROM AWOS ON SITE 1/1/09 TO 12/31/09.
 - THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION OR NAVIGATIONAL PURPOSES.

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APPROVED
AIRPORT MANAGER - WILLIAM B. MANNING

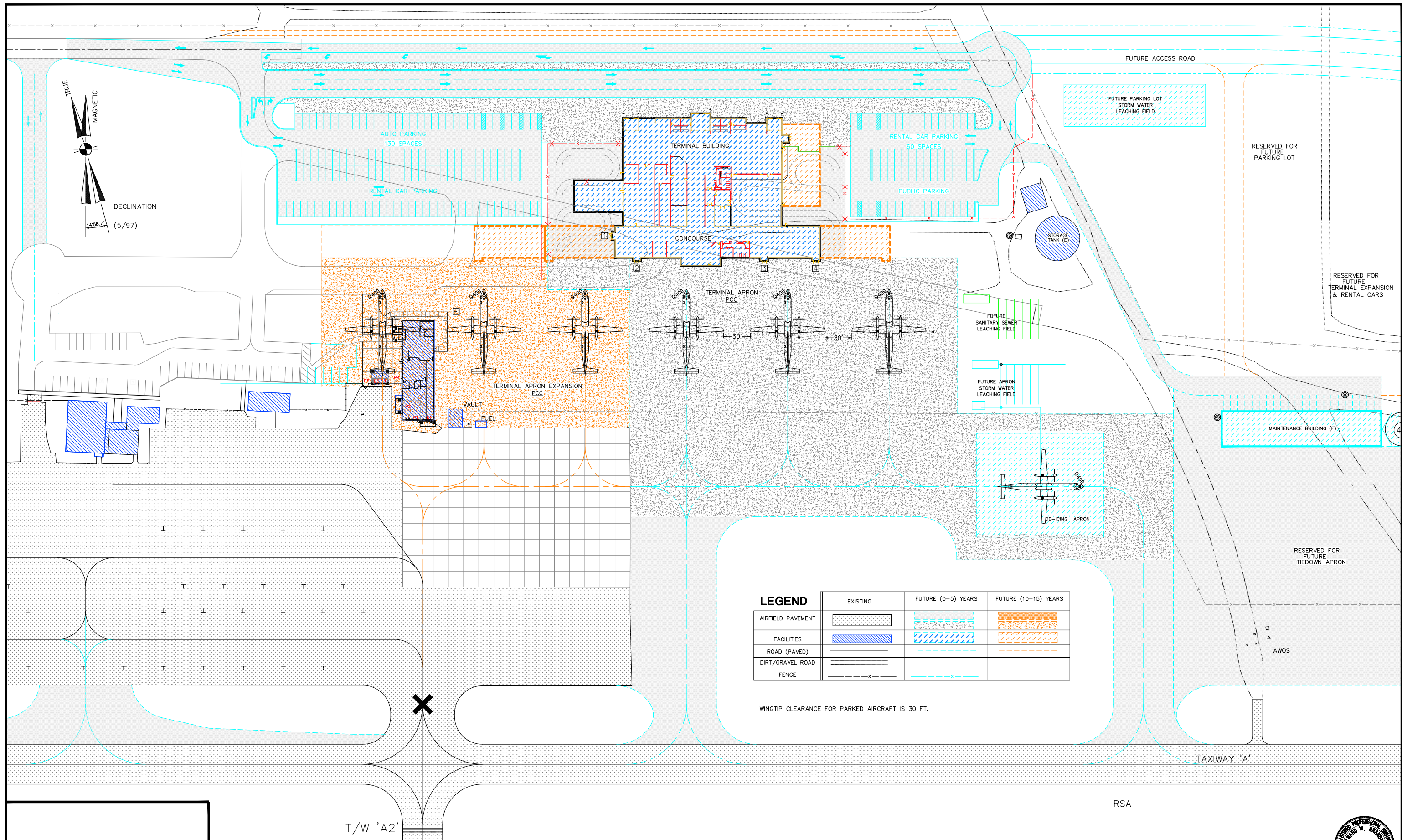
Reinard W. Brandley
CONSULTING AIRPORT ENGINEER

COUNTY OF MONO
STATE OF CALIFORNIA

MAMMOTH YOSEMITE AIRPORT
MAMMOTH LAKES, CALIFORNIA
TERMINAL SITE LOCATION PLAN

NO.	REVISIONS	BY	APR	DATE

DATE APRIL 18, 2017
SHEET NUMBER
PLATE No. 4-1



DATE

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APPROVED

AIRPORT MANAGER – WILLIAM B. MANNING

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CONSULTING AIRPORT ENGINEER

STATE OF CALIFORNIA

MAMMOTH YOSEMITE AIRPORT
MAMMOTH LAKES, CALIFORNIA

TERMINAL AREA SITE PLAN

NO.	REVISIONS	BY	APR	DATE

DATE APRIL 18, 2017

SHEET NUMBER

PLATE No. 4-2

CHAPTER 5. TERMINAL BUILDING

The terminal building studies and requirements were prepared by the Architectural firm of the Van Sant Group. The results of their studies are included in this chapter. Also included in this chapter is Table No. 5-1, which shows the probable architectural design and construction costs for the terminal building. Table No. 5-2 shows terminal facility requirements. Plate 5-1 shows the proposed terminal building floor plan. Plate 5-2 shows typical elevations of the proposed terminal building.

5-1 Terminal Building Requirements

The commercial passenger terminal at Mammoth Yosemite Airport represents a starting point for terminal planning. This minimum facility program is needed to support the current and anticipated levels of passenger activity. This program, in conjunction with specific terminal configurations, will need to be adjusted to accommodate actual building footprints. The gross terminal area derived herein may vary as a result of actual configuration. For example, the amount of secure and non-secure circulation may vary from the program due to the terminal configuration, whereas the amount of commercial space is relatively independent of the concepts. Certain configuration assumptions have been included and are discussed in the appropriate sections.

Based on the Peak Hour Passengers and Design Aircraft, the Terminal has been sized to meet the MMH required level of service, which includes the relative comfort, convenience and ease of use of the Terminal Building at Mammoth Yosemite Airport.

The current design aircraft is the Q400, which is operated by Alaska Airlines. This aircraft has 76 seats and a crew of 3. The total passenger and crew of 79, rounded to 80, will be used as peak hour passengers for this terminal design study.

In addition to the FAA guidelines for Terminal Building Facilities design (AC 150/5360-9), the terminal spaces need to meet the airline industry accepted standards, local and federal governing building codes for occupant load and life safety local fire code requirements.

The current building codes establish the Occupancy Classification for the type of use in the Terminal Building as A-3, Assembly use. In addition specific spaces within the terminal have different occupant loads that are related to life safety concerns and associated issues, such as emergency egress from the building in an emergency situation, based on the occupant load.

The minimum floor area allowable by the governing codes per occupant in Airport Terminals is the following:

<u>Space</u>	<u>SF per occupant</u>
Baggage Claim	20
Concourse	100
Waiting Areas	15

The Terminal Facility Requirements designed and listed in Table 5-2 reflect the utilization of the FAA AC, and governing building code requirements in conjunction with the peak hour passengers.

5-1.1 Aircraft Gates/Hold Rooms

The Airport will need to accommodate the ever-changing airline industry, and the differing aircraft serving markets such as Mammoth Yosemite Airport. The need to provide space that can meet the varying capacity requirements of different aircraft is paramount to the success of the terminal facility. The design aircraft for terminal planning of the new facility is the bombardier Q400, an Airport Reference Code (ARC) C III aircraft (approach speed 121-140 Knots, wing span 70' – 117"), which can accommodate 70 - 76 passengers. This aircraft will meet the needs of the terminal for maximum efficiency and utilization of the space.

Departure Lounges (Holdrooms) are based on the mix of aircraft and the average seating capacity of the ARC CIII aircraft. Hold room sizing for the Terminal Building was determined by the following in accordance with the International Building Code, 2015 Edition:

$$\begin{aligned} 80 \text{ passengers per Hold Room} \times 15 \text{ sf/occupant} &= 1,200 \text{ sf} \\ 1200 \text{ sf} \times 3 \text{ Hold Rooms} &= 3,600 \text{ sf} \end{aligned}$$

The egress area at the end of the circulation corridor for emergency exit for the occupants in the Concourse (shown on the plan as double doors and the number 1), is 314 square feet of the total and is shown in Table 5-2.

Based on the 80 passengers per hold room, it is anticipated that 60 seats will be provided for each of the three hold rooms. The airlines will be asked for their Airport Ticket Office (ATO), Hold Room and Baggage Claim requirements at the appropriate time throughout the process.

The initial enplaning holdrooms should provide for the accommodation of three aircraft at the terminal at the same time. This would require a minimum square footage of 3,600 square feet, (3,914 sf if the egress area at the end of the circulation corridor is included). The configuration should reflect this area.

5-1.2 Commercial Airline Space

Commercial airline space includes both exclusive leased areas (for example, offices, operations and miscellaneous support), and joint use space (such as baggage claim).

Commercial Airline Ticket Counter (ATO Counter) length is typically based on the number of enplaning passengers to be processed in a peak hour. It is therefore incumbent in the space program to provide ample space for the proposed two airlines, and expansion capability for future entrants to the market. This would provide two positions (5' wide each) for each airline, which includes two ticketing positions and a bag well in each 5-foot counter position. The depth for each position is approximately 8 feet to the back wall. This space will accommodate the location of TDS baggage screening equipment behind the ticket counters. A queue space of 10-foot minimum should be included in front of each ticket counter position.

Airline Offices include the ATO offices and other airline administrative spaces. The ATO offices are usually located directly behind or adjacent to the ATO counter and provide support to the ticket agents. These spaces are normally 25' deep along the length of the counter. In a commuter terminal airline operations support spaces are generally located in the same ATO space, and usually include parts storage, break room, and crew support.

Baggage Make-up includes either manual or automated make-up units, the cart container staging areas and maneuvering space for the carts. Normal cart make-up containers include a minimum of two containers and the tug. All space should be covered at a minimum and provide weather related protection, if possible. The space should be at close proximity to the ATO operations space to maximize utilization of airline personnel. All baggage related elements should include accommodations for ski equipment and over-sized elements.

Baggage Service Offices are typically required at major commercial hub operations, therefore are not included in the terminal. Airlines serving MMH will provide this service at their ticket counters.

Baggage Claim requirements are based on the peak demand of deplaning passengers and checked baggage per passenger ratios. The requirements of this facility will be accommodated with approximately 120 lineal feet of claim device. Two units should be adequate, with the capability to add an additional unit as the number of passengers increases. Ski equipment should include a separate slide area.

Baggage Claim sizing was determined by the following:

$$\begin{aligned}\text{Total passengers/aircraft} &= 80 \\ 80 \text{ passengers} \times 20 \text{ sf/person} &= 1600 \text{ sf}\end{aligned}$$

This represents 1,600 square feet of the area listed in Table 5-2. The baggage conveyors comprise 511 square feet, after the reduction of 105 square feet due to circulation space adjacent to the baggage claim area.

Baggage Claim Off-load Areas includes the lanes and maneuvering areas, which are required to accommodate the baggage train of two carts. Circulation area is also included in this area, like the baggage make-up area and should provide cover and minimum weather protection from the elements.

5-1.3 Concessions

Rental Car Counters provide an important service to the passengers and revenue to the Airport. Adequate space should be provided for all companies serving the terminal. These include counter space and office area. A common standard of 10 lineal feet of counter would be adequate, with ancillary office space of 75-80 square feet.

Ground Transportation Services also provide needed service to the terminal passengers. Adequate counter and office space should be included for their use. These areas can serve as extra space for charters, special events accommodation and other uses, if required.

Food and Beverage Services should accommodate a restaurant and should be located on the secure side of the terminal. Seating should be adequate for approximately 50 patrons. Kitchen space should be derived as a result of the desired menu service and include adequate storage space as well as delivery access from the non-secured side of the terminal roadway system.

News/Gifts/Lease Space category includes newsstands, gift, retail and specialty shops, business services and other miscellaneous services. There should be adequate locations on the secured side for these functions. A minimum area of 200-300 square feet should be provided, preferably adjacent to the food service to maximize the potential for cross-utilization of personnel.

Other Services consist of miscellaneous revenue producing areas, including automated teller machines, insurance and related customer services. Advertising should be included as an area and location specific space. Freestanding and those utilizing walls are desirable. Telephones should be included on both the secure and non-secure sides of the facility.

Concession Support consists of storage areas, preparation areas, employee lockers, loading and delivery areas, and administrative offices. Most support

spaces should be integrated into the back of the office area adjacent to the customer serving spaces, rather than in remote locations.

5-1.4 Public Spaces

Public spaces, include most of the non-revenue producing areas of the terminal including queuing areas, seating and waiting area, and circulation corridors. Some of the areas are functions of passenger volumes, whereas others are functions of specific facility requirements.

