

Des Moines International Airport







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- Schedule



- Existing Conditions
- Prior Study
- Proposed Layout
- Utilities
- Program Schedule
- Program Budget

KEY POINTS

- Enabling projects to free east quadrant space for future terminal.
- Underutilized 40acre concrete apron.
- Allow for tenant expansion when needed.

The Des Moines Airport Authority (the Authority) authorized the completion of the South Quadrant Planning and Programming Study so that a comprehensive plan would be in place to support the enabling projects required to relocate east quadrant tenants Signature Flight Support and Des Moines Flying Service (DMFS) from the east quadrant prior to development of the new passenger terminal. The required relocation of these tenants triggered the Authority to consider improving the layout of the south quadrant to be better equipped for anticipated future cargo, corporate, and general aviation growth.

Existing Conditions

The south quadrant currently accommodates air cargo, general aviation, airfield maintenance, and aircraft maintenance activities. The bulk of the infrastructure revolves around the 40 acre south cargo apron, which is where Fed Ex and UPS park their aircraft. The apron is 17" thick, designed to accommodate heavy cargo loads, and is in good condition with an average PCI of 82. In recent years, the apron would typically handle seven cargo aircraft a day. However, with UPS removing its 2nd Day Service to Des Moines in June 2017, this number is down substantially to three aircraft a day. Therefore, the largest asset on the south quadrant is underutilized. Overall, the existing conditions today are similar to when HNTB conducted their site layout, except for the recent decrease in cargo activity.

Prior Study

HNTB has been retained by the Authority to complete planning and programming for the proposed new passenger terminal. HNTB included a proposed south quadrant layout in their 2016 "Terminal Site Study Plan" as shown in Figure 1. The layout proposes the removal/relocation of Buildings 33-35 to extend existing SW 28th St. to the relocated Signature and DMFS hangars. Apron expansion projects would occur on the east and the west side to provide airfield access to future corporate and general aviation tenants. UPS would relocate out of Building 35 and into Building 31 or a newly constructed facility adjacent Fed Ex. T-hangar expansions were proposed on the west end of the site, adjacent to existing t-hangar facilities.

Proposed Layout

Starting with the HNTB 2016 layout, and through multiple design iterations the final proposed layout of the south quadrant was formed. The four anchor tenants (DMFS, Signature, Fed Ex, & UPS) formally met with the Authority Staff and Foth on two separate occa-



sions to discuss their current and future site needs in the south quadrant. The proposed layout in Figure 2 on Page 2 represents the needs of the affected tenants, and also achieves the Authority's goal of providing accommodations for future corporate and general aviation growth while maintaining flexibility.

With the recent decline in cargo activity, the consolidation of Fed Ex and UPS operations to a smaller footprint on the apron became possible. This plan allows for all cargo operations to be located on 15 acres of apron located on the northeast end of the site. Fed Ex will relocate to a newly constructed facility on the cargo half of the apron. The proposed building is 40,700 SF and is shared with UPS Cartage in similar fashion to existing Building 32. This building can theoretically expand an additional 100' to the northwest before encroaching into the taxilane object free area for the general aviation apron. UPS will relocate operations from Building 35 to Building 31. A 10,000 SF expansion to Building 31 is planned as part of their relocation. Six aircraft parking spaces will be available to cargo aircraft, with two dedicated to Fed Ex, two dedicated to UPS, and



KEY POINTS

- Provide significant corporate hangar capacity.
 - Consolidated
 deicing pad.

another two available as flex spaces. A consolidated deicing pad will be located on the northwest end of the cargo apron; aircraft will no longer be able to deice from their parking position. A consolidated deicing pad will significantly reduce the area of apron needed to be treated for contaminated runoff.

With the relocation of cargo to the northeast, there is 1,000 LF of apron frontage available for general aviation use. This area is planned for up to (4) 24,800 SF hangar buildings and an FBO terminal for Signature. During communication with Signature they believed that (3) 24,800 SF hangars and the terminal would be constructed during Phase 1, with the fourth space remaining available for future development.

The proposed layout has Des Moines Flying Service positioned on their own apron to the west of the general aviation apron. The site allows for up to 42,500 SF of hangar building, with 32,500 SF being constructed in Phase 1. Ongoing talks with DMFS will be necessary to determine initial site needs.

The Phase 1 layout is shown on Figure 3 of Page 3. Phase 1 is the minimum amount of construction necessary to meet the relocation needs of the four anchor tenants.

Ultimately, thirteen locations have been identified for future corporate hangars on the proposed layout. These proposed large corporate hangars were sized to accommodate up to a Gulfstream G650, a large corporate jet on today's market. These corporate hangars are not included in the Phase 1 build, but will be constructed post Phase 1 on an as needed basis.





Utilities

KEY POINTS

- Signature, DMFS, UPS, and Fed Ex requirements influenced the layout
- Utility upgrades are needed throughout the site.
- Utility service providers have been included during the planning.

Utility coordination between the Authority and service providers was included in the south quadrant planning. Included in this study are the proposed utility plans for communications, electric, gas, sanitary sewer, storm sewer, and water. The majority of the utility implementation will occur during the SW 28th St. Extension construction project planned to be completed in 2019, see Figure 4.

