

PLANNING AND ENGINEERING DESIGN REPORT - SUMMARY ARDMORE MUNICIPAL AIRPORT (ADM)

SOUTH CARGO AREA DEVELOPMENT

March 2021



Submitted to:



ARDMORE
DEVELOPMENT AUTHORITY

The
**Aviation
Planning
Group**

EXECUTIVE SUMMARY

INTRODUCTION AND GENERAL SCOPE OF THE PROJECT

The Ardmore Development Authority (ADA) and The Aviation Planning Group (ADG) entered into a contract for planning, 30% engineering design, and environmental services for the development of a cargo facility area (ramp, taxiway, lighting, signage and drainage improvements) along the southern edge of the airport as depicted in **Figure 1-1**. In addition to the airside needs required for this proposed cargo area, this report also analyzes the landside needs (e.g. street, storm sewer, and utility improvements) associated with supporting said air cargo development.

The plan for this cargo facility development program includes a new taxiway system, new aircraft parking ramp (2,500-ft x 630-ft), improved street access, site development for three (3) future cargo transfer facilities, 600-ft x 100-ft each, and a US Border and Customs Control facility.

The purpose of this summary is to present an overview of findings, design considerations, recommendations, and estimated construction costs for the proposed improvements. Additional detail and support can be reviewed in the *Planning and Engineering Design Report, South Cargo Area Development*, March 2021.



Figure 1-1: General Development Area

1. AIRSIDE IMPROVEMENTS

There are three main types of aircraft that serve as air freighters: wide-body jets, narrow-body jets, and narrow-body turb-props. It was determined that the Boeing 767-200 and Cessna Caravan 208B are the aircraft that satisfy all existing airfield operating criteria and would be able to efficiently perform cargo operations for both inbound and outbound cargo operations.

The Boeing 767-200, the larger of the two aircraft, is used as the design aircraft for the taxiway, taxilanes and ramp pavement design and geometry.

Taxiway System

Key factors to consider when laying out a taxiway system: taxiways that connect to a runway do so at a perpendicular (90 degree) approach, and there shall be no direct access to a runway from a ramp without requiring the aircraft to turn. **Figure 1-2** depicts the existing layout of the Runway 31 end. While the connecting taxiway does force aircraft to turn when accessing the Runway 31 threshold, it also does not connect to the runway at 90 degrees.



Figure 1-2: Existing Runway 31 End Layout

By correcting the 90-degree requirement only, the new cargo apron would have direct access to the runway without requiring the aircraft to turn. Thus, in order to mitigate both scenarios, we propose to construct both a connecting taxiway that intersects the runway at 90 degrees as well as a partial parallel taxiway. **Figure 1-3** illustrates a new taxiway connecting to the Runway 31 threshold, a parallel taxiway to Runway 13-31, and a connecting taxiway to the ramp. The existing taxiway would be removed.

Finally, it should be noted that once this area becomes dedicated to cargo operations, the existing taxiway used for access to Runway 31 will no longer be available to aircraft from the west side of the airport. With the cargo aircraft, ground crew, tugs, etc. operating on the cargo apron, it is not safe or viable to have other aircraft taxiing through. Those aircraft will need to utilize the mid-connecting taxiway and then back-taxi on Runway 13-31 to reach the Runway 31

end. This also highlights the importance of constructing a parallel taxiway (at least up to the mid-connecting taxiway) for Runway 13-31.

