

Appendix B

AIRPORT SUSTAINABILITY MANAGEMENT PLAN

The *Flagstaff Airport Sustainability Plan* (Sustainability Plan)¹, completed in 2015, contains many recommendations for Flagstaff Airport to create a more economically viable, socially equitable, and environmentally aware facility. More specifically, Chapter Three of the Sustainability Plan contains ten sustainability resource categories, which include:



Air Quality



Land Use & Transportation



Community Well-Being



Planned Development



Energy



Resiliency & Preparedness



Dark Skies



Waste Management



Natural Resource Management



Water

¹ Full *Flagstaff Airport Sustainability Plan* available on the City of Flagstaff's website.

The Sustainability Plan provides guidelines of how to put sustainability initiatives and projects into action, with progress tracking methods and ways to overlap with City and Regional Plans, as well as this Airport Master Plan. The goal of the Sustainability Management Plan is to marry the goals and implementation approach of the Sustainability Plan with the projects proposed within this Airport Master Plan. **Exhibit B1** illustrates the airport capital improvement program (CIP) alongside sustainability initiatives, showing how the airport can incorporate recommendations from the Sustainability Plan with the Master Plan CIP.

The Sustainability Plan set overarching goals for each sustainability category. These goals are outlined below, along with recommendations on how projects proposed within the Master Plan can incorporate sustainability initiatives to help achieve the sustainability goals.

Air Quality



- Reduce criteria air pollutants emitted from airport owned and controlled sources to improve public health and reduce environmental impact.
- Reduce airport owned and controlled greenhouse gas emissions by 5% below current levels by 2020.

Projects at the airport that help reduce carbon dioxide emissions (CO₂) positively impact Air Quality goals. Opportunities exist for the airport to reduce emissions in certain capital improvement projects, like the airfield equipment reconfiguration. By locating airfield equipment close together, there is increased efficiency in terms of accessing it for routine service or maintenance, reducing on-airport vehicular emissions. Although a more expensive option, there is technology available that would allow the airport to use warm mix asphalt as opposed to the traditional hot mix asphalt for projects like parking lots, taxiways, runways, and aprons. Warm mix asphalt lowers greenhouse gas emissions and other air pollutants during production and reduces energy consumption by lowering the temperature required to produce and place asphalt.

Community Well-Being



- Enhance awareness of the community benefits of the airport.
- Enhance user experience at the airport.
- Provide a safe and efficient airport.
- Build and maintain community partnerships.
- Support the community by being an economic driver.

Several projects within the airport's CIP will positively influence the surrounding community and the patrons at the airport. Approximately 180 acres of land is proposed for acquisition within the Master Plan to protect the runway protection zone (RPZ). Having ownership control over this property enhances the operational safety and efficiency of the airport. The airport plans to purchase a new aircraft rescue and firefighting (ARFF) vehicle and associated equipment, which improves operational safety, thus providing a safer and more efficient airport for users and the community. Within the terminal building, there are plans to improve security by upgrading security locks, adding access controls, and closed-circuit security cameras. These improvements also support the airport's efforts toward providing a safe and efficient facility. There are plans to eventually update the existing terminal building, which could