The Authority's Technical Systems Manager provided the required communication infrastructure needed to support the south guadrant expansion. These requirements have been reflected in the utility layout within the report.

Coordination has occurred with Mid American to establish electric layouts to support site development and future demand.

Coordination with Mid American to establish natural gas supply and demand has been ongoing. The maximum for the ultimate buildout is estimated to be 56,800 cubic feet per hour. Mid American has indicated that upgrades will be needed, but has not communicated the plan at this time.

The proposed sanitary sewer layout has been discussed with the Des Moines Water Reclamation Authority (WRA). The WRA is in favor of the proposed layout that will remove the lift station and force main within the south quadrant, and route sanitary sewer to the South East Airport Lift Station south of Army Post Road. An estimated 1,650 LF of existing sanitary sewer will need to be removed and replaced during Phase 1 construction.

Water main location and supply rates have been evaluated for the site. A new 12" water main off of Army Post Road is planned to improve the fire flow rate to the future buildings. It is assumed that all future buildings will require internal sprinkler systems which reduces the required fire flow rates. The water supply from the Des Moines Water Works booster pump station near Coca Cola on Army Post Road is capable of delivering required fire flows to the site. The Authority will not be providing a centralized water supply pressure tank; rather tenants will be required to provide fire booster pumps and/or tanks for their specific development needs.

The storm sewer plan will utilize a combination of existing and proposed storm sewer. Storm water runoff for the General Aviation Apron, DMFS, and Cargo aprons will drain to Frink Creek to the northwest, as is the case today. The remaining development will enter the regional detention basin. Storm sewer construction will occur along the SW 28th Street extension to accommodate runoff from building roof drains and landside pavement. The existing storm sewer infrastructure cannot accommodate these runoff flow rates, therefore, a new run of 48" diameter storm sewer will convey this runoff to the regional detention basin.









Figure 4

Utility Corridor

KEY POINTS

- Phase 1 Construction 2017-2020.
- Phase 1 Authority costs: \$35 million

Program Schedule

A primary goal for the study was to develop a plan that can be implemented in phases as need dictates. The proposed layout facilitates two separate development sites; the General Aviation Apron, and the Corporate Hangar Park. The General Aviation Apron includes all development that will be accessed from the SW 28th extension. Phase 1 construction in the GA Apron (Teal color Figure 5) is the minimum amount of construction needed to complete the east quadrant enabling projects. From years 2017-2020 the design & construction of DMFS, Signature, Fed Ex, and UPS will occur on this site. A T-Hangar and building pad are currently under construction at the T-Hangar GA site to enable the relocation & demolition of existing Buildings 33 & 34.

The remaining planned infrastructure is labeled as "future" in Figure 5. The order of construction for these future projects is as they appear in the legend. The future corporate hangar projects will be constructed on an as needed basis, thus a projected construction year was not given for these projects.

Program Budget

Significant capital investment will be necessary to construct the south quadrant additions. An estimated Phase 1 cost breakdown by year in 2017 dollars is contained in Figure 6. The dollar amount is the Authority's estimated required contribution to each project. The four year combined estimate is \$35 million.

Conclusion

The Des Moines Airport Authority is currently constructing projects in the south quadrant to allow for future terminal growth in the east quadrant and to better provide for growth in the general aviation market, while accommodating the needs of cargo operators at DSM. The south quadrant layout will be updated, separating cargo and general aviation activities, and allowing for more FBO and corporate aviation hangar space. Communication with the primary tenant stakeholders DMFS, Signature, Fed Ex, and UPS had a great impact on the proposed layout. Phase 1 construction is slated for years 2017-2020 and at an estimated cost to the Authority of 35 million dollars.



| | Project | 2017 | 2018 | 2019 | 2020 |
|--------------------|--------------------------------------|-------------|--------------|--------------|-------------|
| | 18 Unit T-Hangar | \$3,800,000 | | | |
| | South Quadrant Planning | \$247,000 | | | |
| | Building 33 Relocation & Office | | \$840,000 | | |
| | Fed Ex Relocation | | \$10,085,600 | | |
| | UPS Relocation | | \$440,000 | | |
| Figure 6 | Building 33 Site & 34 Demolition | | | 748,000 | |
| Initial Investment | Building 35 Demolition | | | \$1,532,000 | |
| | Signature Hangars | | | \$1,070,000 | |
| | Des Moines Flying Service Hangar | | | \$4,420,000 | |
| | SW 28 th Street Extension | | | \$2,949,000 | |
| | South General Aviation Apron | | | | \$5,664,000 |
| | Frontage Taxiway and Apron | | | | \$3,254,000 |
| | Totals | \$4,047,000 | \$11,365,600 | \$10,719,000 | \$8,918,000 |



Figure 5





Chapter 1 Existing Condition



Existing Conditions

Existing Conditions

KEY POINTS

- 40 Acre Cargo Apron
- Many Uses: Cargo, GA, Airfield Maintenance, **Aircraft Mainte**nance
- Significant Cargo underutilization as of July 2017.