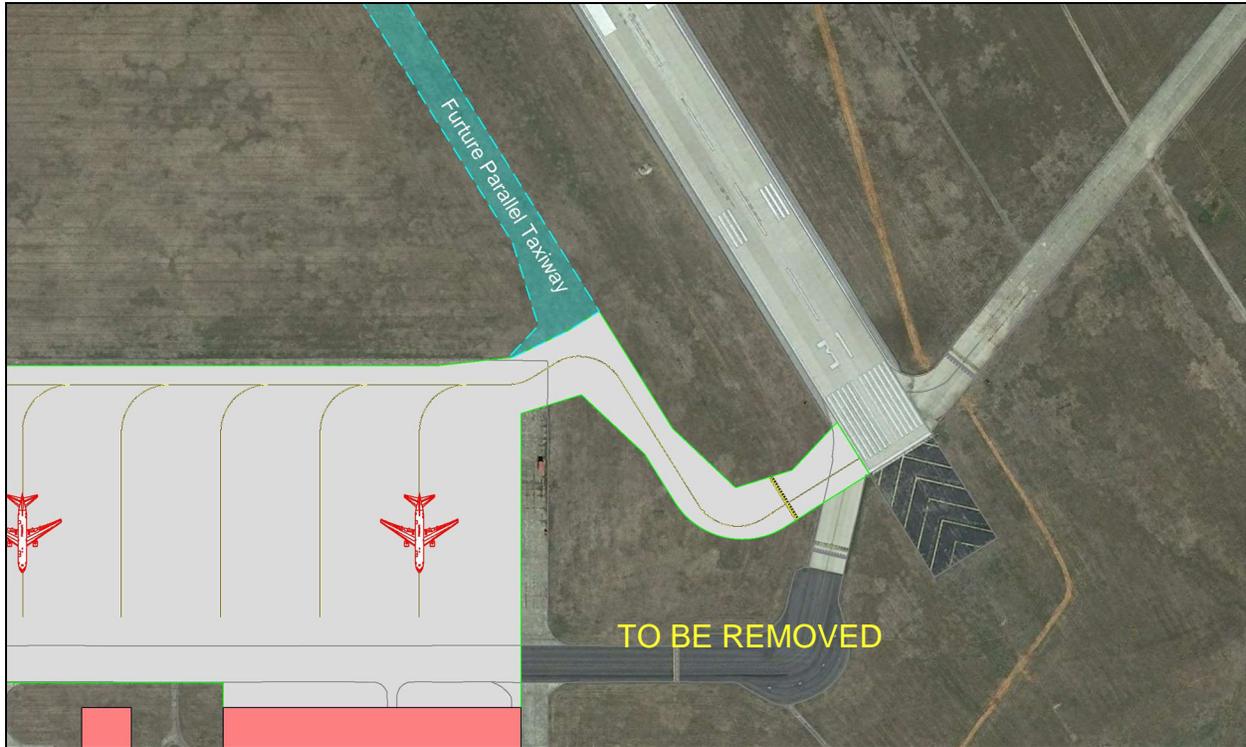


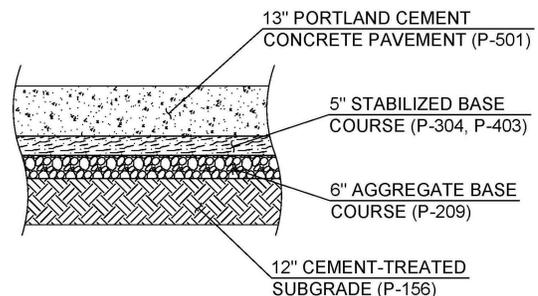
Figure 1-3: Proposed Runway 31 End Layout

Cargo Ramp

Figure 1-4 depicts the entire development site including the full aircraft ramp and transfer facilities. In developing the ramp area layout, the following design criteria were utilized:

- Aircraft should be parked as close as possible to the freight building in order to reduce the amount of ground traffic movement and to reduce exposure to sensitive climate-controlled cargo to differing conditions.
- Sufficient length and maneuvering space must be available for aircraft tugs and towbarless tractors.
- Sufficient space and clearance must be provided for loading equipment operating in front of nose-loaded cargo aircraft configured in the upright position.
- Adequate separation is needed between wingtips of aircraft occupying adjacent parking positions, as well as between wingtips and any fixed or movable object.