Ticket Lobby includes ticket queuing area, cross circulation, entrance vestibules and general circulation at the main entrance to the building. The minimum distance from the face of the ticket counter to any obstruction should be 40'- 45' for a terminal of the required size. This includes queuing depth of 20'- 25' and the remainder in cross circulation.

Public Seating areas include general (non-secure) waiting areas near the ticket lobby, baggage claim areas and concessions. Programmed square footage should include seating for approximately 15% of the peak hour passengers, in these areas. This represents approximately 40 seats and 600 square feet.

Rental Car Counter Queuing should be 10' deep in area facing the counters. Additional area should accommodate cross-circulation adjacent to the queuing space.

Restrooms should have an adequate number of fixtures to accommodate the peak hour passengers utilizing the facility. Restrooms will be required on both the non-secure and secure side areas of the terminal. The number of fixtures should be designed to meet the local codes and ordinances. The American with Disabilities Act (ADA) requires that restroom facilities be provided.

Secure Circulation will accommodate the processing of passengers through the TSA Security Checkpoint. The present terminal provides one lane of security, however it would be wise to provide room for two lanes in the new facility initially, and expansion for an additional lane, to accommodate expansion. Exit corridor from the holdrooms for deplaning passengers should be 16' wide, and prohibit wrong way access from the non-secure side.

Based on the peak hour Passengers, the Security Screening Checkpoint was derived in conjunction with TSA input and includes two lanes for passenger screening baggage and the long neck wand station for secondary screening. Queuing space, document checking, private screening and post screening seating area are included.

The future of screening is very dynamic and rapidly changing and TSA recommends as much flexibility and potential expansion as possible. The initial design includes:

Queuing	412 SF
Screening area	1,168 SF
Post Screening	264 SF
Secure Circulation	450 SF

Other Public Circulation includes all corridors and architectural spaces that tie the functional elements of the terminal together. The terminal configuration will accommodate the inclusion of necessary additional space based on the layout.

5-1.5 Other Areas

An Information Counter, including skier information, should be located near the main entrance(s).

Mechanical/Electrical/Utility areas should be provided throughout the facility, as required and should comprise approximately 8-10 % of the terminal gross area. All systems, mechanical, electrical, plumbing and communication should be designed for expansion.

Janitorial/Storage areas should be included in the facility and located adjacent to mechanical/electrical areas, and be supplemented with additional spaces outside the main terminal area.

Airport Administration/Operations is presently located in another building and is assumed to be similar in size to existing administration space in the present location. This will probably be located on the second floor of the new terminal.

5-1.6 Expansion

It is important to note the environmental documentation anticipated as the next step in implementation of the ten year Airport Capital Improvement Program will be based on projects included in the approved ALP. While it is certainly prudent to consider the possibility of future expansion so as to not preclude the possibility without undue hardship, those projects proposed are to be designed solely for the ten-year projection. No significant design is to be included toward the possibility of future expansion. Only consideration of that possibility may be included.

The new terminal building should be designed to meet the program needs of the Airport for at least ten years after it is opened, and also provide the opportunity to be expanded, should the market dictate. The fluid nature of the commercial airline industry and the need to respond to the inherent changes it creates require the Airport to be responsive to the market potential of the terminal. The new facility should be able to be expanded with minimal interruption to the existing operations of the terminal. Critical areas of the building, which may require expansion should be located away from critical built-in program areas. Sensitivity to the placement of expandable areas should be a major criterion of the actual layout.

5-2 **Design Narrative**

5-2.1 Architectural Design

The architectural plan and space design layout of the New Terminal Building reflects the clear concise symmetry of the linear terminal configuration. The layout of the Landside functions of Ticketing and Bag Claim allow the building users to experience each function separate from the other, thereby permitting a smaller scale building use for both enplaning and deplaning passengers.

The center spine of the building is the Security Checkpoint and deplaning passenger exit way, which connect the landside and airside functions, for the passengers. This central connection is expressed in the aesthetic design of the building as the Main Entry Façade element. The expression includes a gable element, with large expanse of glass, which illuminates the entryway. In addition, the façade includes vertical polished black granite, with stained wood columns, accenting the entry on both sides. The entryways to Bag Claim and Ticketing, are also emphasized in the façade, in a slightly smaller fashion. In addition to the stone and wood columns, the façade has a native stone base, with stucco above, and accent panels of stained horizontal wood siding, further recalling the horizontal expression of the building design. Windows are provided at all appropriate locations to accent the views from all sides of the building. Interior finishes include colors and finishes similar to the exterior palette, and utilize maintenance free materials, where appropriate. The overall palette presents warm colors, in various materials and finishes.

The overall aesthetic expression is one of a horizontal expression, which reflects the site, and presents a building, which is less than 35 feet in height, at the highest point. The overall horizontal expression in both form and proportion reflects this harmony with the site.

The fenestration of the linear concourse, which comprises the Holdrooms, repeats the same use of materials, and also continues the horizontal expression of the building. The function associated with the Food Service/Lounge areas is emphasized with a gable roof element, similar to the landside main entry, with stone and wood accents, highlighted with vaulted glass. This element further dramatizes the expansive view of the Mammoth mountain range, and will be a featured area for passengers.

The entire building design and layout will not preclude future expansion of all major areas of the building, as the need arises, with minimal interruption to the operations. In that regard, the building core, including restrooms, mechanical, electrical have been designed so as to not preclude possible expansion of holdroom and lobby spaces. This will be invaluable as the need arises to expand the building, when increases in air service warrant additional space, and allow for that to occur, without interruption. Also, TSA checkpoint and associated office space is expandable without interruption of any adjoining spaces. The need to

provide expansion space for the security checkpoint is important at all increasing service terminals, as the need to process the passengers remains very fluid, with new machinery and protocols changing constantly.

The materials and colors utilized afford low maintenance and express the simplicity and detail necessary to convey a positive public image of the building to the users and an overall pride for the residents in the Mammoth Lakes region.

5-2.2 Structural Design

The selected structural system will be designed to utilize the most economical, durable and functional type of construction and compliment the architectural design. Structural steel frame with wood sub framing will probably be utilized. The exposed columns at the facades will be heavy timber members, with appropriate anchors. Primary consideration will be given to the bay spacing (spans) and the bearing properties of the supporting soil strata to efficiently size the structural system members. Where required, structural design will not preclude future expansion.

All lateral forces on the structure, such as seismic and wind forces, will be analyzed in accordance with local governing building codes. It is important to note that Mammoth is an active seismic and volcanic area, and structural design will accommodate these forces. Lateral bracing, where required, will be integrated into the design, to compliment the aesthetic. Moment frames will also be studied in future phases of the design, to provide lateral stability.

The roof trusses will be designed to reflect the desired open effect, and will be scissor type. They will reflect the desired spacing and have minimal impact on the space utilization of the building.

The construction of the exterior walls will be designed for maximum economy and ease of construction, and match the aesthetic value. Wood framing for the walls will be utilized, where possible, with concrete masonry used to ease maintenance and where desired to reduce wear.

Foundations will be designed to reflect the existing soils, and be based on recommendations made during subsurface soils investigations and laboratory testing, which will be done in future phases. Preliminary discussions indicate that either spread footings on compacted sub-fill or drilled piers will be the two preferred alternatives for the foundation system

5-2.3 Utilities Design

Utilities Design required for the Building will be designed by the Building Engineers in conjunction with the Site Utilities design for the New Terminal Site. Building load data will be derived in future phases of design, and given to Site Engineer for inclusion in master site utility design. A defined utility corridor, established away

from possible future expansion(s), will be the point where the Building design engineers will bring the various utilities into the building. It is desirable to have the utility corridor completely encompass the terminal site; to accommodate the double feed of desired utilities. The Airport Engineer will obtain water for the building, from on-site wells, located east of the terminal site, adequately sized to provide the required domestic and fire protection pressure of the facility. Also, the sewer system will be accommodated by the Airport, with the construction of a new on-site package sewage disposal plant, to serve the needs of the terminal, other airport facilities and the fixed base operators' commercial development. The package plant would treat the sewage, with effluent disposed of by underground leach lines.

5-2.4 Building Systems

Electrical Design – The building should be fed underground with power from a nearby substation. The preferred enclosure would be an underground vault, with conduit encased in concrete, within 600 to 1,000 feet apart. From there, loop feeds to pad mounted transformers, near the building, would be utilized, for secondary service. There will be at least two transformers; one each for the main terminal and concourse, with power supplied of 277/480V, three-phase, four-wire from the main supply to the building. Final total load will be determined in the next design phase and submitted to the providing utility (Southern California Edison). Transformers will be located on concrete pads, and secured from the public. The building will provide a secure (non-public) electric room for step down panels and other appropriate distribution to all areas within the facility. The room should be designed for expansion of service needs, which may arise. A provision for emergency power for critical components of the building would be desirable.

The airlines will require 400 Hz power at each gate for aircraft service needs, and need to have tenant panels for their own power needs, associated with their operations.

Lighting for the building will be provided based on NEC standards, and include the use of energy-efficient fixtures throughout the facility. Light levels will meet the required foot-candles for the areas and their associated tasks. Public area light fixtures will be designed to compliment the aesthetic values of the spaces. It is essential to limit the replacement lamps, wherever possible, to assist in the replacement of bulbs, while still meeting the required light levels. Lighting for the apron area will be included in the site work, designed by the Airfield Engineer.

Mechanical Design – The primary energy source for the heating of the building will be propane gas. Cooling energy will be provided by electricity. Mechanical equipment will be included in the central mechanical room, including the major air handling units and central control system. All distribution will include concealed ductwork, with multiple zones throughout the facility. Energy conserving variable air volume systems with independent perimeter heating will be

used where architectural and functional conditions permit. Supplementary mechanical units will be used where necessary.

All equipment will include the state-of-the-art filtration to assist in the removal of dust and odors generated by the high occupancy rate of the building. In addition, fresh air will be obtained away from the airfield side, so as not to include the fumes associated with the airside. The desired effect of an energy conserving and pollution-free air circulation system is paramount in the design.

A control system with full energy management and preventative maintenance capabilities will be included in the main mechanical room. This computer-based system will allow for monitoring the system in remote areas, for load analysis and optimum utilization of the heating and cooling systems.

Plumbing Design – A conventional soil/waste and vent system will be designed to serve the needs of all plumbing fixtures throughout the facility. All public toilet room fixtures will be provided with automatic infrared sensors for control and use.

Domestic water supply to all concessionaires will be sub-metered to control and monitor usage. Tempered water supply to public lavatories will be provided at 95 degrees F. The main distribution system will be recirculated to minimize temperature loss. A central hot water heater (gas) for each of the two restroom cores (terminal and concourse) will supply the required hot water for each. The system will include shutoff capabilities to groups of fixtures to prevent water supply interruptions to public toilet rooms and concessionaires, for ease of maintenance. Where advantageous, individual hot water heaters of the electric instantaneous type may be utilized for remote locations.

Tenants requiring hot water will be required to provide their own domestic hot water heating equipment.

All tenants utilizing water and gas can be separately sub-metered. Fixtures throughout the building will be low water usage type, with lavatories of the timed, regulated-flow type.

Backflow preventers will be installed on all service and fire lines entering the building. Metering of all domestic service lines will be required. All sewer and waste shall conform to those standards in place at the Airport, and in conformance with the Town of Mammoth Lakes.

Fire Protection – A fire alarm and detection system will be provided, including all detectors and manual pull stations. The individual specific requirements of respective areas, in conjunction with local governing codes, will determine the location of sprinkler flow alarms and valve monitoring. Alarm systems will be directly transmitted to the local fire department, in addition to the local fire annunciator panel.

The fire protection will consist of wet- and dry-pipe, automatic closed head sprinkler systems, for all required areas. Sprinkler systems will be hydraulically designed with maximum square feet of sprinkler area as required by codes. Automatic sprinkler risers will include a fire alarm flow switch.

Communications – All communication systems required for terminals will be included in the Project. Telephone service for the building users and tenants will be included, with the main service panel located in the electric/communication room on the secured side of the building. Private lines will be provided for the airlines and other tenants. Public phones will be provided in the main terminal and concourse, including ADA required volume control, text-type, and assertive listening telephones. Telephone service will be brought into the terminal from the closest available source.

A wireless local area network (wlan) will be provided throughout the terminal, with protection services available for users. The individual tenants will be responsible for their own wi-fi.

A public address system, utilizing the telephone system, with secure controlled access for all parties, will be provided. Speakers for the system will be included in the building and located strategically throughout the facility. In addition, a joint use flight information display system (FIDS) will be provided at strategic locations.

The flight information provided will include arrivals and departures for all carriers at Mammoth Yosemite Airport.