The existing south quadrant of the Des Moines International Airport has a variety of operations including cargo, general aviation, airfield maintenance, aircraft maintenance, federal facilities, and fuel farm facilities. Figure 1-1 labels the existing facilities in the South Quadrant.

The Des Moines International Airports largest asset in the south quadrant is the South Cargo Apron. The 40 acre apron was constructed at a 17 inch depth to accommodate heavy cargo operations. The apron is in good condition, with an average PCI of 82. The west 24 acres constructed in 2003, and the east 16 acres constructed in 1989. The apron has sufficient lighting, with a series of high mast lights positioned throughout the apron. During winter months Fed Ex and UPS are able to deice anywhere on the apron, therefore, runoff throughout the entire apron is treated in the deicing tanks located between South Cargo and Taxiway P, or is diverted to the terminal deicing tanks.

Fed Ex has two parking positions in close proximity to Building 32, whereas UPS has scattered up to seven aircraft throughout the apron. These cargo tenants also store approximately 150,000 SF of Ground Support Equipment (GSE) around the apron. The 40 acre apron has accommodated up to seven daily cargo aircraft for the past several years. However, the UPS reduction in daily flights from five to one has created a significant underutilization of the apron.

Buildings 33 relocation and 34 demolition have been planned prior to this study. Currently under construction is the 2017 Construct T-hangar project, which will alleviate the need for these buildings at their current location. Building 35 is in the worst existing condition of any building in the South Quadrant, nearing the end of its useful life. The FAA's remote transmitter/ receiver (RTR) structure is located in the South Quadrant. This structure is responsible for transmitting/receiving all communication between the tower and aircraft.





Figure 1-1



Chapter 2 **Overview & Goals**

- Proposed Overview
- Goals

- HNTB Report

South Quadrant Overview HNTB Report

KEY POINTS

- Signature and DMFS Relocation to the South Quadrant
- Cargo Expansion
- Corporate Expansion
- General Aviation
 Expansion

South Quadrant Planning & Programming was completed in conjunction with the Des Moines Terminal Site Study Program. In October 2016 following the Board's decision to keep the proposed passenger terminal in the east quadrant it became apparent that the south quadrant would need to be reconfigured to allow for relocation and expansion of general aviation facilities.

HNTB's Terminal Site Study Report identified that in order for the east terminal concept to work, enabling projects would have to occur first in the south quadrant. The enabling projects include the relocation of Signature Flight Support and Des Moines Flying Service (DMFS). Additional themes from the report include providing room for cargo, corporate, and GA expansion as required by demand.

Figure 2-1 details HNTB's initial proposed layout in the south quadrant. Initial construction would include an apron expansion to the west of the existing cargo apron. Signature and DMFS would have a combined 90,000 sf of hangar and office space to operate on this new apron. Buildings 33, 34, and 35 would need to be demolished to allow for this construction.

UPS would relocate out of Building 35 and into Building 31 or to a newly constructed building adjacent to Fed Ex. Cargo aircraft parking positions would remain as existing, utilizing the entire South Cargo Apron.

The easterly side of the south quadrant proposes a new taxilane, apron, and five hangar buildings for future corporate growth. The westerly side proposes two additional T-Hangars and six small box hangars for GA growth.

This first south quadrant layout provided a solid foundation to begin ultimate layout discussions. This layout was going to evolve as the site was analyzed in closer detail, and as the affected stakeholders voiced their needs.





South Quadrant Goals

KEY POINTS

- Relocate Signature and DMFS
 - Separate GA from Cargo
- Consolidate Deicing
- Space for existing tenant expansion.
- Space for corporate hangar growth.

The south guadrant is unique because it provides landside and airfield access to many different aviation activities. These activities include cargo sort facilities, general aviation hangars, aircraft maintenance hangars, airfield maintenance buildings, FAA RTR facility, commercial terminal parking, and fuel farms. Each activity has specific infrastructure needs in order to provide safe and efficient operations. The south quadrant is also unique because it has a 40 acre concrete apron that is underutilized and in good condition. This asset can be maximized if utilized effectively.

Relocate General Aviation - The relocation of Signature and Des Moines Flying Service (DMFS) is required to support the terminal program in the east quadrant. When relocating these general aviation tenants to the south quadrant a goal was to separate their operations from cargo operations. The intermingling of airplane design group (ADG) I and ADG IV aircraft is not a safe practice.

Separate GA from Cargo & Consolidate Deicing - The separation of cargo and general aviation will require an efficient design approach to control aircraft movements on the apron. An efficient approach would include an area of apron to serve as a consolidated deicing facility. The Airport's goal is to consolidate the footprint of runoff that needs to be collected and treated during the winter deicing months.

Existing Tenant Expansion Capacity - Signature, DMFS, UPS, and Fed Ex need to have space to expand as the growing local population increases aviation activities in Des Moines. A goal is to provide these tenants with an ability to expand when the opportunity presents itself.

Future Tenant Capacity - The Airport is currently unable to accommodate any future corporate growth. A goal of the south quadrant will be to provide multiple locations for a future corpo-



rate tenant to construct large hangars and corporate aviation offices.