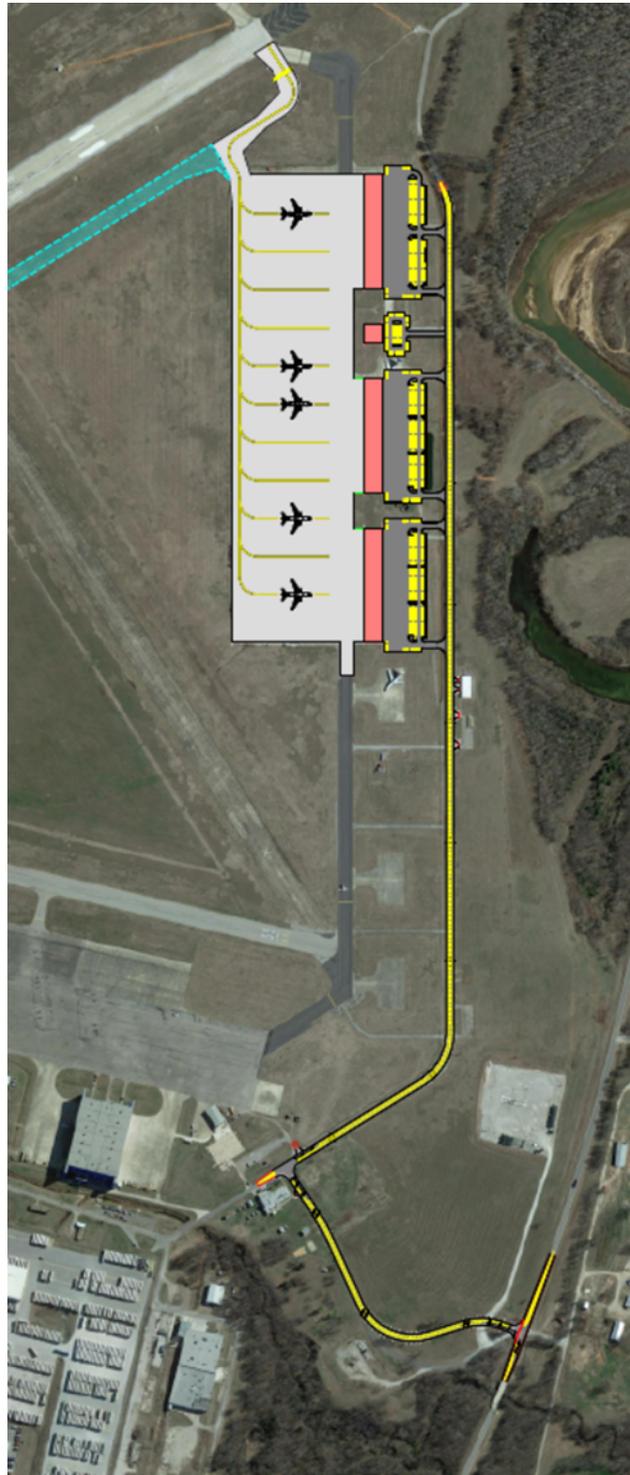
Using FAA criteria, to the right is the recommended pavement section for the taxiway and ramp area.



New LED taxiway and ramp edge lighting and signage will be installed along the pavement edges

as required by FAA. The current Taxiway D does not have a lighting system, so this addition will be a safety improvement for the airport.

FIGURE 1-4: Proposed Cargo Area Layout and Access



2. LANDSIDE IMPROVEMENTS

A Traffic Impact Study (TIS) was prepared to analyze the proposed landside traffic patterns associated with the proposed Phases 1-3 of the cargo area development and provide recommendations pertaining to roadway justification, roadway width, intersection configuration, and intersection control.

The TIS resulted in the following conclusions:

- Internal roadways (Grumman Street and Airport Access Road) will require three 12-foot lanes.
 - One lane is required for each direction of travel plus one median lane allowing for two-way left turn.
- The existing Airport Access Road that is to be improved is sufficient to accommodate anticipated traffic for Phases 1-3. Thus, the additional State Highway 53 access road proposed is not necessary for the near term and should be considered at a later time for Phases 4-5 or when additional industrial development occurs at the northeast area of the airport.
- Stop signs are sufficient to control both the intersection at Grumman Street/Airport Access Road and Airport Access Road/State Highway 53.
- It is recommended to have minimum 100-foot left turn lanes at both intersections except the eastbound approach on State Highway 53, where a 50-foot left turn “pocket may be more adequate due to the tight space between the existing bridge and the intersection.”
- Access onto State Highway 53 will have minimum impact on the traffic operation on the State Highway 53 corridor. By providing a dedicated east-bound left turn lane on State Highway 53, the eastbound and westbound through traffic will remain free flowing and have minimum delays.