PROJECT	Project Description	Sustainability Considerations	Categories Impacted
Short Term Projects (0 - 5 years)			
ARFF Truck and Equipment Purchase	Acquire ARFF vehicle and equipment.	Consider ARFF equipment that uses the NoFoam System technology to eliminate foam laden wastewater from periodic aircraft hangar fire suppression foam system nozzle discharge checks.	
Snow Removal Equipment Building	Design & construct snow removal equipment building and acquire associated equipment.	Incorporate sustainability principles into the design of the building and develop the facility to support long term, compatible, efficient, and flexible growth. Purchase snow removal equipment that relies on less energy than traditional snow removal equipment.	
Conduct Drainage Master Plan	Design plan to address drainage issues throughout the airport.	Design a drainage plan that minimizes wildlife strikes by harvesting rainwater to reduce water pooling.	
Clear Runway Object Free Area	Clear the ROFA on the west side of Runway 3-21.	Consider relocating and/or replacement vegetation in other areas of the airport or community to replace the areas that are cleared.	
Acquire Land for Safety Areas	Purchase 60 acres of land on the north side of the airport to enhance airfield safety and approach protection.	Continue to encourage land use compatibility around the airport through necessary property acquisition.	
Runway 3 REILs	Implement REILs on Runway 3.	Use LEDs in the REILs.	
Taxiway A Rehabilitation	Mill and overlay Taxiway Alpha from A-1 to A-6 including entrance/exit Taxiways A1 - A6. This project includes enhancing the MITL with LED technology.	Incorporate sustainable practices into the contract for the work and construction of the project.	
Taxiway W Loop Rehabilitation	Restoration/sealcoat of Taxiway W including LED technology addition to the MITL.	Incorporate sustainable practices into the contract for the work and construction of the project.	
Implement No-Taxi Islands	Design and construct the implementation of no-taxi islands adjacent to Taxiways A6, A7, and A8.	This project will reduce energy consumption and harmful emissions by reducing taxiing time.	
Design & Construct Terminal Building Expansion & Security Upgrades	Upgrade security locks, add access control and closed circuit security cameras. Put in positive exit control lanes from ramp to terminal.	Choose equipment that is energy efficient to help the airport meet its Net Zero goal by 2030, as well as updating security measures to make the airport safe and efficient for passengers.	
Design & Construct Terminal Parking Apron Expansion & Taxiway W Relocation	Design & construct a terminal parking apron expansion to accommodate larger aircraft in addition to rehabilitating the existing aircraft parking apron. This project also includes Taxiway W relocation.	Incorporate sustainable practices into the contract for the design and construction of all project phases.	
Design Terminal Vehicle Parking Expansion	Design the expansion of the terminal vehicle parking area.	Consider a sustainable design that incorporates permeable pavement to reduce the amount of impermeable hardscapes at the airport.	
Runway Rehabilitation	Restoration/sealcoat of Runway 3-21.	Maintain the structural strength of the original pavement to prepare airport facilities for the future.	
Intermediate Term Projects (6 - 10 years)			
Construct Terminal Vehicle Parking Expansion - Phases I & II	Construct the surface lot and realign the road to support the terminal vehicle parking expansion as previously designed.	Constructing this new facility increases the airport's resiliency for the future, especially when it incorporates sustainable design principles, like using permeable pavement for the surface lot and road realignment. In addition, the airport should incorporate designated parking spaces for alternatively-fueled vehicles.	
Construct Rental Car Preparation Center	Construct the rental car preparation center to support rental car operations.	Incorporate sustainability into the construction of the rental car preparation center, reusing and recycling materials when possible. This facility also adds convenience to airport patrons, enhancing the user experience.	
Construct Hold Apron	Construct the hold apron adjacent to the south side of Taxiway A.	Construct the hold apron to maintain its structural integrity far into the future and consider reusing materials from other airport projects to supplement the use of new, raw materials for the hold apron.	
Property Clearing & Acquisition	Clear property for general aviation redevelopment adjacent to the south side of the aircraft parking apron.	Consider relocating and/or replacement vegetation in other areas of the airport or community to replace the areas that are cleared.	
<p>ARFF - Aircraft Rescue and Firefighting Facility LED: Light-Emitting Diode CatEx: Categorical Exclusion MITL: Medium Intensity Taxiway Lights REIL: Runway End Identifier Lights LEED: Leadership in Energy and Environmental Design</p> <p>RPZ: Runway Protection Zone RDC: Runway Design Code EA: Environmental Assessment NEPA: National Environmental Policy Act ROFA: Runway Object Free Area</p>			

Source: Sustainable Aviation Guidance Alliance; Airport Management NOTE: Project implementation is dependent on federal and state grant funding and availability. The CIP is based on FAA fiscal year programming.