Phased Construction Approach - The south guadrant plan will require a large capital investment from the Airport. To lessen the immediate financial burden the site plan needs to be constructed in phases. A goal was to create a site plan to allow for construction to occur only when the need presents itself.

These goals are some of the major themes that the Air-



Preferred Concept

Cargo "Right Sized" **Expansion Capable** Flexible **Operationally Efficient** Phased Development

port Authority wanted addressed during the south quadrant planning. Many more considerations have been included to develop a preferred concept that maximizes space, cost, and efficiency. Multiple stakeholders are impacted by the south quadrant plan and their own specific goals are expressed in detail throughout the report.

South Quadrant Overview

Proposed Overview

KEY POINTS

- Fed Ex is shifted to NE half of Apron. UPS relocates to Building 31
 - Signature and **DMFS** relocated from east quadrant
- 13 locations for future corporate hangars.

Beginning with the HNTB initial layout and through many design iterations the proposed south quadrant overview is shown in Figure 2-3.

Four primary tenant stakeholders were included during the south quadrant planning and programming. These stakeholders include Des Moines Flying Service, Fed Ex, Signature Flight Support, and UPS. The Des Moines Airport Authority Directors (Executive Director, Engineering and Planning Director, Operations Director, and Finance Director) and members of Foth Infrastructure and Environment, LLC met with each stakeholder on two separate occasions to discuss their site requirements in the south quadrant. Their requirements have been well represented by the proposed overview and will be explained in further detail throughout the report.

Along with satisfying the future needs of existing tenants the Airport Authority recognized an opportunity in the south quadrant to bolster the corporate hangar footprint. The Airport in its existing state does not have a site readily available to accommodate a corporate tenant if they wanted to construct a hangar in Des Moines. The proposed overview has thirteen box hangar locations to meet the future corporate demands.

An event that influenced the proposed overview was the UPS removal of 2nd Day Air in Des Moines. Reducing their daily presence from five aircraft to one aircraft made it viable to relocate all cargo activities to the northeast half of the apron. The proposed overview allows the airport to better manage future hazardous cargo and general aviation intermingling in the south quadrant.

Ultimately, the south quadrant will become an efficient and effective way of supporting many different aviation activities.







Chapter 3 General Aviation Apron



- Overview
- Phase 1 Construction
- SW 28th Street Extension
- Signature Flight Support
- Des Moines Flying Service
- Fed Ex
- UPS
- Future Hangar Development
- Future GA Development

Overview

KEY POINTS

- Cargo & GA
 separation
- Large hangar frontage for Signature and DMFS
- Future corporate growth

The General Aviation Apron Redevelopment plan greatly improves the efficiency of the South Cargo Apron. The South Cargo Apron will be split into two distinct functional spaces; everything northeast of the high mast lights remains as cargo apron, and everything to the southeast becoming the South General Aviation Apron.

The consolidated cargo apron will continue to service Airplane Design Group (ADG) IV and Taxiway Design Group (TDG) V aircraft such as Boeing 767's and Airbus A300's that the cargo operators utilize in Des Moines. Two cargo parking positions each will be dedicated to Fed Ex and UPS respectively, with two additional positions available as flex space for both carriers during the peak season. The relocation of UPS to Building 31 and Fed Ex to a relocated building along this northeast half of the apron will completely separate all cargo and GA activity.

Relocating cargo to the northeast makes available a 12 acre parcel of 17" PCC pavement and 1,000 LF of apron frontage for hangars. It is proposed to relocate Signature Flight Support operations to this section of apron. The south GA Apron is designed to accommodate an ADG III aircraft such as a Boeing 737-800 or a Gulfstream G650.

Additional apron and taxiway pavement will need to be constructed to provide a 2.0 acre apron and 400 LF of apron frontage for Des Moines Flying Service operations. This taxiway is designed to accommodate up to a Gulfstream G650 (ADG III).

South of DMFS is a proposed taxilane and apron to provide a 1.7 acre apron with 500 LF of frontage for corporate hangars. This taxilane is designed to accommodate up to a Gulfstream G650 (ADG III). This area will be used by future corporate tenants.





Phase 1 Construction

KEY POINTS

- Relocate Cargo to
 the northeast
- General Aviation
 occupies the
 southwest

The goal of Phase 1 construction is to relocate all cargo activities to the northeast half of the apron and to relocate Signature Flight Support and Des Moines Flying Service (DMFS) from the east quadrant to the General Aviation Apron area. Details related to the program schedule are located in the "Program Schedule" section of the report.

Shown in Figure 3-2 is Phase 1 of construction. This is the minimum amount of infrastructure that must be constructed in order to meet the needs of the affected tenants.

Anticipated construction projects requiring airport funding include the Fed Ex relocation, Signature Apron Reconstruction, the DMFS taxiway/apron/hangar, and the SW 28th Street extension.