STATE HIGHWAY 53

As noted in the TIS, State Highway 53 will need to be widened to accommodate traffic turning into the development on the airport entrance road. Coordination with ODOT will be required to get approval for said widening and any other improvement ODOT deems necessary. The engineer will coordinate with ODOT for the appropriate pavement section based on the existing pavement section in the area and the traffic data associated with the highway. The exact location of the tie-in of the airport entrance road will also be coordinated with ODOT to ensure it is acceptable with their design standards. This report will be submitted to ODOT for their review and comment. Once the Development Authority is ready to proceed with construction documents, a driveway modification request will need to be submitted to ODOT District 7 for their input and approval.

Figure 2-1 and **Figure 2-2** depict the intersections with the proposed traffic improvements.

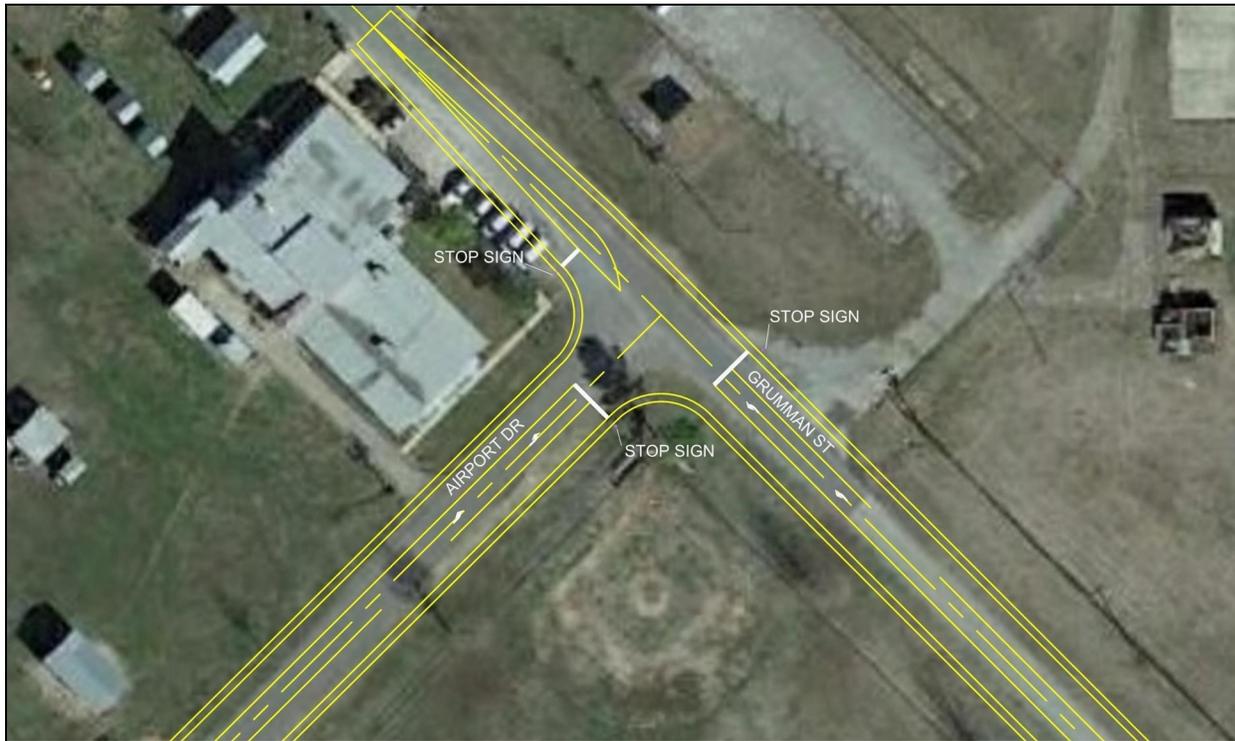


Figure 2-1: Grumman Street/Airport Access Road Proposed Intersection



Figure 2-2: State Highway 53/Airport Access Road Proposed Intersection

GEOMETRIC DESIGN

The TIS recommended the travel lanes be 12 feet in width. It suggested a total of three travel lanes for the airport access road and Grumman Street – one lane in each direction and a lane in the median to serve as a two-way left turn lane.