PROJECT	Project Description	Sustainability Considerations	Categories Impacted
Intermediate Term Projects (6 - 10 years) continued			
Perimeter Access Road Upgrade	Upgrade the perimeter access road on the east and west sides of the airfield to provide better access for operations and emergency vehicles to all areas of the airport.	Consider permeable pavement during construction.	
Airfield Equipment Reconfiguration	Co-locate the segmented circle with the existing windcone on the west side of the runway.	Increasing airfield efficiency reduces energy use associated with driving to and from the equipment for service, maintenance, etc., which lowers the emission of climate changing emissions.	
Acquire Land for Safety & Approach	Purchase 54 acres of land on the south side of the airport to improve airfield safety and promote approach protection.	Acquiring land protects the airport from incompatible development while protecting the community from the hazards of residing too close to an airport.	
Construct Air Cargo Support Apron	Construct the air cargo support apron.	Consider using a warm mix asphalt for the taxilane construction in place of hot mix asphalt, which lowers GHG emissions by lowering the temperature at which the asphalt mixtures are produced and placed.	
Airfield Pavement Maintenance	Perform general airfield pavement maintenance.	Upkeep of airport facilities maintains the integrity of the airport for its patrons. Specifically, pavement maintenance maintains the proper pavement condition index rating.	
Long Term Projects (11 - 20 years)			
Relocate Hold Lines	Relocate the hold line markings to 321 feet to meet RDC C-III.	Consider using a zero- or low-volatile organic compound paint and coating when repainting hold line markings to minimize the chemical input into the stormwater system.	
Terminal Area Study	Conduct the terminal area study to analyze the ultimate terminal building replacement.	During the study, look for ways to realistically incorporate sustainability into the ultimate terminal building, including site selection, construction management practices, and design.	
Construct Terminal Vehicle Parking Expansion - Phase III	Construct the terminal vehicle parking garage - Phase III.	This expansion prepares the airport for the future by providing proper accommodations for anticipated passengers. By incorporating dedicated spaces for those who carpool and/or use alternatively fueled vehicles, posting no-idling signs to reduce unnecessary emissions, and using permeable pavement, the airport can meet many of its sustainability goals.	
Construct Stub* Taxilane	Construct the stub taxilane that supports general aviation development on west side of the airport.	Consider using a warm mix asphalt for the taxilane construction in place of hot mix asphalt, which lowers GHG emissions by lowering the temperature at which the asphalt mixtures are produced and placed.	
CatEx or EA for New Terminal Building	Complete the environmental documentation necessary for the new terminal building (CatEx or EA).	Performing the required NEPA documentation ensures that the new construction is done in the most environmentally-sensitive way possible, protecting the environment of the airport, as well as its neighboring communities.	
Design & Construct New Terminal Building	The existing terminal building was built in 1993 and will not meet future travel needs at the airport.	Pursue LEED certification for the new terminal building, infusing sustainability into pre- and post-construction phases of the development.	
Property Acquisition	Purchase 63 acres of land on the east side of the airport to support future airport development potential.	Acquiring property can reduce noise complaints by creating a larger buffer between airport activities and nearby neighbors.	
Airfield Infrastructure Development	Implement the infrastructure development on the east side of the airfield, which will be done in multiple phases.	Using this project as the catalyst, develop and implement an Infrastructure Management Plan that incorporates a systematic set of activities through which the airport can sustainably manage its assets and their associated performance including risks and expenditures over their lifetime.	
Taxiway Construction	Construct the taxiway network that extends east from Runway 3-21 to serve future aviation development potential (to be done in multiple phases).	Consider warm versus hot mix asphalt to reduce emissions. If there is leftover material from previous construction projects, reuse materials where possible.	
Airfield Pavement Maintenance	Perform general airfield pavement maintenance.	Upkeep of airport facilities maintains the integrity of the airport for its patrons. Specifically, pavement maintenance maintains the proper pavement condition index rating.	

KEY
 Air Quality
 Community Well-Being
 Energy
 Dark Sky
 Natural Resource Management
 Land Use
 Planned Development
 Resiliency and Preparedness
 Waste Management
 Water

ARFF - Aircraft Rescue and Firefighting Facility LED: Light-Emitting Diode
 RPZ: Runway Protection Zone RDC: Runway Design Code
 CatEx: Categorical Exclusion EA: Environmental Assessment
 MITL: Medium Intensity Taxiway Lights NEPA: National Environmental Policy Act
 REIL: Runway End Identifier Lights ROFA: Runway Object Free Area
 LEED: Leadership in Energy and Environmental Design

Source: Sustainable Aviation Guidance Alliance; Airport Management NOTE: Project implementation is dependent on federal and state grant funding and availability. The CIP is based on FAA fiscal year programming. *A stub taxilane is a taxiway that connects a runway to a parallel taxiway or a taxiway to an adjacent apron area (FAA).

incorporate sustainable design elements that would enhance passenger experience. The use of low-emitting materials would improve air quality, and additional windows would allow for increased natural light and improved outside views. Overall, any capital improvement project that would reduce incompatibility between airport operations and its surrounding community, and create a greater user experience while at the airport, will positively impact the Community Well-Being category.

Energy



- Reduce electricity use at the airport by 15 percent below 2013 levels by 2020.
- Reduce natural gas use at the airport by 2 percent below 2013 levels by 2020.
- Secure 35 percent of electricity used in buildings and operations from renewable sources by 2020.
- Net Zero by 2030.

Projects that incorporate energy reduction measures, as well as renewable energy technology, are ways the airport can reduce its reliance on fossil fuels. Projects proposed within the Master Plan, including the construction of a snow removal equipment building (SREB) and the purchase of new security equipment for the terminal, can incorporate energy-efficient design/equipment, which would help the airport meet its energy goals. The new terminal building also offers opportunities for increased energy efficiency by considering the incorporation of solar panels and/or other renewable energy sources, as well as operable windows that, on temperate days, would allow for the use of passive, free cooling. Any project that better connects the airfield and/or the landside facilities to the airside, will help the airport reduce its energy consumption simply by increasing the efficiency of which patrons and airport employees can get from one place to another.

Dark Skies



- Become the most “International Dark Sky Compliant” commercial service airport in the nation.
- Improve lighting in areas at the airport to meet and, if possible, exceed the goals of the International Dark Sky Association and the City of Flagstaff Outdoor Lighting Standard, as permitted by FAA regulations.