A security monitoring camera system, implemented by the Airport, will provide monitoring of gate holdrooms, bag claim, access points, security, and other secured areas of the terminal and other site related areas. Monitors for the system will be located in the Airport Administration security offices. The system will also be expandable.

5-2.5 Estimate of Probable Design and Construction Costs

An estimate of the costs of design and construction of the proposed terminal building initial development, and long-range development has been prepared and is included in Table No. 5-1. All costs shown are based on 2017 prices and must be adjusted for inflation.

TABLE NO. 5-1

**MAMMOTH YOSEMITE AIRPORT
ESTIMATE OF PROBABLE DESIGN AND CONSTRUCTION COSTS
TERMINAL BUILDING**

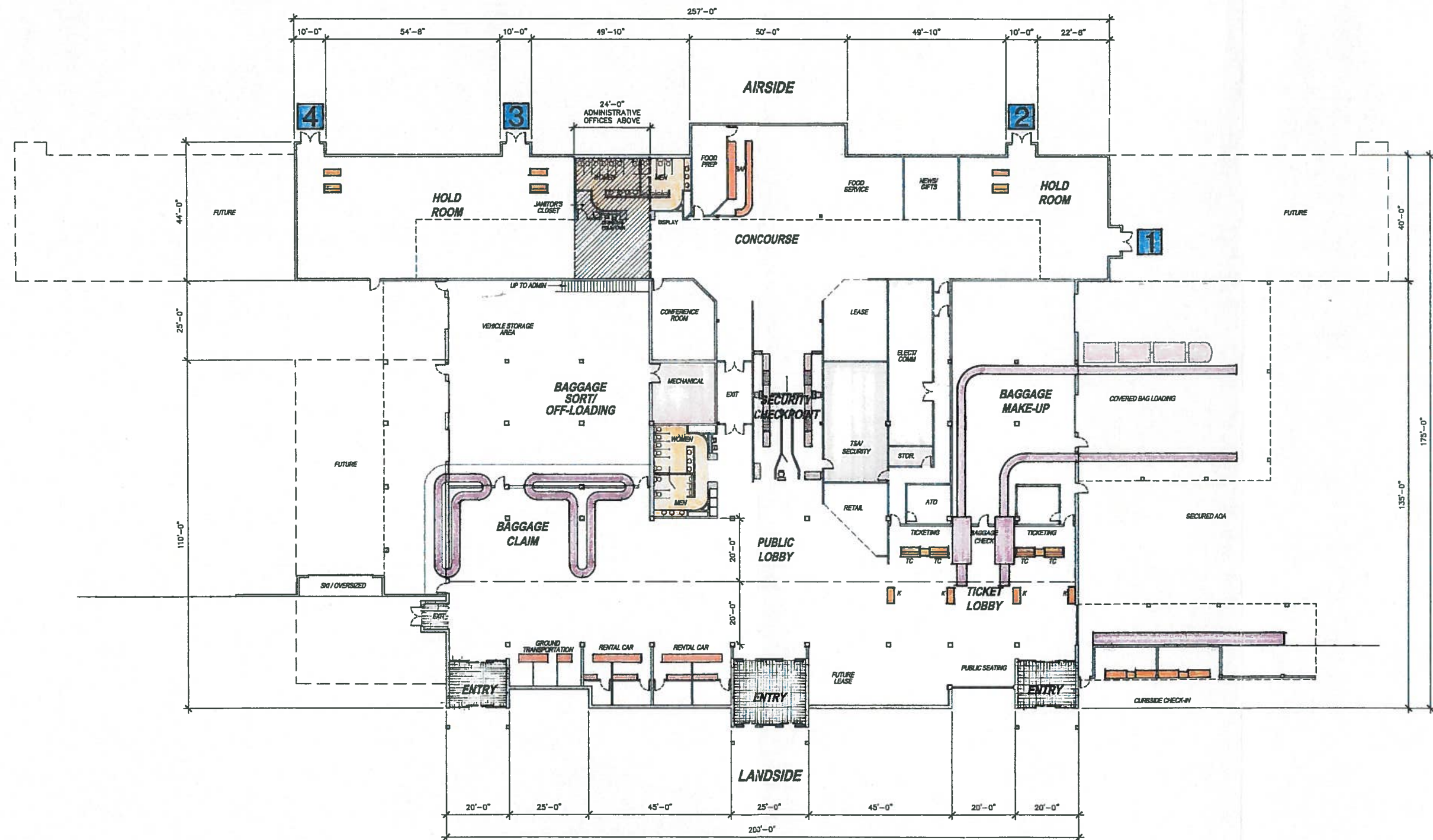
A. INITIAL DEVELOPMENT (within 5 years)		
1.	Design New Terminal Building	\$1,750,000
2.	Construct New Terminal Building	\$17,525,000
3.	Design Terminal Apron & Related Infrastructure	\$1,120,000
4.	Airline Terminal Apron & Related Infrastructure	\$13,114,000
B. LONG-RANGE PLANNING (approximately 11-20 years)		
1.	Design Expanded Terminal	\$514,685
2.	Construct Expanded Terminal	\$4,117,500

Note: For long-range planning (10 to 20 years) it may be necessary to expand the terminal area apron, terminal access road, and automobile parking somewhat. Because of the type service forecast for this airport it is not possible at this time to forecast if, when, or how much expansion may be necessary. It is anticipated that the required expansion of these facilities will be minimal. No estimated cost for long-range development has been included in this table.

TABLE NO. 5-2

**MAMMOTH YOSEMITE AIRPORT
TERMINAL BUILDING REQUIREMENTS**

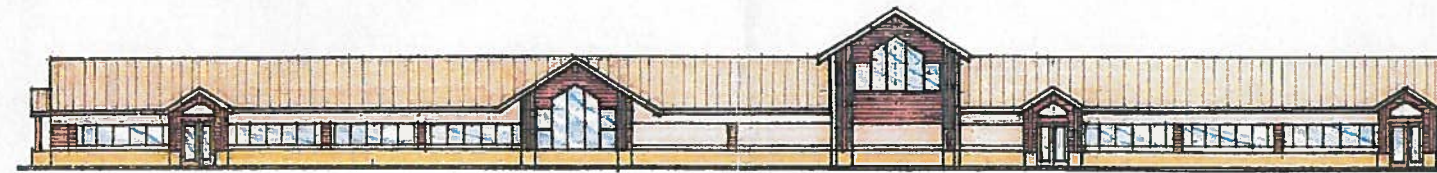
		EXISTING TERMINAL 2016	NEW TERMINAL 2021	NEW TERMINAL 2026
Year		2016	2021	2026
Enplanements		22,253	23,618	24,581
Peak Hour Passengers		163	171	204
Lease Space				
Airlines				
	Holdrooms	940	3,600	3,600
	Emergency Exit Concourse		314	314
	Ticket Counter	18 LF	30 LF	30 LF
	Ticket Kiosk		20 LF	20 LF
	Ticket Counter Area	420	872	872
	ATO	120	332	332
	Baggage Make-up	285	3,185	3,185
	Curbside Baggage		1,563	1,563
	Baggage Sort/Off-Loading		3,874	3,874
	Baggage Claim	120	1,600	1,600
	Baggage Conveyors		511	511
	Ski/Oversized Baggage		182	182
	SUB-TOTAL	1,885	16,033	16,033
Car Rental				
	Lease Space	150	1,202	1,202
	Counter Length	25 LF		
	Front		34 LF	34 LF
	Back		27 LF	27 LF
Restaurant			1,822	1,822
Retail		22	324	324
Vending			23	23
News/Gifts			340	340
Lease/Display			315	315
	SUB-TOTAL	172	4,026	4,026
Gates		1	3	3
Public Space				
	Ticket Lobby	504	1,360	1,360
	Public Seating Areas		600	600
	Restrooms - Non Secure	285	429	429
	Restrooms - Secure	76	539	539
	Security Checkpoint	835	2,294	2,294
	Circulation	1,215	11,112	11,112
	SUB-TOTAL	2,915	16,334	16,334
Other Areas				
	Ground Transportation		344	344
	Airport Administration		897	897
	Multi-purpose/Support (Conf.)		473	473
Support				
	Mechanical/Elec/Utility	24	1,098	1,098
	Support/Storage	64	83	83
	SUB-TOTAL	88	2,895	2,895
Total Terminal Area (SF)		5,060	39,288	39,288



TERMINAL BUILDING – FLOOR PLAN

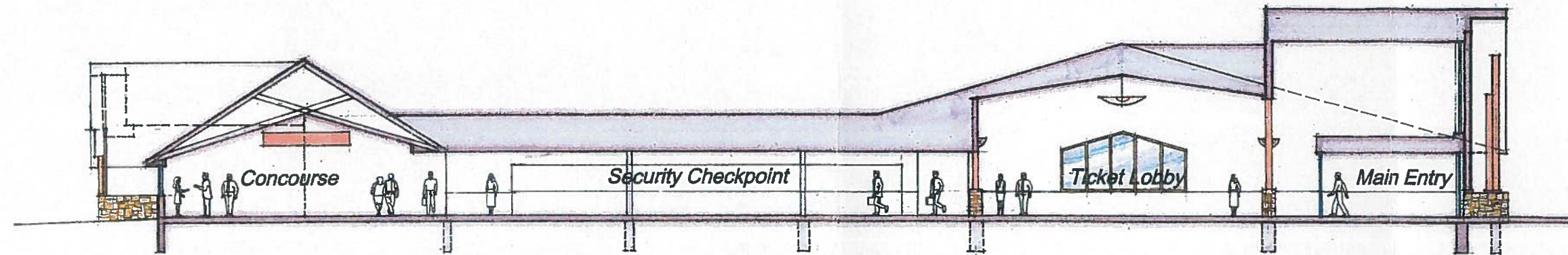
MAMMOTH YOSEMITE AIRPORT
MAMMOTH, CALIFORNIA

 PLAN NORTH		Van Sant Group
	SCALE: 1/16" = 1'-0" FULL SHEET 24" x 36"	



AIRSIDE ELEVATION
(South)

Scale 1/16" = 1'-0"



Building Section



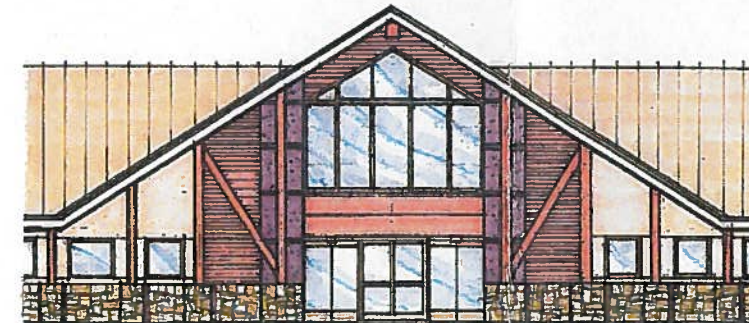
Concourse Food Service



Hold Room Entrance



Ticket Lobby/ Bag Claim Entry



Main Entry

Scale: 1/8" = 1'-0"



EAST ELEVATION

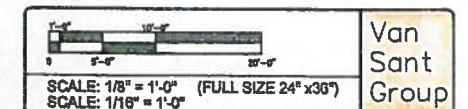


LANDSIDE ELEVATION
(North)

Scale: 1/16" = 1'-0"

TERMINAL BUILDING – ELEVATIONS

MAMMOTH YOSEMITE AIRPORT
MAMMOTH, CALIFORNIA



CHAPTER 6. TERMINAL SUPPORT FACILITIES – CIVIL WORKS

The terminal support facilities include all areas and facilities required to support the airline operations and passengers. These facilities include aircraft parking aprons, deicing facilities, access roads, automobile parking areas, maintenance facilities, utilities, and other facilities required to provide a complete and functional commercial terminal facility. These facilities are civil engineering design features commonly known as Civil Works and are shown on Plates 6-1 and 6-2.

6-1 Terminal Apron

The commercial terminal building has three main gate positions. The proposed apron will be capable of accommodating three Q400 aircraft or three CRJ700 aircraft in a taxi-in/taxi-out type operation. This should adequately serve the proposed commercial services for the first 10 years after opening of the terminal. The terminal apron will be 20,444 square yards and will be a rigid pavement design using a 16-inch Portland cement concrete surfacing material. Space should be reserved to enlarge the concourse and apron so as not to preclude accommodation of a total of six Q400 aircraft positions.

The existing grades require that the terminal apron drain toward the terminal building. A continuous grated slot drain will be installed at the north edge of the apron and immediately behind the aircraft parking position to accommodate all drainage from the apron and terminal. The preliminary grading and drainage plan has been prepared and is included in Plate 6-1. The terminal apron at the north edge will slope from west to east at 1 percent grade to accommodate the drainage and minimize embankments. This will require that the adjoining concourse on the terminal have level areas for the hold rooms and shallow ramps between the hold room areas to accommodate the change in grade.

Apron lighting will be provided by floodlights located along the north edge of the apron.