In addition, the TIS suggests four-foot-wide shoulders on the outside lanes (which would then utilize roadside ditches to convey storm runoff). However, given the urban/suburban nature of the project and the desire for future high-end development, our recommendation is to install a curb and gutter system to capture the surface runoff (along with curb inlets and storm pipe). The curb will be two feet wide with the gutter approximately seven inches from the back of curb. **Figure 2-3** depicts the typical total width of the roadway section.

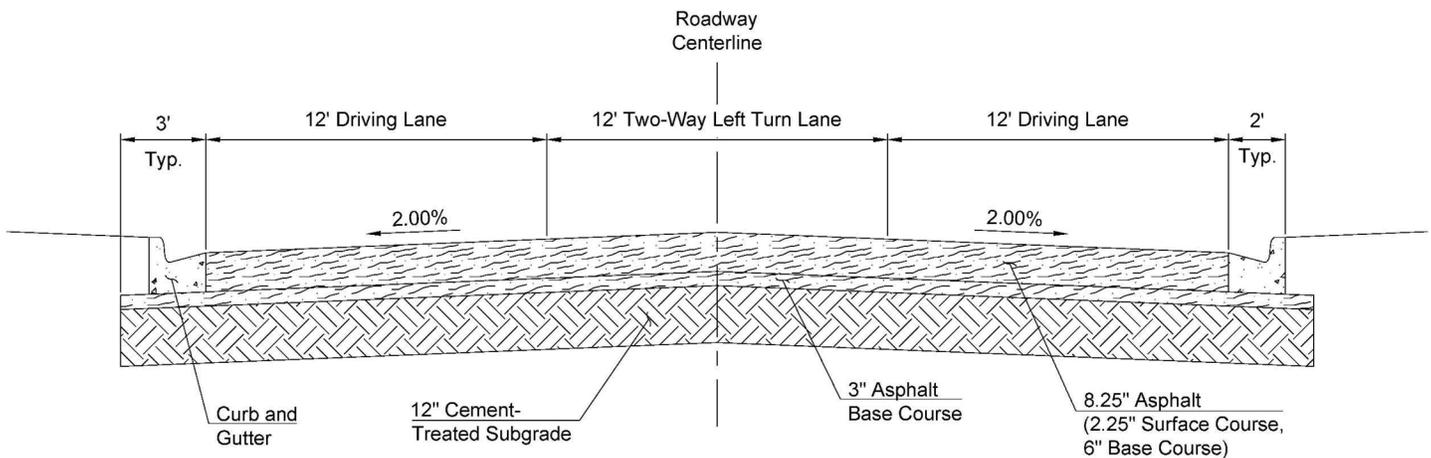
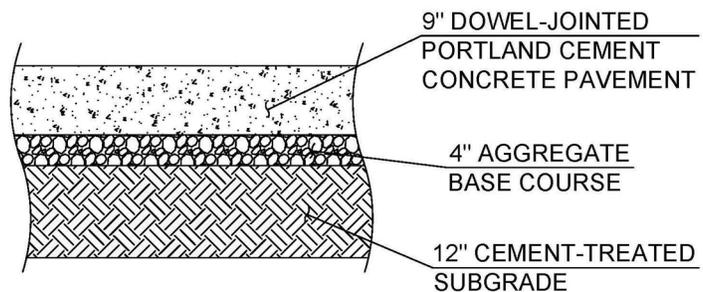


Figure 2-3: Roadway Typical Section

Chapter Sixteen of ODOT’s *Roadway Design Manual* provides guidance for roadway pavement design. Both rigid (concrete) and flexible (asphalt) pavement sections are provided as options in the design criteria. The type of roadway, traffic anticipated, and existing soil characteristics play a role in the design of the pavements.



LIGHTING, SIGNAGE, AND MARKING

The City of Ardmore’s policy for streetlights involves the franchised vendor that provides electrical service to install any streetlights required for new developments. Coordination with the franchised power company, Oklahoma Gas & Electric (OG&E), will be required during the design of construction documents and the construction phase in order to ensure proper installation sequencing relative to other construction activities. During discussions with OG&E, they indicated their preference for the street lights to be located only on one side of the street. In addition, they requested the street lights be located on the opposite side of the existing overhead power lines currently adjacent to Grumman Street. Thus, the lights will be located on either the south side or north side of the street only, and changing as necessary depending on where the overhead power line is.