SW 28th St. Extension

KEY POINTS

- 1,200 LF road extension
- Slope Apron away from building

Southwest 28th Street currently connects the south quadrant to Army Post Road. The road will no longer dead end at Building 33 and Gate 8, but will be extended approximately 1,200 ft into the site as shown in Figure 3-3. The road will tie into existing SW 28th St. near station 22+00 at a 36 ft width. The road will decrease to a 26 ft width at station 17+00. It is anticipated that all Fed Ex tractor trailers, Signature fuel tankers, and charter buses will exit the proposed road by station 17+00. Thus, only passenger vehicles and local delivery trucks will travel on the 26 ft pavement width section. The SW 28th St. proposed profile is included in Figure 3-3

All proposed buildings have been assigned a building floor pad elevation. Each floor pad elevation allows for water to drain away from the face of the building at a slope within the FAA's tolerance. A Signature Apron Reconstruction Project is needed to tie the building pad elevations into the existing cargo apron. The existing cargo apron runs at a constant 1% slope along the edge of the apron towards Taxiway Papa. Reconstruction is necessary to transition this apron from a flat grade at the hangar face to a 1% grade at the tie in location. See Appendix B for additional information on site elevations.





SW 28th St. Extension

KEY POINTS

- Utility Corridor
- Limit utilities under pavement
- 26' pavement section width

Proposed site utilities will be constructed in conjunction with Southwest 28th St. Extension project. Proposed utilities are described in further detail in the "Utility Relocation" section of the report.

The cross section view in Figure 3-4 of the Southwest 28th St. extension displays the proposed alignment of the utilities within the right-of-way. It was intended to limit utilities underneath the roadway to allow for easier access to the utility for service connections and maintenance. Sanitary and storm sewer will run underneath the Signature Parking Lot, this is the only location where a utility is consistently underneath pavement. If a utility needs to be underneath pavement the parking lot was the preferred location over the roadway.

SW 28th St. will be crowned with storm sewer running along the south side of the road. Crossovers will occur underneath the road from curb intakes on the north side. To increase clearance distances it is recommended to stagger the locations of curb intakes, light poles, communication manholes, and hydrants.

Mid American utilities, gas and electric, are on the north side of the corridor. Electric would make a short connection to the proposed street lights.

Communication utilities and water main will run along the south side of the corridor. The proposed communication conduit location would provide enough room for the proposed 3'x5'x3' pulling manholes.





Signature Flight Support

KEY POINTS

 Initial - Combined 60,000 SF hangar. Combined 20,900 SF office.

- Initial 165 parking stalls
- Apron & taxilane to accommodate ADG III (B737)

DES MOINES

Signature Flight Support is an existing Fixed Based Operator (FBO) at the Des Moines International Airport. As a result of the proposed terminal master plan Signature needs to relocate to the south quadrant. The Des Moines Airport Authority and Foth met with the Signature management team on two separate occasions to discuss the Signature site needs.

From the meetings it was determined that Signature needed an FBO hangar similar in size and design to their recently constructed terminal in Grand Rapids, Michigan. Signature indicated that they needed 60,000 SF of hangar space initially with an ability to expand in the future. Signature also indicated that they need enough apron to park up to three Boeing 737-300 charter aircraft. Signature currently holds the fuel consortium contract at the Airport, thus, it was important to maintain close proximity to the fuel farm and an airfield site access gate. The Signature Flight Support table details the existing facility, their site needs, and the site statistics of the initial and ultimate build.

Figure 3-5 shows the plan view of the ultimate Signature Flight Support location at the general aviation apron. All of the major design needs are met except for the space to achieve their ultimate hangar square footage. Signature indicated that they would like to

Figure 3-5

Signature Flight Support

ADG:III TAXILANE

| have the ability to construct up to 120,00 |
|--|
| shown is capable of supporting up to 92, |

The proposed taxilane can accommodate up to ADG III aircraft (Boeing 737-300). The available apron to park aircraft is 236,800 sf. To illustrate the capacity of the general aviation apron Figure 3-5 displays 3-737s, 3-G650s, 4-Falcon 900s, 5-King Air 350s, and 8-fuel trucks. The northeast half of this apron will be adequately lit by existing high mast lights. It would be advantageous to mount additional lights on the proposed hangars to cover the southeast half of the apron.

Landside, Gate 8 would allow immediate access to the site from SW 28th Street. The ultimate parking lot can accommodate up to 215 parking stalls.