6-2 Deicing Apron

The majority of the commercial aircraft forecast to use Mammoth Yosemite Airport will operate during the winter months, and in the winter many of these aircraft require deicing immediately prior to takeoff. From an environmental and operational standpoint it is not appropriate to deice the aircraft in their parking positions at the gates. A separate deicing apron is proposed adjacent to the apron.

This deicing apron will also serve the business jets that frequent the airport in the winter.

The deicing apron will also be constructed of a rigid pavement section with a 16-inch Portland cement concrete slab. It will be graded to a central drain in the middle of the apron. Storm water and/or deicing fluid from this apron will be picked up in the central drop inlet and carried by pipe to an area immediately southeast of the deicing apron where a holding tank will be installed to hold the deicing fluid that washes off the aircraft until it can be pumped out and transported to a suitable disposal area. The pipe discharge from the drop inlet in the center of the deicing pad will have a dual discharge controlled by valves. One discharge will be into the deicing fluid holding tank and a second will be in a storm water leaching field in the same area as the holding tank. The valves will be controlled so that at all times when deicing operations are taking place the valve to the storm water leaching field will be closed and the valve to the holding tank will be open. During storms, only when deicing is not occurring, the valve to the holding tank will be closed and the valve to the storm water leaching field will be open.

6-3 Connecting Taxiways

Two connecting taxiways, 230 and 280 feet long, will connect the new aircraft parking apron and deicing apron to Taxiway A. These taxiways will be flexible pavement sections using asphalt concrete for the surfacing.

6-4 Automobile Parking

There is enough space on the existing airport property adjacent to the terminal for two automobile parking areas. The parking area to the west of the terminal will be used for rental car company vehicles and will accommodate 130 automobiles. The parking lot to the east of the terminal will be used by commercial passengers and other visitors and there is space for 60 parked automobiles. Additional existing parking lots can also be used for rental cars. If it becomes necessary to expand the rental car and/or the visitor parking facilities, provision has been made in the Airport Layout Plan for this supplemental parking facility to be located in front of the terminal across the access road on U.S. Forest Service land. Security lighting will be provided for each parking lot.

6-5 Access Road and Service Roads

An access road will be constructed as an extension to Airport Road. This road will have a cul-de-sac at the east end of the east automobile parking lot as shown on Plate 6-1. There will be a 20-foot concrete sidewalk in front of the terminal building, then a 9-foot space for parallel automobile parking used for loading and unloading, two 12-foot eastbound travel lanes, a 10-foot concrete island and two 12-foot westbound travel lanes.

During the design and construction of the access road to the terminal building, care should be taken not to preclude the potential of providing a secondary access road in the future.

An asphalt-paved access road, service area, and automobile parking will also be constructed to the proposed new maintenance building to be located immediately east of the deicing apron.

6-6 Maintenance Building

The Airport currently has need of a new maintenance building to store and maintain snow plows, snow blowers, and other maintenance gear since the maintenance building they original had was converted to the temporary terminal facility. It is proposed to construct a 10,000-square foot maintenance building to the east of the deicing facility. Automobile parking will be provided in front of the building to the north and a paved operations area will be provided to the south of the building.

6-7 Utilities

Utilities within the terminal building and for a distance of 10 feet outside the building are included in the terminal building plan. Utilities serving the building and other facilities on the airport are included in the civil engineering design section of the project and consist of:

- Sewer
- Water
- Electrical
- Telephone

These utilities of the size and type required for the existing and potentially expanded terminal building will be installed both in front of the terminal building and on the airside portion of the concourse.

There is no natural gas available. Propane will be provided for each facility developed at the airport.

A preliminary Utility Plan showing the location and routing of the proposed utilities in the terminal area is presented in Plate 6-2.

6-7.1 Electricity

Electricity is provided to the airport by Southern California Edison from a primary power line located to the south of U.S. Highway 395 and is carried to the existing airport electrical vault building for distribution to the airport users. It will, no doubt, be necessary to enlarge the service to the electrical vault building or directly to the commercial terminal facility, which can be readily handled by

Southern California Edison. Power cables will be carried from the vault to the terminal building by underground duct.

6-7.2 Telephone

Telephone service is provided by Verizon or Voice Over Internet by a variety of carriers via the airports connection to the local broad band network. Both networks terminate in the existing electrical vault building. A significant capacity is available, to be added as needed. Service to the terminal building will be provided from the electrical vault.

6-7.3 Gas

There are no gas lines in the area of the airport and all facilities that require gas are served by propane from local suppliers. The terminal facilities can also be served by propane as necessary.

6-7.4 Water

Potable water is obtained from wells on the airport. There are two wells and a 450,000 gallon storage tank located immediately east of the terminal facilities. An emergency generator is available at the pump house to provide power for the pumps in an emergency. There is adequate water supply to accommodate both domestic and fire use for the new terminal facilities.

6-7.5 Sewer

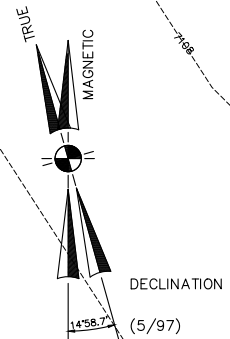
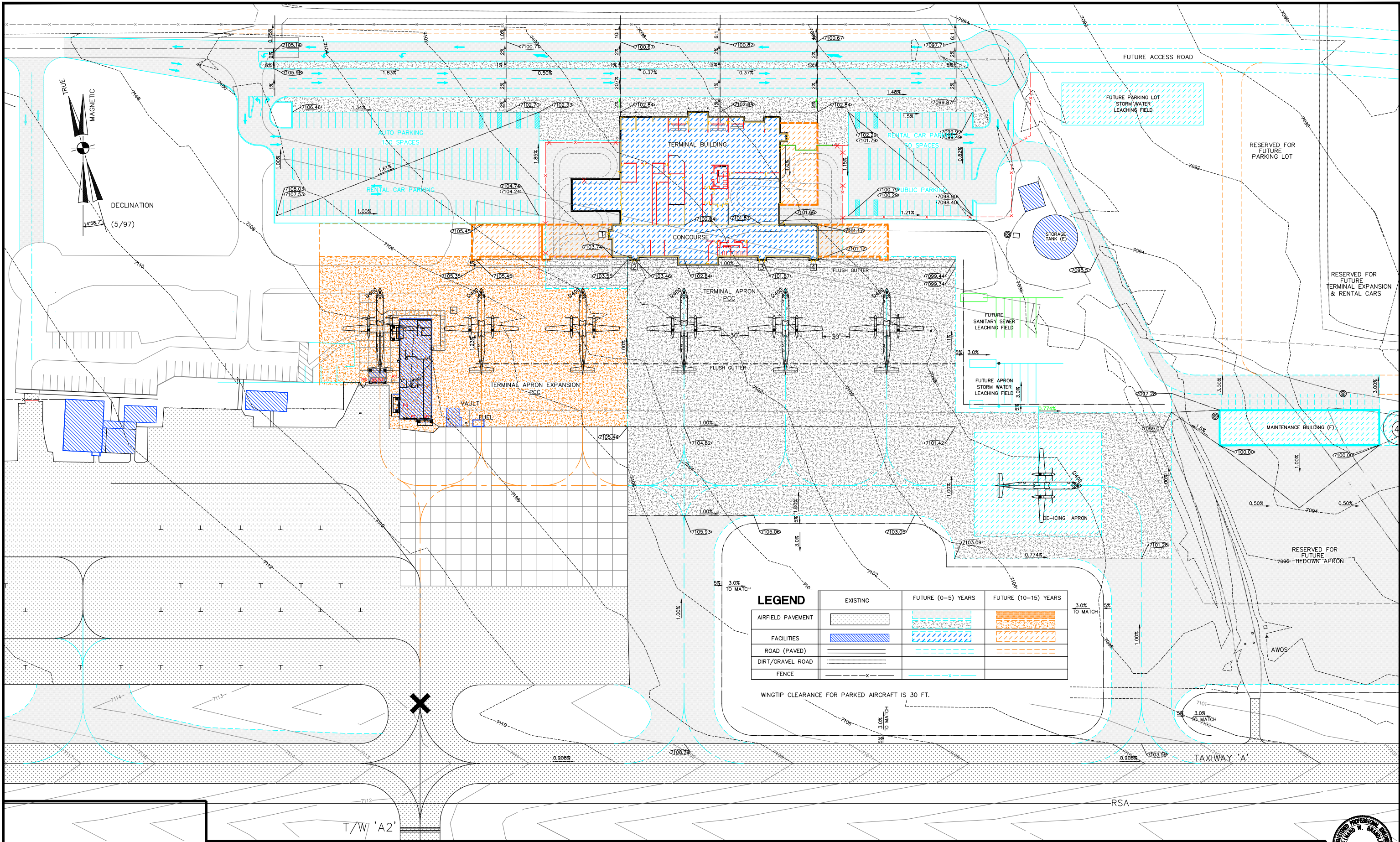
The soils at Mammoth Yosemite Airport are very porous clean sand and gravel soils with some small cobbles embedded. The ground water table is deep and these soils provide good leaching characteristics. Currently all facilities at the airport are served by septic tanks and underground leaching fields. With the development of the new terminal facility and the potential development of additional commercial facilities on the airport, it is proposed to construct a package sewage treatment plant and to discharge the effluent from this plant into an underground leaching field adjacent to the plant. The plant will be located west of the commercial apron. New sewer lines will be installed to carry the sewage from the new terminal facility and existing facilities on the airport to this new package plant.

6-8 Security

Security will be provided in the terminal building as necessary, including alarmed doors and security cameras. In the new terminal area the security fencing will be installed and/or relocated such as to separate the airport operations area from the non-secure civilian use area. The existing barbed wire fence around the entire airport will be replaced with a new 8-foot chain link fence with coded gates as

required. There will be security cameras at all entrance gates and at critical points on the aircraft parking apron.

The commercial apron, automobile parking lots, and access roads will be lighted with floodlights that will be provided with cut-off features such that full light is available on the apron and parking lots but the light is not visible from the runway, Highway 395, or other surrounding areas.



LEGEND			
	EXISTING	FUTURE (0-5) YEARS	FUTURE (10-15) YEARS
AIRFIELD PAVEMENT	[Pattern]	[Pattern]	[Pattern]
FACILITIES	[Pattern]	[Pattern]	[Pattern]
ROAD (PAVED)	[Pattern]	[Pattern]	[Pattern]
DIRT/GRAVEL ROAD	[Pattern]	[Pattern]	[Pattern]
FENCE	[Pattern]	[Pattern]	[Pattern]

WINGTIP CLEARANCE FOR PARKED AIRCRAFT IS 30 FT.

FAA DISCLAIMER

THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS PLAN BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