Street lights will be spaced at approximately every 200 feet to accommodate the completed analysis. It is recommended that the 30' light poles are furnished with a breakaway system to provide increased safety in the event of a vehicle to light pole collision.

All signage required for the street improvements will be installed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). As previously described in the TIS, both intersections will be controlled via Stop sign.

DRAINAGE

Comparison of discharges for existing, proposed site, and future conditions indicated an increase of 102.8 cfs resulting from the development of the proposed site and 96.6 cfs from development of the west site. The future development results in a further increase of 564.4 cfs, for a total increase of 763.8 cfs.

As this is a significant increase, the impacts of the increase were evaluated. The increase from the storm sewer outfall and from the building sites impacts the Washita River floodplain and the increase from the storm sewer outfall also impacts the Big Branch floodplain.

Stormwater runoff from the apron and airfield, an existing system of pipes already conveys a significant amount of the surface water across Grumman Street and into the Washita River. At the downstream-most end, the pipe is 60 inches in diameter, carrying a significant amount of discharge during large storm events. In order to ensure the street improvements, have no adverse impacts on that system, it is our intention to avoid tying into it. Instead, new pipes will parallel the existing system to a similar outfall to the south.

3. ENVIRONMENTAL CONSIDERATIONS

Despite the use of non-FAA funds for this project, all construction activities on Federally-obligated land, including the airport property within ADM, are required to get environmentally cleared by the FAA. Coordination was initiated with Mr. Dean McMath with the FAA to begin the process. It was determined that a Documented Categorical Exclusion (CATEX) would be sufficient to document the associated environmental impacts. In addition, even after the Documented CATEX receives FAA approval, engineering design still must take into consideration a number of environmental factors described in this document. They include:

CULTURAL RESOURCES

Improvements to Airport Road are located in the vicinity of Big Branch Cemetery/Ardmore Air Park Cemetery. Improvements in this area have been preliminarily designed to avoid the cemetery. However, the cemetery is located in a floodplain, and its extents are not well defined. If cultural materials or human remains are encountered during construction, work shall cease immediately at that location, and the FAA and SHPO must be notified to determine the appropriate course of action.

MIGRATORY BIRD TREATY ACT (MBTA)

Trees are anticipated to be removed as part of the project to accommodate the realignment of Airport Road. It is recommended that these trees be removed outside of nesting season, between October 15th and March 31st. If removal takes place from April 1st to October 14th, trees

must be examined to determine whether active nests are present. If an active nest of a species protected under the MBTA is identified, removal of the tree shall not take place until the nest has been observed to be inactive.

HAZARDOUS MATERIALS

The proposed improvements to Airport Road and State Highway are located in an area historically occupied by an ordnance landfill. This unpermitted landfill has resulted in the leeching of industrial solvents in the vicinity. The plume of industrial solvents has been documented through extensive subsurface investigation, primarily led by the US Army Corps of Engineers (USACE). The USACE and Oklahoma Department of Environmental Quality (ODEQ) has stipulated that at least three feet of clean soil must remain in place above the former landfill material. The current design concept maintains this three-foot soil buffer. However, should design be modified in the future, coordination with the USACE and/or ODEQ must be completed to determine acceptable mitigation alternatives.

Additionally, three monitoring wells are currently being utilized in the vicinity of Airport Road, State Highway-53, and Grumman Street. The current design concept does not require removal of any of the three monitoring wells. If the design should be modified in the future, coordination with the owner of the monitoring well, as well as the Oklahoma Water Resources Board (OWRB), must occur.

PERMITTING REQUIREMENTS

Prior to construction, a Notice of Intent must be filed with the ODEQ. A Stormwater Pollution Prevention Plan (SWPPP) shall be developed prior to filing the Notice of Intent. The SWPPP shall describe the project area and its outfalls in detail, and describe BMPs to be utilized to minimize erosion and sedimentation of nearby waterbodies. The SWPPP should consider all land disturbance being completed with the current phase of the project.

Prior to removal of the sewage lagoon located within the footprint of the Phase II cargo apron and truck parking, permitting requirements must be coordinated with the ODEQ. Removal of this lagoon may occur prior to Phase II of the Proposed Action, when the Wastewater Treatment Facility (a project unrelated to the Proposed Action) is completed. However, if the lagoon has not been removed from service prior to the design of Phase II of the Proposed Action, the City will need to obtain the required permit prior to commencing removal of the lagoon for the South Cargo Area.