| Signature Flight Support | | | | | | | | |
|--------------------------|---|--|---|--|--|--|--|--|
| | Existing | Needs | Initial | Ultimate | | | | |
| Hangar Dimensions | Bldg 10 - 240'x100' Bldg 9 - 120'x125' Bldg 8 - 2 80'x80' bays | Need to be able to ac- commodate G650 | d to be able to ac- mmodate G650 3 - 160'x125' | | | | | |
| Hangar Size (SF) | Building 10 - 24,000 sf Building 9 - 15,000 sf Building 8 - 12,800 sf Total - 51,800 sf | 60,000 SF of hangar space initially with room to grow. Would like 120,000 ultimate. | 3 - 20,000 sf hangars Total - 60,000 sf | 4 - 20,000 sf 1 - 12,500' Total - 92,500 sf | | | | |
| Office Space (SF) | Building 10 - Office space is included in the 24,000 sf above | FBO - use Grand Rapids as example. Provide small office space to each hangar. | FBO - 6,500 sf Office 3 - 4,800 sf Total 20,900 sf | FBO - 6,500 sf 4 - 4,800 sf 1 - 2,250 sf Total 27,950 sf | | | | |
| Door Height (FT) | Bldg 10 ~ 19' | Door height is the lim- iting factor, need to accommodate G650, 26' | N/A | N/A | | | | |
| Parking Spaces | 113 total - 90 paved, 23 gravel | No indication of needing more parking but men- tioned 200 spaces | 165 stalls | 215 stalls | | | | |
| Apron Dimensions | 640'x210' | Need to accommodate 3 B737s | 640'x370' | 640'x370' | | | | |
| Apron Size (SF) | 134,400 sf | At capacity when large events bring multiple chartered fights. Need to accommodate 3 B737s | 236,800 sf | 236,800 sf | | | | |



~

11120 1120

69 SPACES

00 SF of hangar space. The proposed Signature site as ,500 SF of hangar, and 27,950 SF of FBO and office space.

Des Moines Flying Service

KEY POINTS

- Continued discussions with DMFS on site layout.
- Site available for future hangar/ apron expansion.
 - 63 parking spaces

Des Moines Flying Service (DMFS) is an aircraft sales, parts, and service company currently existing in the Airport's east quadrant. As a result of the proposed terminal master plan DMFS needs to relocate to the south quadrant. The Des Moines Airport Authority and Foth met with the DMFS management team on two separate occasions to discuss the DMFS site needs.

From the meetings it was expressed that DMFS preferred to have a strong visible presence airside and could compromise landside visibility. The majority of customers arrive airside to purchase or service aircraft. DMFS indicated that a 20,000 SF hangar with double the office space as existing (5,500 SF) is needed for the initial build. DMFS needs to have real estate located adjacent to their initial build to allow for future growth. Being a Honda Jet retailer, DMFS may be required to construct a stand-a-lone Honda Jet hangar to satisfy their contract.

Figure 3-6 shows the ultimate DMFS site plan. The construction of the site will include the Taxiway Papa connector taxiway and frontage taxilane reconstruction, DMFS apron, and DMFS hangar and building. Site elevations are located in Appendix B.

The layout shown in Figure 3-6 has an initial hangar build of 25,000 SF with a 7,500 SF office space. There is additional space on the site to add a future 10,000 SF box hangar. Continued discussions with DMFS remain regarding initial and future site needs.

The DMFS table below details additional design criterions that were factored into the DMFS overall site plan.

| Des Moines Flying Service | | | | | | | | |
|---------------------------|---|---|-----------|--|--|--|--|--|
| | Existing | Needs | Initial | Ultimate | | | | |
| Hangar Dimensions | Building 7 - 134'x110' | Depth is not advanta- geous. Do not like having to dump three rows of aircraft. | 250'x100' | Can add an additional 100'x100' building to the site | | | | |
| Hangar Size (SF) | Building 7 - 14,750 sf Building 8 - 6,400 sf Total - 21,150 | Proposed 20,000 sf at follow up meeting. Said enough space if office & storage are separate | 25,000 sf | Can add 10,000 sf of building | | | | |
| Office Space (SF) | Building 7 - 5,500 sf | Currently limited, utilizes office space at Signature. Double current space. | 7,500 sf | Available office space included within hangar size above | | | | |
| Part Storage (SF) | Building 8 - 80'x80' Building 8 - 6,400 sf Bldg 7 - Included in Office Space | Parts storage market is decreasing, may only need part space for maintenance | N/A | N/A | | | | |
| Door Height (FT) | 26' | 26' is sufficient but would make sense to increase height | N/A | N/A | | | | |
| Parking Spaces | Building 7 - 33 stalls Building 8 - 6 stalls | Will need to increase to match employee growth | 63 stalls | 63 stalls | | | | |
| Apron Dimensions | 300'x250' | Need enough to park two honda jets and taxi through apron, 40' wingspan | 330'x200' | 460'x200' | | | | |
| Apron Size (SF) | 75,000 sf | Enough space, don't frequently stage air- craft | 66,000 sf | 92,000 sf | | | | |





KEY POINTS

- Construct a larger facility than existing along the cargo apron.
- Building expansion capacity to the NW towards GA apron.
- Additional truck and employee parking.

Fed Ex currently operates out of Building 32 with two aircraft parking positions directly adjacent to the building. An initial goal of the south quadrant redevelopment was to separate cargo & GA aircraft movements. To achieve this it was initially proposed to relocate the parking positions to the northeast half of the cargo apron but to maintain the cargo sort operations in Building 32. Fed Ex responded that having to travel 500 LF from the sorting facility to the aircraft would increase the safety risk and decrease operational efficiency. This tenant feedback, coupled with the need to provide additional landside and airside operating space for general aviation purposes sparked the relocation of the entire cargo sort facility to the northeast half of the cargo apron.