APPROVED
AIRPORT MANAGER - WILLIAM B. MANNING

Reinard W. Brandley
CONSULTING AIRPORT ENGINEER

6125 King Road, Suite 201 • Loomis, California 95650 • (916) 652-4725

STATE OF CALIFORNIA

MAMMOTH YOSEMITE AIRPORT

MAMMOTH LAKES, CALIFORNIA

TERMINAL AREA GRADING AND DRAINAGE PLAN

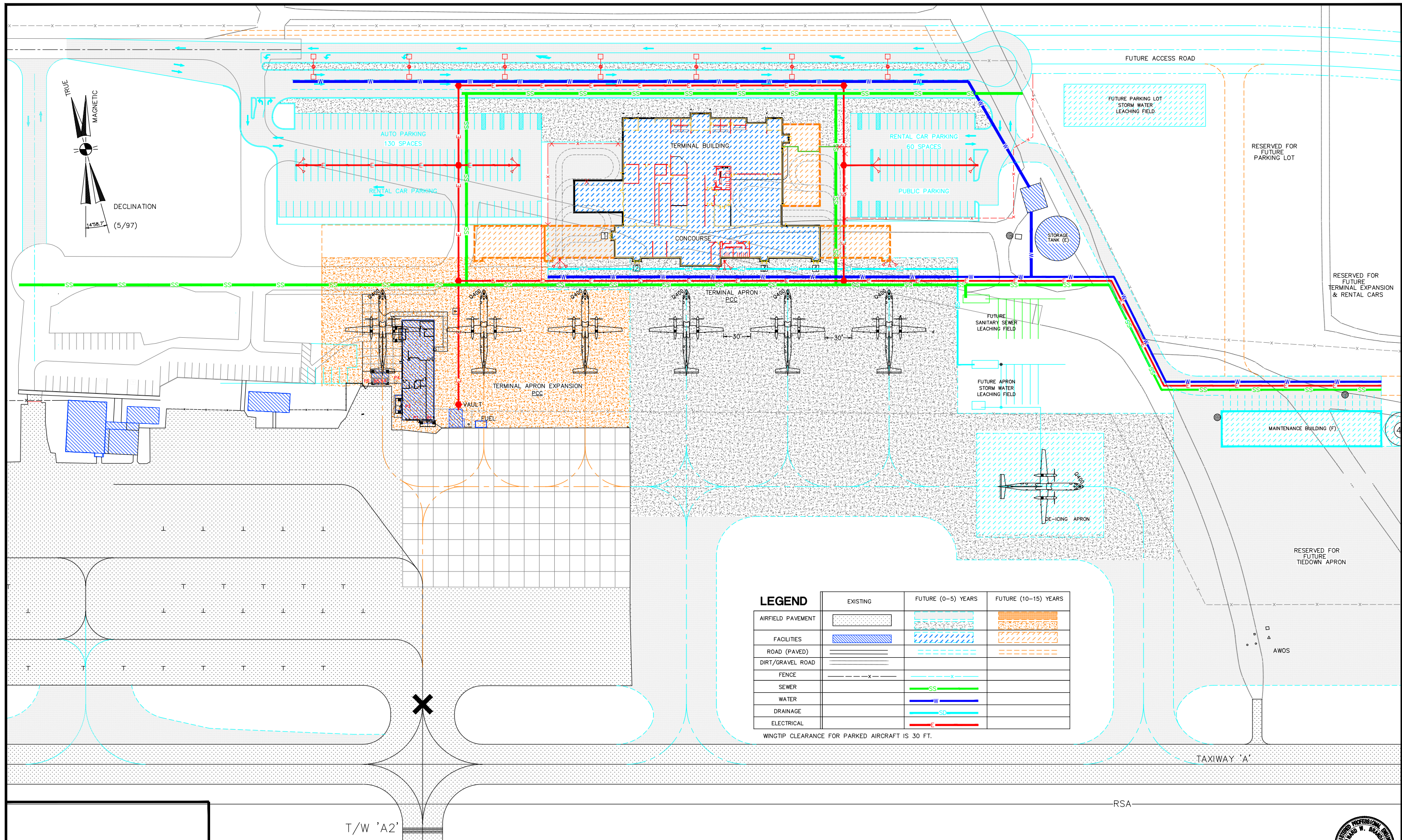
NO.	REVISIONS	BY	APR	DATE

REGISTERED PROFESSIONAL ENGINEER
No. C 8044
Exp. 12-31-2018
CIVIL
STATE OF CALIFORNIA

DATE APRIL 18, 2017

SHEET NUMBER

PLATE No. 6-1



LEGEND

	EXISTING	FUTURE (0-5) YEARS	FUTURE (10-15) YEARS
AIRFIELD PAVEMENT			
FACILITIES			
ROAD (PAVED)			
DIRT/GRAVEL ROAD			
FENCE			
SEWER			
WATER			
DRAINAGE			
ELECTRICAL			

WINGTIP CLEARANCE FOR PARKED AIRCRAFT IS 30 FT.

FAA DISCLAIMER

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APPROVED
AIRPORT MANAGER - WILLIAM B. MANNING

Reinard W. Brandley
CONSULTING AIRPORT ENGINEER

6125 King Road, Suite 201 • Loomis, California 95650 • (916) 652-4725

MAMMOTH YOSEMITE AIRPORT

MAMMOTH LAKES,

CALIFORNIA

UTILITY PLAN

NO.	REVISIONS	BY	APR	DATE



DATE APRIL 18, 2017

SHEET NUMBER
PLATE No. 6-2

CHAPTER 7. ESTIMATE OF PROBABLE DEVELOPMENT COSTS

Van Sant Group Architects have prepared an estimate of probable construction costs for the terminal building. These costs are included in Table No. 7-1. The probable construction costs of all civil works required to support the new terminal building have been prepared by Reinard W. Brandley and are included in Table No. 7-2. A summary of estimated total costs for the terminal area development including design fees, construction inspection fees, and 10 percent allowance for administrative costs has been prepared and is included in Table No. 7-3.

Funding sources to cover the cost of the proposed development include:

- F.A.A. Airport Improvement Program (AIP) Grants
- Passenger Facility Charges (PFC)
- Fees and Rents
- Tourist Improvement District Funds
- Municipal Bonds

All cost estimates are based on 2017 prices and must be adjusted for inflation if construction is scheduled beyond that timeframe.

TABLE NO. 7-1

**MAMMOTH YOSEMITE AIRPORT
ESTIMATE OF PROBABLE CONSTRUCTION COST – TERMINAL BUILDING**

	ELEMENT	COST/SF	COST
A.	Terminal – Shell Space		
1.	Ticketing and Queuing	\$360/sf	Includes:
	Ticket Lobby		Structural system
	Bag Make-up		Mechanical system
	Bag Claim		Electrical system
	Holdroom		Plumbing system
	Airlines Lease Space		Finishes
	Non-Airline Lease Spaces		Public seating
	Restrooms		
	Security Checkpoint		
	Restaurant		
	Circulation		
	Support Spaces		
	Total Area = 40,010 SF		
	Subtotal – Terminal – Shell Space		<u>\$ 14,403,600</u>
B.	Airline Lease Spaces / TSA – Tenant Improvements		
1.	Airline Offices - 332 sf	\$80/sf	\$ 26,560
2.	TSA Offices - 950 sf	80/sf	76,000
3.	Lease/ Display - 515 sf	95/sf	48,925
4.	Ground Transportation / Rent Cars-1,546 sf	95/sf	146,870
5.	Airport Administration / Conference-1,370 sf	95/sf	130,150
6.	Restaurant / Lounge - 1,822 sf	100/sf	182,200
	Subtotal – Airline Lease Spaces/TSA		<u>\$ 610,705</u>
C.	Other		
1.	Generator		\$ 242,200
2.	Baggage System – Inbound & Outbound		818,300
3.	Curbside Check-in		299,000
4.	Ski-Oversized Bag Claim		231,200
5.	Covered Bag Claim Area		245,100
6.	Covered Outbound Bag Make-Up		675,200
	Subtotal – Other		<u>\$ 2,511,000</u>
	TOTAL		<u>\$ 17,525,305*</u>

*There is an estimated engineering and administration cost of \$3,150,000, for a total estimated cost of \$20,675,000. This excludes terminal design costs of \$1,750,000.

VS GROUP

June 2011

Revised April 2017

TABLE NO. 7-2
MAMMOTH YOSEMITE AIRPORT
ESTIMATE OF PROBABLE CONSTRUCTION COSTS - CIVIL ENGINEERING FACILITIES

Item No.	Description	Unit	Unit Price	Quantity	Cost
A. Airline Apron - 184,000 Sq. Ft., Taxiways - 35,600 Sq. Ft. & Delcing Apron - 65,000 Sq. Ft.					
A1	Mark & Light Closed Airport Facilities	L.S.	L.S.	L.S.	\$ 20,000
A2	Mobilization	L.S.	L.S.	L.S.	50,000
A3	Clearing and Grubbing	Acre	\$ 3,000.00	5.7	17,161
A4	Excavation	Cu. Yd.	18.00	14,000.0	252,000
A5	Imported Embankment	Cu. Yd.	30.00	6,200.0	186,000
A6	Recompact 12" of Native Subgrade	Sq. Yd.	3.00	33,000.0	99,000
A7	10" of Aggregate Subbase	Ton	45.00	2,200.0	99,000
A8	6" or 8" of Crushed Aggregate Base	Ton	60.00	16,600.0	996,000
A9	3" Bituminous Surface Course	Ton	120.00	700.0	84,000
A10	1 1/2" Bituminous Surface Course	Ton	120.00	2,400.0	288,000
A11	16" Portland Cement Concrete	Sq. Yd.	150.00	27,800.0	4,170,000
A12	Bituminous Prime Coat	Ton	1,400.00	16.0	22,400
A13	Bituminous Tack Coat	Ton	1,400.00	1.0	1,400
A14	Marking	Sq. Ft.	3.00	2,200.0	6,600
A15	Drainage Allowance	L.S.	L.S.	L.S.	100,000
A16	Floodlighting Allowance	Each	35,000.00	3.0	105,000
A17	Utilities Relocation	L.S.	L.S.	130,000.0	130,000.0
A18	Fencing	Ln. Ft.	25.00	1,350.0	33,750
	Total Airline Apron				\$ 6,660,311
	Total Airline Apron - USE				\$ 6,660,000

Item No.	Description	Unit	Unit Price	Quantity	Cost
B. Access Road - 26' x 1,000' & 22' x 1500'					
B1	Mark & Light Closed Airport Facilities	L.S.	L.S.	L.S.	\$ 7,000
B2	Mobilization	L.S.	L.S.	L.S.	10,000
B3	Clearing and Grubbing	Acre	\$ 3,000.00	2.7	8,100
B4	Excavation	Cu. Yd.	18.00	1,600.0	28,800
B5	Imported Embankment	Cu. Yd.	30.00	5,000.0	150,000
B6	Recompact 12" of Native Subgrade	Sq. Yd.	3.00	8,500.0	25,500
B7	10" of Aggregate Subbase	Ton	45.00	4,500.0	202,500
B8	6" Crushed Aggregate Base	Ton	60.00	3,000.0	180,000
B9	3" Bituminous Surface Course	Ton	120.00	1,300.0	156,000
B10	Bituminous Prime Coat	Ton	1,400.00	5.0	7,000
B11	Bituminous Tack Coat	Ton	1,400.00	2.0	2,800
B12	Marking	Sq. Ft.	3.00	5,000.0	15,000
B13	Drainage Allowance	L.S.	L.S.	L.S.	100,000
B14	Concrete Curb	Ln. Ft.	25.00	4,000.0	100,000
B15	Landscape Allowance	L.S.	L.S.	L.S.	80,000
B16	Floodlighting Allowance	L.S.	L.S.	L.S.	80,000
	Total Access Road				\$ 1,152,700
	Total Access Road - USE				\$ 1,153,000

TABLE NO. 7-2 (Continued)

Item No.	Description	Unit	Unit Price	Quantity	Cost
C. Automobile Parking Lot - 70,000 Sq. Ft. & Sidewalks - 24,000 Sq. Ft.					
C1	Mark & Light Closed Airport Facilities	L.S.	L.S.	L.S.	\$ 2,000
C2	Mobilization	L.S.	L.S.	L.S.	5,000
C3	Clearing and Grubbing	Acre	\$ 3,000.00	2.7	8,100
C4	Excavation	Cu. Yd.	18.00	2,000.0	36,000
C5	Imported Embankment	Cu. Yd.	30.00	10,700.0	321,000
C6	Recompact 12" of Native Subgrade	Sq. Yd.	3.00	10,500.0	31,500
C7	10" of Aggregate Subbase	Ton	45.00	5,000.0	225,000
C8	6" Crushed Aggregate Base	Ton	60.00	5,500.0	330,000
C9	3" Bituminous Surface Course	Ton	120.00	1,650.0	198,000
C10	Bituminous Prime Coat	Ton	1,400.00	6.0	8,400
C11	Bituminous Tack Coat	Ton	1,400.00	2.0	2,800
C12	Marking	Sq. Ft.	3.00	1,900.0	5,700
C13	Drainage Allowance	L.S.	L.S.	L.S.	50,000
C14	4" Portland Cement Concrete Sidewalk	Sq. Yd.	30.00	2,700.0	81,000
C15	Concrete Curb	Ln. Ft.	25.00	1,300.0	32,500
C16	Landscape Allowance	L.S.	L.S.	L.S.	40,000
C17	Floodlighting Allowance	L.S.	L.S.	L.S.	120,000
	Total Automobile Parking Lot				\$ 1,497,000
	Total Automobile Parking Lot - USE				\$ 1,497,000

D. Utilities					
D1	10" Water Line	Ln. Ft.	\$ 60.00	2,285.0	\$ 137,100
D2	10" Gate Valve	Each	2,000.00	5.0	10,000
D3	Fire Hydrant Assembly	Each	5,000.00	5.0	25,000
D4	Backflow Preventer	Each	3,000.00	1.0	3,000
D5	8" Sewer Main	Ln. Ft.	60.00	3,596.0	215,760
D6	36" Sewer Manhole	Each	5,000.00	10.0	50,000
D7	Package Sewer Station	Each	290,000.00	1.0	290,000
D8	2W-4" Electrical Duct	Ln. Ft.	50.00	2,374.0	118,700
D9	Electrical Pull Box	Each	5,000.00	12.0	60,000
D10	Apron, Parking, and Road Floodlights (45')	Each	25,000.00	18.0	450,000
D11	Electrical Service Allowance	L.S.	L.S.	L.S.	150,000
D12	Telephone Service Allowance	L.S.	L.S.	L.S.	200,000
	Total Utilities				\$ 1,709,560
	Total Utilities - USE				\$ 1,710,000
	Total Construction Cost				\$ 11,019,571
	TOTAL CONSTRUCTION COST - USE				\$ 11,020,000
	Engineering and Administration				2,094,000
	TOTAL PROJECT COST*				\$ 13,114,000

*Excludes terminal area apron, access road, automobile parking lot, and utilities design costs of \$1,120,000.