CONTINUED ENVIRONMENTAL MONITORING

The South Cargo Area is subject to additional permitting and/or plan notes, depending on how the design is modified. It is recommended that an environmental professional continue to be included in milestone design evaluations to ensure compliance with State and Federal environmental requirements.

The final consideration for horizontal layout of the new cargo apron involves the environmental aspect at the Ardmore Municipal Airport. In addition to the items detailed in previous sections, the airport has a history of other environmental concerns, including the use of industrial solvents and disbursements of sewage. The existing pavement at ADM acts as a barrier between these potential pollutants and the ground surface. The FAA's Environmental Specialist has historically recommended (at a minimum) leaving the pavement footprint in place in order to avoid vapor

intrusion. Thus, we recommend showing a similar footprint in apron pavement as the current condition. In addition, it is recommended to only remove the pavement that is to be reconstructed, so the removal of existing pavement will need to be further broken down into phase-specific requirements instead of all at once.

SUSTAINABILITY

During design there will be efforts to also provide sustainability measures to prevent adverse effects on the environment. Further testing will be performed on the existing pavements to determine if the pavement is acceptable to crush and re-use as a base material under the new pavements.

In addition, LED lighting will be utilized when available to decrease electrical power needs.

4. WATER SYSTEM

In order to provide the proposed development areas with an adequate water supply for both consumptive demand and fire flow demands, it is recommended to install separate systems for each within the development area.

By separating the fire flow demand from the rest of the distribution system, the distribution mains can be a standard size as opposed to the larger diameter mains that are required to carry the large fire flows. It is recommended to install 8" distribution mains to the proposed development areas. Ideally these mains would connect to the existing distribution system at multiple locations to allow for looping of the system and to provide multiple avenues of service. However, to reduce the initial costs of the construction, the proposed plan would be to install a single water line along Grumman Road to serve Phases 1 to 3 initially.

Water required for fire flow demands does not require disinfection nor does it matter if the water becomes stagnant since it is only used for fire flow needs. The water mains for the fire flow system would be 20" diameter through Phase 3 in order to deliver the flow to the area of need with minimal restrictions. A water storage tank to supply the fire flow requirements would be required at the airport along with a booster pump station to deliver the fire flow at rates and pressures needed.

5. SANITARY SEWER SYSTEM

The sanitary sewer system will consist of a gravity collection system comprised of mostly 10" or 12" diameter pipe and 4 ft. diameter manholes meeting City standards. The new line will parallel Grumman Road and connect to the existing collection system at the pump station located at Airport Road and Grumman Road.

6. GENERAL CARGO TRANSFER FACILITIES

Cargo storage and handling systems are designed for the unique attributes of products being transported, and handling methods vary in and among air cargo carriers, shippers, and manufacturers.

The cargo transfer facility serves four principal functions:

- Conversion (breakdown and buildup of cargo pallets and Unit Load Devises)
- Sorting (arranging ULDs and cargo by air carrier, destination and flight)
- Storage (on a short-term basis), and
- Facilitation (customs inspection, dept of agriculture exam, etc.) and documentation.

The cargo transfer facilities plan for this development program includes three (3) facilities, each 600-ft x 100-ft, however cost for the cargo facility is not included with this report. A US Customs and Border Protection operation building has been included in the cost associated with this report.

7. ENGINEER’S PRELIMINARY ESTIMATE OF PROBABLE CONSTRUCTION COST
(v. 4-15-21)

Airside Improvements	\$ 23,800,000
Street Improvements	\$ 4,250,000
Utility Improvements (Water Supply)	\$ 650,000
Utility Improvements (Fire Storage)	\$ 3,300,000
Utility Improvements (Sanitary Sewer)	\$ 1,800,000
General Cargo Transfer Facilities	<u>\$ 2,087,500</u>
Construction Subtotal	\$ 35,887,500
Contingency (10%)	\$ 3,588,750
Engineering and Architecture Design	\$ 3,947,625
Construction Inspection and Materials Testing	<u>\$ 3,158,100</u>
	\$ 46,581,975