The construction of the Snow Removal Equipment Building (SREB) should incorporate into its design lighting that helps the airport support the City of Flagstaff’s goal of protecting the night skies. Further, the design of any new facility at the airport should include lighting that conforms to Dark Skies standards. In addition to new facility projects, the airport should actively replace all non-conforming lighting with options that adhere to the Dark Skies standards.

Natural Resource Management



- Manage the airport property to protect habitat, where able, while ensuring the safe and efficient operation of the airport.
- Minimize wildlife hazards to enhance safety for aircraft operations.
- Reduce potential for fire hazards on-airport through community partnerships.

Meeting the airport’s natural resource management goals means protecting the airport from wildlife, potential fire hazards, and maintaining safety and efficiency. Designing a drainage plan that minimizes the amount of pooling water is a project that works toward these goals because it would eliminate a current wildlife attractant. Using building materials that are less toxic will also positively impact the Natural Resource Management category, like using zero- or low- volatile organic compound paint for the relocation of the hold lines. Projects that can incorporate permeable pavement, reducing the amount of hardscapes on airport property, will reduce the burden on the local stormwater system and natural waterways. Again, the construction of a new terminal building offers ways for the airport to work in concert with the surrounding forests. Options to consider include reducing light pollution by using downlighting and harvesting gray water that could be reused in landscaping and toilets.

Land Use and Transportation



- Continue to encourage local jurisdictions to enable aviation/land use compatibility around the airport currently and in the future.
- Work with surrounding communities to proactively address aircraft noise issues.
- Increase connectivity between the airport and the community to allow for multi modal alternatives for transportation.

To meet this goal, the airport is taking on projects that secure its compatibility with the surrounding community while providing increased access to the airport. The project that involves acquiring approximately 180 acres of property for safety areas will help protect the airport from incompatible encroachment to ensure it can continue operating safely and efficiently into the future. The expansion of the terminal vehicle parking lot will increase accessibility for airport patrons, with the opportunity to encourage alternative transportation modes by designating spaces for carpool, hybrid vehicles, and charging stations.

Planned Development



- Develop and maintain facilities and infrastructure at the airport to support long term, compatible, efficient, and flexible growth.
- Integrate sustainability into all major airport planning documents and contracts, where applicable.
- Enhance sustainability practices for all airport activities (i.e., operations and maintenance, administration, procurement, design/construction/post-construction) as conducted by all involved in the operation of the airport.

Projects that incorporate sustainable elements into the construction design and post-construction operations help the airport achieve its goal of creating an environmentally-conscious facility into the future. Projects like the construction of a new terminal building, the SREB, milling and overlay work on Taxiway A, ramp expansion to accommodate larger aircraft, and the rehabilitation of Runway 3-21, among many others, are all projects that the airport plans to pursue in the future. Establishing a precedent of incorporating sustainability into the design, construction, and ultimate operation of these facilities reduces the airport’s footprint in the future. The incorporation of sustainability within this Master Plan is evidence the airport is following through with its goal to integrate sustainability into all major planning projects.

Resiliency and Preparedness



- Increase operational resiliency and preparedness to the changing climate.
- Enhance the level of organizational and individual preparedness through education and training.
- Incorporate resiliency and preparedness principles into airport operations.

There are several projects the airport is undertaking that help secure a safe and flexible future for itself, including the purchase of an updated ARFF vehicle, Taxiway A rehabilitation, constructing a ramp expansion to accommodate larger aircraft, and rehabilitation of Runway 3-21. Each of these projects maintain the airport's long-term viability and financial resiliency. By incorporating resiliency into airport improvement projects, the airport is protecting itself against the uncertainty of the future, especially with a changing climate. Further, the airport can create new plans and protocols to better prepare themselves for the future; for example, by developing an infrastructure management plan.

Waste Management



- Reduce the volume of solid waste (per enplanement) sent to a landfill by the airport by 50 percent by 2025.
- Promote sustainable procurement in airport operations, including for tenants.
- Become zero waste by 2035.

All proposed construction projects within the Master Plan should incorporate initiatives to reuse/recycle materials and reduce the amount of ultimate construction and demolition waste. Once operational, the new terminal building should incorporate an internal recycling, and possibly composting, policy that reduces the amount of products that end up in the landfill. Practices like these will help the airport achieve its goal of becoming zero waste by 2035.

Water



- Reduce potable water consumption to 5 percent below 2013 levels by 2020.

Preparing a drainage plan that incorporates rainwater harvesting could help the airport meet its goal of reducing potable water consumption. Captured rainwater could be used for non-potable water needs, like landscaping and in toilet fixtures. On-site rainwater treatment facilities should also be considered as an alternative to reduce potable water consumption at the airport. Low-flow fixtures and toilets should be implemented in the ultimate terminal building, reducing the building's water use.