The Des Moines Airport Authority and Foth met with Fed Ex management on two separate occasions to further discuss the Fed Ex site needs in the South Quadrant. During these meetings it was discovered that Fed Ex carries U.S. Mail but this mail is sorted by UPS cartage in Building 32. As a result the relocation moves both Fed Ex and UPS cartage together, each of which has their own spatial requirements. UPS cartage requirements will be discussed on Page 16.

3,000 pieces/hour; capacity is not an issue currently. Office space is currently an issue in Building 32. FedEx has indicated that they would prefer to expand the facility during the initial reconstruction to be better suited for future growth.

The initial build would provide Fed Ex with 29,700 SF. Theoretically, the space is available to add an additional 100 LF of building beyond the initial plan (370' total building length) before encroaching on the general aviation apron taxilane object free area.

Fed Ex requested that additional trailer parking spaces be added to eliminate congestion on SW 28th St. The proposed site adds twelve trailer parking spaces initially with the ability to add onto the proposed trailer parking lot in the future.

A major improvement to the south quadrant redevelopment plan will be the consolidated de-icing pad. Fed Ex will no longer be able to deice at their parking position. Consolidating deicing operations in the south quadrant will drastically reduce deicing chemical treatment costs in the south quadrant.



| Fed Ex | | | | | | | |
|-------------------------------|---|--|--|---|--|--|--|
| | Existing | Needs | Initial | Ultimate | | | |
| Building Dimensions | Building Dimensions Building 32 - 175'x100' | | 270'x110' | Ability to grow to 370'x110' | | | |
| Building Size (SF) | Building 32 - 17,500 sf | ,500 sf Need to allow for future expansion as pieces/ hours increase 29,700 sf | | Ability to grow to 40,700 sf | | | |
| Employee Parking Spaces | Building 32 - 35 | Need more dedicated parking spots | 61 stalls | 61 stalls | | | |
| Trailer Parking Spaces | Building 32 - 24 | Need more spots to remove stacking along entrance drive | 36 stalls | Extension options NW of trailer lot | | | |
| Trailer Docking Positions | Building 32 - 3 trailer docks, 2 van loading | No shortfalls indicated | 10 docks | 10 docks | | | |
| Ground Support Equipment | 63,000 sf estimated | Sent GSE Inventory, difficult to calculate sf from the inventory. | 24,600 sf plus 33,000 sf shared and 21,600 sf of shared deicing GSE | 24,600 sf plus 33,000 sf shared and 21,600 sf of shared de-icing GSE | | | |
| *Existing values only include | le Fed Ex usage in Buildi | ng 32 Initial & ultim | ate values only inc | lude Fed Ex us- | | | |

*Existing values only include Fed Ex usage in Building 32. Initial & ultimate values only include Fed Ex usage in the proposed building. All data pertaining to UPS Cartage is shown with UPS on Page 16.



General Aviation Apron Redevelopment United Parcel Service (UPS)

KEY POINTS

- Relocate all cargo sort to Bldg. 31
 - 10,000 sf addition to Bldg. 31

• UPS cartage would remain next to Fed Ex in their new building In April 2017, UPS announced that all 2nd Day Air operations were to be terminated in Des Moines. The impact of this announcement would decrease UPS air traffic in Des Moines from five daily aircraft to one daily aircraft. The result will be UPS relocating all cargo sort operations to Building 31.

The Des Moines Airport Authority and Foth met with UPS on two separate occasions to discuss the site improvements at Building 31. UPS believed that a 10,000 sf addition to Building 31, shown in Figure 3-8, would provide them with enough space to sort all cargo shipments as well as Freight Forward shipments. Ultimately cargo would utilize 17,700 SF and Freight Forward would utilize 5,000 SF at the Building 31 site. The 5,000 SF addition for Freight Forward would allow UPS to consolidate all Freight Forward sorting to DSM. The existing van doors at UPS would need to be converted to semi trailer dock doors; the number of dock positions has not been determined by UPS at this time. A concept called "through the fence loading" was discussed; where semi trailers would back up directly to the apron adjacent to Building 31 to complete the package transfer. Employee vehicles would continue to park at the 86 spaces adjacent to Building 31. UPS Cargo will continue

Figure 3-8

to access all data at their parking position with a mobile tether unit. Therefore, UPS could theoretically park in any of the 4 parking positions on the northeast end of the apron.

The aforementioned UPS Cartage would continue to operate in the same building as Fed Ex. UPS Cartage currently leases 10,000 SF at Building 32. They have proposed to maintain their current footprint in relocated Building 32. UPS Cartage needs 4 trailer docking positions at the relocated building. UPS Cartage would continue to share employee and trailer parking with Fed Ex at the relocated site.