TABLE NO. 7-3
MAMMOTH YOSEMITE AIRPORT
SUMMARY OF ESTIMATED PROBABLE TOTAL DEVELOPMENT COSTS (x 1,000)
(Based on 2017 Costs)

Project	Construction Costs	Design Fees	Construction Management Fees	Administration Cost	Total Cost
1. Terminal Building - First Stage	\$ 17,525	\$ 1,750	\$ 1,400	\$ 1,750	\$ 22,425
2. Airline Apron, Taxiways & Deicing Apron	6,660	670	530	670	8,530
3. Access Road	1,153	120	90	120	1,483
4. Automobile Parking Lots	1,497	150	120	150	1,917
5. Utilities					
a. Sewer	556	60	50	60	726
b. Water	175	20	20	20	235
c. Electrical	779	80	60	80	999
d. Telephone	200	20	20	20	260
TOTALS	\$ 28,545	\$ 2,870	\$ 2,290	\$ 2,870	\$ 36,575

CHAPTER 8. RECOMMENDATIONS

The Town is located in one of the most scenic areas of California as well as the United States. It has one-of-a-kind access to many venues of outdoor adventure popular amongst outdoor enthusiasts today. Mammoth Mountain Ski Area is recognized both nationally and internationally as one of the preeminent ski areas in the world. Skiing and other mountain recreation activities are the driving forces for economic development of the area. Flying is a convenient way to access the area and considerably reduces the required travel time; for example one can fly from Los Angeles in 1 hour while driving required 5 hours.

The Town of Mammoth Lakes, Mammoth Lakes Tourism, and Mammoth Mountain Ski Area are dedicated to continuing and improving commercial airline service to Mammoth Yosemite Airport. Over the last eight years the Town has demonstrated that there is a demand for air service, despite the limitations placed on the existing service by the sub-standard temporary terminal building. The temporary terminal building was inadequate for existing demand immediately after it was put into service.

It is, therefore, considered appropriate to construct the new terminal facilities to accommodate the traffic forecast for the 10-year period but to design the facilities and provide room to expand the terminal building, the air operations area, and the support facilities to accommodate possible future growth. The design of the facility should be such that any expansions required can be performed with minimal interference to the operation of the existing facility. It is recommended that the size, location, and configuration of the terminal development presented in this report be developed. This

development needs to occur as early as possible since the existing facilities are currently overloaded and major growth is expected within the next five years.

Economic feasibility studies have been performed for the terminal development project. This study included preparing estimates for the following:

- Construction costs for required terminal facilities.
- Anticipated contributions in aid, including Federal grants and Passenger Facility Charges.
- Annual operating costs.
- Annual revenue.

The results of this study are summarized in Table No. 8-1. It will be noted that a \$36,575,000 development project can be constructed in a three-year period and the net amount financed is only \$1,719,000.

This study shows that over the next 10 years enplaned passengers will remain approximately the same. Therefore, annual support required from the Town of Mammoth Lakes General Fund will remain approximately the same (\$530,000).

TABLE NO. 8-1
MAMMOTH YOSEMITE AIRPORT
AIRLINE TERMINAL FACILITY DEVELOPMENT
ECONOMIC FEASIBILITY DATA

Cost of Construction:	Terminal Building	\$22,425,000
	Aprons, Roads, Parking, Utilities	14,150,000
	Total	\$36,575,000
Less Contribution in Aid	Terminal Building - AIP	\$20,330,505
	Aprons, Roads, Parking, Utilities - AIP	12,828,390
	Tourist Business Improvement District / Passenger Facility Charge / Finance costs of \$1,718,963	3,416,105
	Total	\$36,575,000

Date of Initial Operations: December 2021			
	Year 1 2016	Year 5 2021	Year 10 2026
Annual Revenue			
Airline Rents	\$ 121,600	\$ 140,000	\$ 147,000
Facility Rents	5,500	6,100	6,800
Hangar Rents	90,000	95,000	103,000
Car Rental	106,000	115,000	141,000
Food/Beverage	4,000	6,000	35,000
Overnight Parking	6,000	6,900	23,000
Miscellaneous Income	18,000	19,500	25,500
Total Revenue	\$ 351,100	\$ 388,500	\$ 481,300
Annual Expenses			
Airport Operations	\$ 221,828	\$ 183,000	\$ 193,000
Maintenance	137,482	143,100	182,500
Personnel	584,770	608,500	639,500
Total Expenses	\$ 944,080	\$ 934,600	\$ 1,015,000
Excess Revenues	\$ -	\$ -	\$ -
Annual Support Required from TML General Fund	\$ 592,980	\$ 546,100	\$ 533,700

Source of Data:

Construction Costs - Terminal Area Development Plan

Annual Revenue - Town of Mammoth Lakes

Annual Costs - Town of Mammoth Lakes

**MAMMOTH YOSEMITE AIRPORT
AIRPORT LAYOUT PLAN UPDATE NARRATIVE**

**Appendix C
7-Bay ARFF / Snow Removal Facility
Project Scope and Justification Report by
Brandley Engineering**

PROJECT SCOPE AND JUSTIFICATION

**MAMMOTH YOSEMITE AIRPORT
MAMMOTH LAKES, CALIFORNIA**

**7- BAY ARFF/SNOW REMOVAL
FACILITY**

**July 12, 2021
Revised September 20, 2021
Revised April 6, 2022**

Prepared By:



**MAMMOTH YOSEMITE AIRPORT
MAMMOTH LAKES, CALIFORNIA**

7- BAY ARFF/SNOW REMOVAL FACILITY

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**MAMMOTH YOSEMITE AIRPORT
MAMMOTH LAKES, CALIFORNIA**

7- BAY ARFF/SNOW REMOVAL FACILITY

PROJECT SCOPE AND JUSTIFICATION

I. ARFF/SNOW REMOVAL FACILITY SCOPE of WORK

This project includes the construction of a new 7-bay ARFF/Snow Removal Facility with Apron and Access Roads. This building will have a composite footprint of 10,350 sf with 9,740 sf on the first floor and 4,840 sf on the second floor for a total of 14,580 sf of usable space. This facility will house the existing snow removal equipment, ARFF vehicle and ARFF support rooms at the airport. The airport currently leases a hangar from the FBO on the airfield to house some of its ARFF and snow removal equipment, but this building does not have the capacity to hold all the airport's equipment and is lacking the adequate ARFF support rooms. The construction of this facility will extend the life of the equipment and meet the FAA's goal of housing ARFF vehicles and snow removal equipment indoors. In addition, it will provide an important enhancement to airport safety by providing adequate ARFF support rooms and increase ease of access and response times to any airport incidents.



The proposed building will be designed to accommodate the following equipment:

Make	Model	Year	Material Condition of Vehicle	Vehicle Size
FAA Eligible				
Caterpillar	966D Loader with 352SC Kodiak Snow Blower (1997 Blower Attachment)	1983	Fair	40' X 12'
Michigan	L90 Wheel Loader with 15' Blade & Chains	1985	Good	25' X 12'
Kodiak	CR 3000 Snow Blower (3,500 ton/hr. capacity)	1994	Fair	24' X 9'
Caterpillar	966G Wheel Loader with Future Snow Blower Attachment	2001	Good	40' X 12'
Caterpillar	966G.2 Wheel Loader with 15' Blade & Chains	2005	Excellent	30' X 12'
Colet	K-15 Jaguar ARFF Vehicle (1,500 gal. water; 100 gal. foam; 500 lbs. dry chemical, Nitrogen 125 psi)	2006	Fair	33' X 10'
Caterpillar	966H Wheel Loader with 15' Blade & Chains	2008	Excellent	30' X 12'
Tool Cat	Multi-Purpose Vehicle	2009	Good	12' X 8'
Kodiak	CR 700D Heavy Duty Snow Blower (5,000 ton/hr. capacity)	2009	Excellent	37' X 12'
FAA Ineligible				
John Deere	644E Wheel Loader with 12' Blade & Chains	1980	Good	24' X 12'
Peterbilt	Dump Truck with Plow Blade	2010	Excellent	34' X 12'

There are two FAA ineligible pieces of equipment included in this list including the John Deer 644E Wheel Loader with 12' blade and chains and the Peterbuilt Dump Truck with Plow Blade. These pieces of equipment will be housed in the seventh bay. As a result, the ARFF/ Snow Removal Facility will have 6 bays of FAA eligible space and the 7th bay (18' X 72' 4") is ineligible and will be paid for with Town of Mammoth Lakes funding.

In addition, the airport has the following maintenance equipment which the proposed building is not designed to accommodate:

Make	Model	Year	Material Condition of Vehicle	Vehicle Size
FAA Ineligible				
Ford	F-250 XL Super Duty Diesel Crew Cab 4x4	2000	Fair	22' X 10'
Ford	F-250 XL Super Duty Gas Crew Cab 4x4	2002	Fair	22' X 10'
Ford	F150 Gas Pickup	2009	Fair	20' X 10'
Ford	F150XL Gas Pickup	2018	Excellent	20' X 10'

The proposed building will accommodate the following non-vehicle ARFF support rooms:

Area/Use	Level	Room Size	AC 150/5210-15A Eligible Space
1 st Aid & Medical Storage	Ground Floor	15'-0" X 8'-0" 120 Sq. Ft.	Minimum 120 Sq. Ft.
Electrical / Mechanical Room	Ground Floor	15'-0" X 10'-6" 157.5 Sq. Ft.	Mech. Room – no dimensions given Electrical Room – no dimensions given
Gear Wash / Drying Room	Ground Floor	15'-0" X 13'-0" 195 Sq. Ft.	Gear Wash/Drying Room – 200 Sq. Ft.
Medical Decon Shower Uni-Sex/ADA Restroom	Ground Floor	15'-0" X 13'-0" 195 Sq. Ft.	Medical Decon Room – 150 Sq. Ft. No dimensions given
Lobby / Visitor Check-in	Ground Floor	15'-0" X 12'-2" 182.5 Sq. Ft.	No dimensions given
Workshop Storage	Ground Floor	95 Sq. Ft.	Storage Area Min 100 Sq. Ft.,
ARFF Maintenance Bay	Ground Floor	36' – 0" X 10' - 0" 360 Sq. Ft.	1 Bay
Watch / Alarm Room	Second Floor	14'-0" X 10'-0" 140 Sq. Ft.	Minimum 130 Sq. Ft.
ARFF Chief Admin Office	Second Floor	13'-10" X 19'-7" 270.9 Sq. Ft.	Chief's Room – 200 Sq. Ft.
ARFF Deputy Chief Admin Office	Second Floor	14'-0" X 8'-11" 125 Sq. Ft.	Deputy Chief's Office – 160 Sq. Ft.

Area/Use	Level	Room Size	AC 150/5210-15A Eligible Space
ADA Women's Locker Room / Lavatory	Second Floor	15'-0" X 13'-0" 195 Sq. Ft.	Locker Room - 15 Sq. Ft per Firefighter, 7 Firefighters = 105 Sq. Ft. Lavatory – No dimensions given
ADA Men's Locker Room & Lavatory	Second Floor	15'-0" X 13'-8" 205 Sq. Ft.	Locker Room - 15 Sq. Ft per Firefighter, 7 Firefighters = 105 Sq. Ft. Lavatory – No dimensions given
Day Room	Second Floor	15'-0" X 10'-11" 163.8 Sq. Ft.	Day Room – 20 Sq. Ft. per occupant, 7 Occupants = 140 Sq. Ft.
Women's Dormitory	Second Floor	14'-0" X 10'-0" 140 Sq. Ft.	Dormitory Room – 140 SF per room, men or women
Men's Dormitory	Second Floor	14'-0" X 10'-0" 140 Sq. Ft.	Dormitory Room – 140 SF per room, men or women
Computer Training Room	Second Floor	317.9 Sq. Ft.	Computer Training – 48 Sq. Ft. per person, 7 people = 336 Sq. Ft.
Training Room	Second Floor	23'-0" X 13'-10" 318 Sq. Ft.	Training – 48 Sq. Ft. per person, 7 people = 336 Sq. Ft.
Kitchen Dining / Break Room	Second Floor	27'-7" X 15" 413.8 Sq. Ft.	Kitchen– 400 Sq. Ft. min. Dining – 20 Sq. Ft. per person, 7 People = 140 Sq. Ft.
Workshop / Agent Storage	Second Floor	76'-10" X 13' – 7" 1043.6 Sq. Ft.	Agent Storage – 225 – 350 Sq. Ft. Workshop – 300 Sq. Ft. Total – 650 Sq. Ft.

Some of the designated Use Area dimensions vary from what is eligible in AC 150/5210-15A. The variances are necessary in order to facilitate a usable floorplan with walls and entry doors which align to provide ease of flow through the building. Overall the net total non-vehicle ARFF support room sizes are less than the net eligible sizes.

The proposed non-building portions of this project include the following:

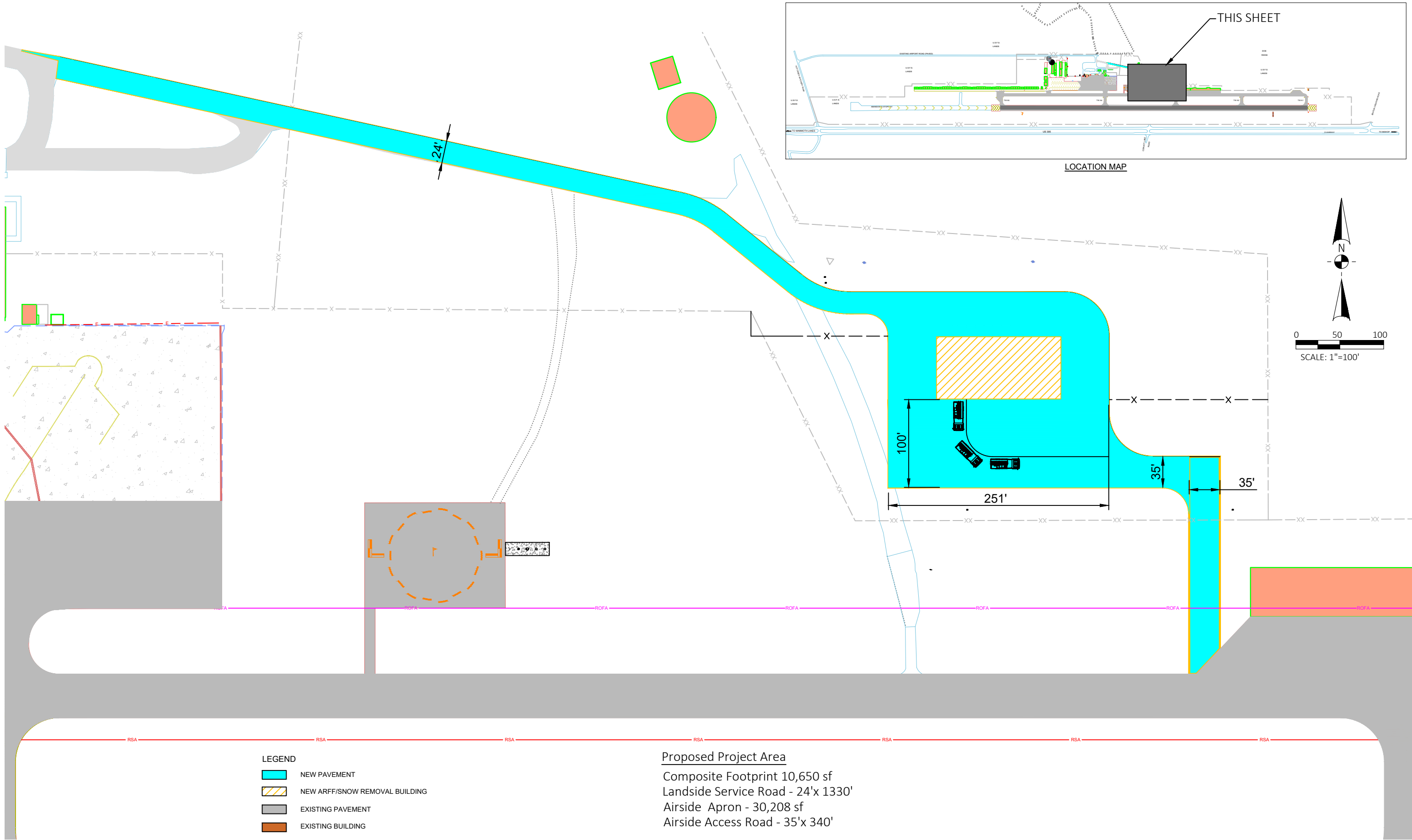
Area/Use	Size
Landside Service Road	24' X 1,330'
Personnel Vehicle Parking	7 Parking Spaces
ADA Vehicle Parking	1 Parking Space
Visitor Vehicle Parking	3 Parking Spaces
ARFF/Snow Removal Apron	30,280 Sq. Ft.
Airside Access Road	35' X 340' areas

The apron length of 100' is designed to allow adequate space for the ARFF vehicle to fully pull out of the vehicle bay doors and then turn with a turning radius of 30' (per manufacturer) and also have room for an incoming snow removal equipment to pass without delaying the ARFF vehicle's response time. As a result the apron length was determined as follows:

Apron Length = ARFF Vehicle Length + Turning Radius + ARFF width + Snow Removal Equipment Width + Buffer

Apron Length = 33 feet + 30 feet + 10 feet + 12 feet + 15 feet buffer = 100 feet

The full scope of this proposed ARFF/Snow Removal Facility is shown on Plate No.1 and the proposed layout and building footprint is shown on Plate No. 2



- LEGEND
- NEW PAVEMENT
 - NEW ARFF/SNOW REMOVAL BUILDING
 - EXISTING PAVEMENT
 - EXISTING BUILDING
 - EXISTING ROAD
 - EXISTING DIRT/GRAVEL ROAD

Proposed Project Area
Composite Footprint 10,650 sf
Landside Service Road - 24'x 1330'
Airside Apron - 30,208 sf
Airside Access Road - 35'x 340'

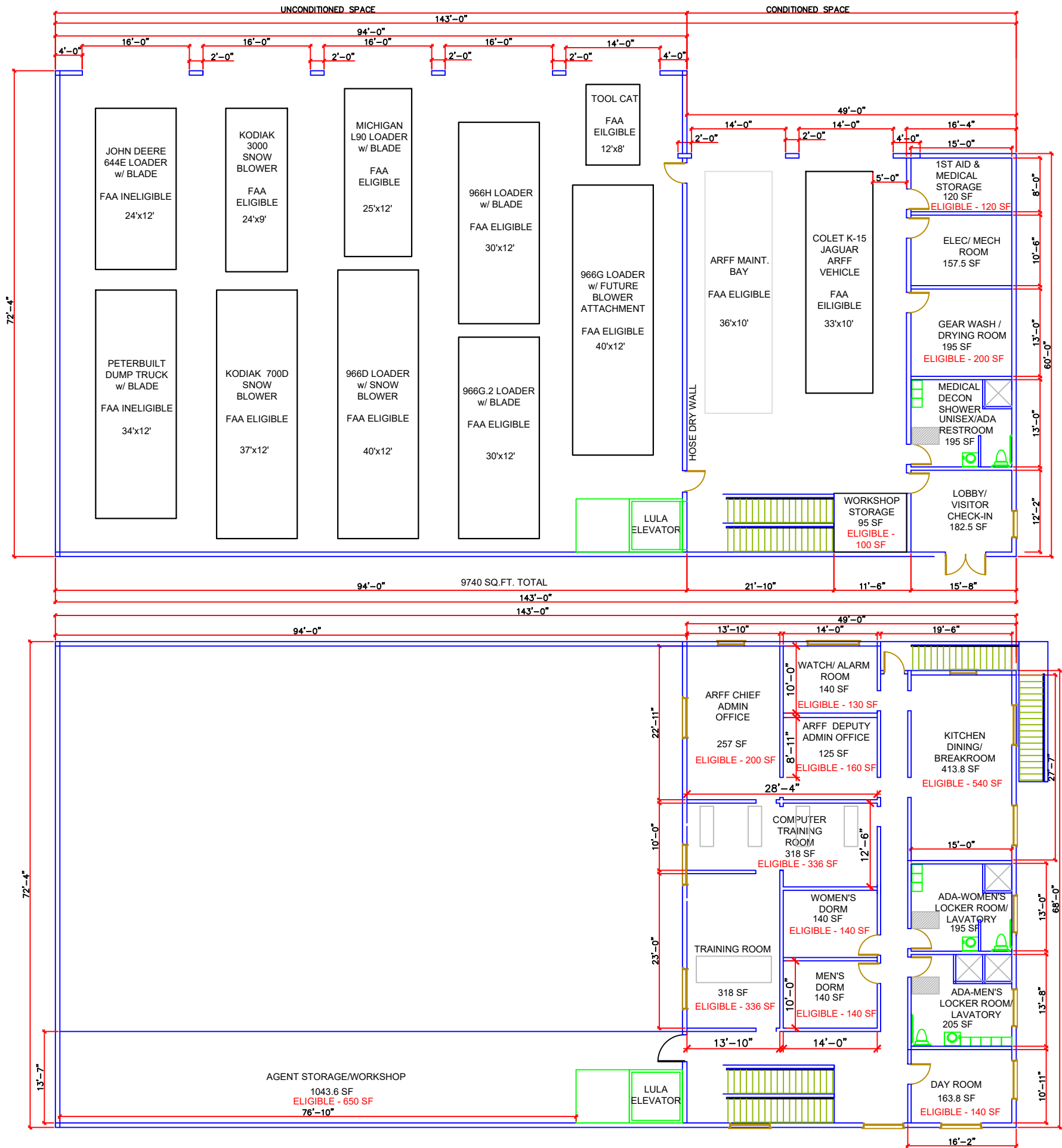


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MAMMOTH YOSEMITE AIRPORT
MAMMOTH LAKES, CALIFORNIA
ARFF/SNOW REMOVAL FACILITY
PROJECT AREA

DATE	3/1/2022
DRAWN	KDC
CHECKED	DB
PROJECT No.	75.02
FILE	75 Snow Priority-sktc
PLATE No.	1



DATE	3/25/2022
DRAWN	KDC
CHECKED	DB
PROJECT No.	75.02
FWINT BOX	2022.4.6.22
PLATE No.	2

MAMMOTH YOSEMITE AIRPORT
MAMMOTH LAKES, CALIFORNIA
ARFF/SNOW REMOVAL FACILITY
BUILDING LAYOUT

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II. MMH AIRPORT SNOW AND ICE CONTROL PLAN SUMMARY

Mammoth Yosemite Airport's Snow and Ice Control Plan defines the Priority 1 Paved Areas as shown in the Plate No. 3.

The following is a summary of assignments based on the FAA regulations of Snow and Ice Plans for MMH. Many factors are involved with the type and density of snow; amount of snow fall during nonoperational hours, weather forecast, and availability of personnel. The following apparatus are normally housed within a heated hangar for ease of start and for snow clearance on vehicles. Delayed operations may occur if vehicles are housed outside during snow events as the vehicles would have to warm up first and potentially be dug out of the snow themselves prior to being able to use them. Our first priority is the NOTAM for runway condition report, which is done using the pickup trucks. Then snow removal operations begin with the following assignments.

Priority 1 * (See Plate No. 3)

Runway 09/27

Taxiway A w/ connectors A1, A4, & A5

North Commercial Ramp and East GA ramp areas

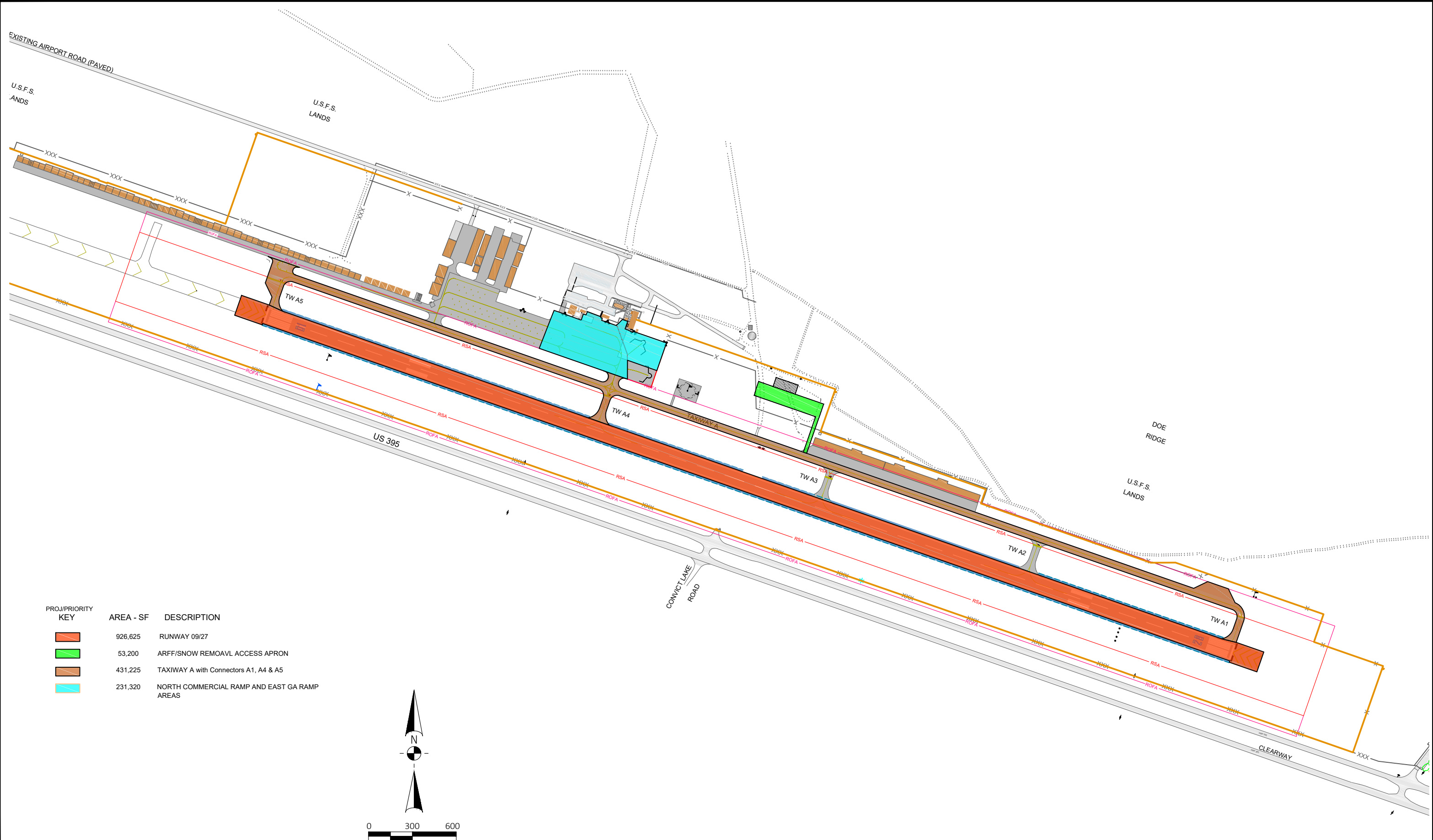
Assignments (based on the availability of 5 personnel):

To begin the 2005 966G.2 & 2008 966H and Michigan L90 Wheel Loader all with 15' Balderson blade attachments are used on Runway 09/27. These apparatuses move snow towards the runway edge markers where then the 2009 Kodiak CR700D snow blower blows snow off the runway to the fields south of the airport.

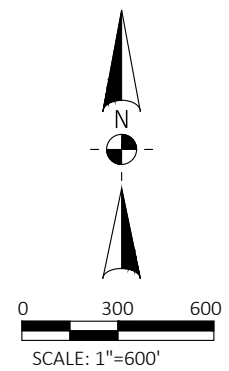
Depending upon size of storm and quality of snow; the 1983 966D and 2001 966G may assist with the Runway 09/27 and Taxiway A areas.

The 1994 Kodiak CR3000 or CAT Loader/blower will blow snow from edge marking to infields from the Taxiways.

The 2009 ToolCat with blower attachment or bucket will assist with snow removal around the lights, guidance signs and NAVAIDS and begin the process of opening the Terminal Areas, with the assistance of the Michigan L90 Wheel Loader, 1980 John Deere or Peterbuilt Dump Truck.



PROJ/PRIORITY KEY	AREA - SF	DESCRIPTION
	926,625	RUNWAY 09/27
	53,200	ARFF/SNOW REMOAVL ACCESS APRON
	431,225	TAXIWAY A with Connectors A1, A4 & A5
	231,320	NORTH COMMERCIAL RAMP AND EAST GA RAMP AREAS





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MAMMOTH YOSEMITE AIRPORT

MAMMOTH LAKES, CALIFORNIA

SNOW PLOW OPERATIONS

PRIORITY 1

DATE	7/9/2021
DRAWN	TS
CHECKED	MB
PROJECT No.	75.02
FILE	75 Snow Priority-sktc
PLATE No.	3

III. ANALYSIS OF REQUIRED SNOW REMOVAL EQUIPMENT

The AIP Handbook stipulates only the space in the building necessary for eligible Snow Removal and ARFF Equipment is AIP eligible. Advisory Circular 150/5220-20A Airport Snow and Ice Control Equipment sets forth the requirements for quantifying the AIP eligible Snow Removal Equipment.

1. Determination of High Speed Rotary Plow Requirements for Priority 1 Area

a. Assumptions:

1. Time – The required Time for snow removal is determined by the number of annual operations as follows:

Annual Operations	Time for Snow Removal
40,000 or more	0.5 Hours
10,000 – 40,000	1 Hour
6,000 – 10,000	1.5 Hour
Less than 6,000	2 Hours

According to the FAA approved Mammoth Yosemite Airport Aviation Activity Forecast 2017 and 2019 Addendum, MMH had 6,744 annual operations in 2018 with forecast growth to 7,755 annual operations in 2028. MMH is a unique airport in that due to the attraction of winter snow sport recreation, their annual operations are more heavily weighted towards the winter operations. As a result, the equivalent annual winter operations are a more appropriate measure for determination of snow removal requirements. The peak month for operations is March with peak monthly operations of 20% of the annual operations or 1,349 peak monthly operations in 2018. This would be corresponding to 16,185 (1,349 X 12 months) equivalent annual winter operations. As a result, the snow removal requirements should be based on 10,000 – 40,000 annual operations and require a 1 hour removal time.

2. Snow Depth – The FAA standard for High Speed Rotary Plow Calculations is to remove 1" of snow in the required removal time. MMH frequently accumulates much more than 1" of snow. The snow removal operations only take place during the day from 7:30am to 4:30pm. Frequently there are overnight accumulations in excess of 1" which require significant removal times the next morning.

3. The table below provides a summary of storm frequency and overall accumulation for 2018 thru 2021.

Mammoth Yosemite Airport		
Snow Storm Frequency and Total Accumulation		
2018 thru 2021		
Month, Year	# of Storms	Total Snow Accumulation
January 2018	7	10.5"
February 2018	0	0"
March 2018	12	42.6"
November 2018	6	16.5"
December 2018	7	7.5"
January 2019	10	27.9"
February 2019	18	57.3"
March 2019	14	20.4"
November 2019	6	16.2"
December 2019	13	21.9"
January 2020	4	4.2"
February 2020	0	0"
March 2020	4	3.6"
November 2020	2	2.7"
December 2020	8	1.8"
January 2021	8	33.9"
February 2021	2	6.3"
March 2021	9	12"
November 2021	1	0.75
December 2021	10	67.5"



Analysis of historical FICON snow removal NOTAMS from November 2019 thru December 2021 show the following excess overnight accumulations and corresponding removal times with an average of 5.85" of overnight snow accumulation. As a result, it is reasonable to use a snow accumulation of 5.85". The record of NOTAMS is included in Appendix 1.

Mammoth Yosemite Airport			
Snow Accumulation Closure Requirements			
Nov. 2019 thru March 2021			
Date	Snow Accumulation	Length of Closure / Snow Removal time (Hours)	NOTAM Reference Number
11/27/2019	1" Wet Snow		55193711
11/29/2019	1" Dry Snow	2	55210378
12/1/2019	2" Dry Snow	3	55232485
12/4/2019	2" Wet Snow	2.75	55279633
12/8/2019	6" Wet Snow	4	55320932, 55321719, 55322251
12/23/2019	4" Dry Snow	2.75	55494349
12/26/2019	2" Dry Snow	2.5	55512748
1/17/2020	5" Dry Snow	1.25	55769261
4/6/2020	2" Dry Snow	2.25	56663377
12/17/2020	2" Dry Snow	2.75	58828726
12/17/2020	1" Dry Snow	1.75	58831898, 58832160
1/24/2021	2" Dry Snow	2	59243661
1/26/2021	1" Dry Snow	2.5	59282532
1/27/2021	28.5" Snow	52.5	59303427, 59303441, 59310153, 59310179, 59325467
2/12/2021	4" Wet Snow	3	59567825
3/12/2021	1" Dry Snow	2.25	59952087
12/14/2021	18.5" Dry Snow	12	62500839
12/15/2021	16.5" Dry Snow	6	62505505 62507617
12/16/2021	8" Dry Snow	2	62530956 62531006
12/23/2021	8.5" Dry Snow	2.25	62611705 62611723 62612206
12/24/2021	4" Dry Snow	1.5	62622509 62622519 62623293
12/26/2021	5" Dry Snow	5	62640959
12/27/2021	11.3" Wet Snow	7	62658274

Mammoth Yosemite Airport			
Snow Accumulation Closure Requirements			
Nov. 2019 thru March 2021			
Date	Snow Accumulation	Length of Closure / Snow Removal time (Hours)	NOTAM Reference Number
12/28/2021	4" Wet Snow	1	62672691
12/30/2021	6" Wet Snow	1	62708118
Average	5.85"	5.2	

4. Snow Density – The FAA standard for snow density of 25 lbs/Cu. Ft. was used in the calculations
5. Rotary Plow Efficiency – The FAA standard for Rotary Plow Efficiency of 70% was used in the calculations.

b. Priority 1 High Speed Rotary Plow Calculations

Using the equation shown in Figure 2-3 of AC 150/5220-20a and the assumptions listed above, the required volume of snow removal for high speed rotary plows is as follows:

$$\begin{aligned}
 Q &= \text{Snow removal (tons / hour)} \\
 A &= \text{Priority 1 Area} = 1,642,370 \text{ Sq. Ft.} \\
 D &= \text{Snow Depth} = 5.85" \\
 \rho &= \text{Snow Density} = 25 \text{ lb/Cu. Ft.} \\
 \text{Efr} &= \text{Rotary Plow Efficiency} = 70\% \\
 T &= 1 \text{ Hour} \\
 Q &= \frac{(A)(d)(\rho)}{(24,000)(\text{Efr})(T)} \\
 &= \frac{(1,642,370)(5.85)(25)}{(24,000)(0.70)(1)} \\
 &= 14,297 \text{ ton / hr}
 \end{aligned}$$



c. Summary:

The FAA requirement for high speed rotary snow plow removal is 14,297 tons/hr. There will be four high speed rotary snow plows with the following capacities which require storage out of the weather elements.

Rotary Snow Plow Model	Capacity
Kodiac CR 3000 Snow Blower	3,500 ton/hr
CR 7000 Heavy Duty Snow Blower	5,000 ton/hr
Cat 966D Loader with 352C Kodiak Snow Blower	3,500 ton/hr.
Cat 966G.2 Loader with Future Snow Blower Attachment	3,500 ton/hr.
Total Capacity	15,500 ton/hr

As demonstrated, four Rotary Snow Plows are required & justified to meet the snow removal requirements for MMH.

2. Determination of Snow Plow Blade Length Requirements for Priority 1 Area

a. Assumptions

1. Bc = "Effective" Blade Length (in feet)
2. Q = Snow Removal (ton / hr) = 14,297 ton / hr (see calculation from rotary plow calculations above)
3. d = Snow Depth = 5.85" (see justification from rotary plow calculations above)
4. V = operating speed = 15 mph
5. ρ = snow density = 25 lb/Cu. Ft.
6. Effp = Snow Plow Efficiency = 70%

b. Priority 1 Snow Plow Blade Length Calculations

Using the equation shown in Figure 2-7 of AC 150/5220-20a and the assumptions listed above, the required effective blade length is as follows:

$$Bc = \frac{(Q)(Eff)}{(d)(V)(\rho)(Effp)} * 4.545 = \frac{(14,297)(0.7)}{(5.85)(15)(25)(0.7)} * 4.545 = 29.6 \text{ feet}$$

Using the chart in figure 2-8 of AC 150/5220-20a the actual blade length is as follows:
Assumptions:

1. Effective Blade Length = 20.3 feet
2. Cutting angle = 35°

Actual Blade Length = 36 feet

c. Summary

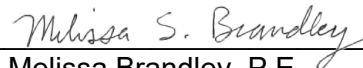
The FAA requirement for actual snow plow blade length is 36 feet. MMH has the following snow plows and blade lengths which require storage out of the weather elements.

Snow Plow Model	Blade Length
Michigan L90 Wheel Loader	15 feet
Cat 966H Wheel Loader	15 feet
Cat 966G Wheel Loader	15 feet
Total Capacity	45' feet

As demonstrated, three 15' blade length Snow Plows are required & justified to meet the snow removal requirements for MMH.

3. Determination of Additional Snow Plow Support Vehicles for Priority 1 Areas

In addition to the required high speed rotary plow and snow plow blade length requirements, the snow clearance of all Priority 1 Areas includes removal of snow around the runway lights, guidance signs and NAVAIDS to facilitate safe operation of the airport. The high speed rotary plow and snow plow equipment justified in the previous sections are too large to maneuver and clear snow around the runway lights, guidance signs and NAVAIDS. As a result, an additional smaller, nimbler piece of snow removal equipment is essential to efficient and safe clearance of the Priority 1 Areas. The 2009 ToolCat multi-purpose vehicle with blower attachment or bucket is used for this purpose and justified for use on snow clearance of Priority 1 Areas.



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