Similar to Fed Ex, UPS will no longer be able to deice at their parking positions. All de-icing activity will relocate to the proposed de-icing pad.

| Cargo will continue | UPS | | | | | | | |
|---------------------|-----------------------------------|--|---|---|---|--|--|--|
| | | Existing | Needs | Initial | Ultimate | | | |
| | Building Dimensions | Building 31 ~ 180'x70' Building 35 ~ 350'x80' | No indication of shortfalls here | Building 31 ~ 180'x70' | Building 31 ~ 180'x70' Addition - 133'x75' | | | |
| | Building Size (SF) | Building 31 - 12,700 sf Building 35 - 27,950 sf | Leaving Bldg 35. Could make Bldg 31 work with an addi- tion | Building 31 - 12,700 sf Addition - 10,000 sf | Building 31 - 12,700 sf Addition - 10,000 sf | | | |
| | Employee Parking Spaces | Building 31 - 24 stalls | Need 50 parking stalls | Building 31 - 86 stalls | Building 31 - 86 stalls | | | |
| | Trailer Parking Spaces | Unknown | Will need 4 trailer parking stalls | UPS to analyze during their space planning | UPS to analyze during their space planning | | | |
| a sate | Trailer Docking Positions | Unknown | Bldg. 31 will need to install dock doors. Also, four declining docks 'through the fence'. | UPS to analyze dock doors at Bldg 31. Four trailer 'through the fence' loading. | UPS to analyze dock doors at Bldg 31. Four trailer 'through the fence' loading. | | | |
| | Ground Support Equipment (GSE) | 85,000 sf estimated | Is able to consolidate GSE to 35,000 SF | 26,700 sf plus 33,000 sf shared and 21,600 sf of shared de-icing GSE | 26,700 sf plus 33,000 sf shared and 21,600 sf of shared de-icing GSE | | | |
| Perelo | UPS Cartage - Attached to FedEx | | | | | | | |
| | Building Dimensions | Building 32 - 100'x100' | No indication of shortfalls here | 100'x100' | 100'x110' | | | |
| | Building Size (SF) | Building 32 - 10,000 sf | 10,000 sf for UPS mail and 5,000 sf for freight forward | 10,000 sf | 11,000 sf | | | |
| | Trailer Docking Positions | Building 32 - 4 docks | 3 dock doors and 1 van lift door | 4 docks | 4 docks | | | |





Future Hangar Development

KEY POINTS

- 46,875 SF hangar space
- 9,375 SF office space
 - 133 parking spaces
- ADG III & TDG II

A major goal of the south quadrant redevelopment plan is to increase corporate hangar capacity. Currently, the Des Moines International Airport does not have a readily available location to add corporate hangars. The future hangar development in Figure 3-9 would provide a 1.7 acre apron and 500 LF of apron frontage for hangars.

The 150'x125' building size shown would allow for an 125'x125' hangar and a 25'x125' office for the future tenant. This hangar size could accommodate a Gulfstream G650, which is considered a large business jet in today's market. The space as shown is flexible, and land leases can be of a size as appropriate based on the tenants space needs.

The taxilane northeast of the Building 37 T-hangar would need to increase in width to accommodate ADG III & TDG II aircraft like the Gulfstream G650.

This site can be phased into the south quadrant as needed. Utility stub-outs for the hangars will be installed in conjunction with Phase 1 construction of the SW 28th St. Extension.



| Future Hangar Development | | | | | | | | |
|---------------------------|---|---|-----------------------|----------------|------------------|-----------------|--|--|
| Hangar Dimensions | Hangar Size (SF) | Office Space (SF) | Door Height (FT) | Parking Spaces | Apron Dimensions | Apron Size (SF) | | |
| 3 - 125'x125' | 3 - 15,625 sf Total - 46,875 sf | 3 - 25′x125′ 3 - 3,125 sf Total - 9,375 sf | As needed, up to 26'. | 133 | 600'x125' | 75,000 sf | | |



Future General Aviation Development

KEY POINTS

Bldg. 41 & Bldg.
 42 under
 construction.

 Site available for an additional T-Hangar, and five box hangars.

Unrelated to the General Aviation Apron Redevelopment but located in the south quadrant is the general aviation T-hangar site. Two T-hangars and one box hangar currently exist in the south quadrant (Buildings 37, 39, & 40). An additional T-hangar and box hangar (Bldg. 41 & Bldg. 42) are currently under construction and will be completed in 2018. The future general aviation site plan, shown in Figure 3-10, includes an additional T-hangar and four box hangars to be phased as needed.

This GA site is designed to handle ADG I aircraft and is slated for 7 inches of PCC pavement. Storm water management of this site is not dependent on the General Aviation Redevelopment plan in any way. Other site utilities such as sanitary sewer, communications, water, gas, and electric will connect to the south quadrant mains. These mains need to be maintained during the General Aviation Apron Redevelopment. Utilities will be described in further detail in the "Utility Relocation" section of the report.

F -Hangar





Figure 3-10

T-Hangar Site Development



Chapter 4 Corporate Hangar Park



- Initial Build
- Ultimate Build

Corporate Hangar Park Initial Build

KEY POINTS

- ADG III, TDG II
 taxiway
- 62,500 SF total hangar space
- 96 total parking spaces
- 180,000 CY fill

The Corporate Hangar Park is a demand based development within the south quadrant plan, separate from the General Aviation Apron development previously discussed. The purpose of the Corporate Hangar Park is to provide large box hangars to future corporate tenants as the demand requires. Because the timeline is independent of the occupancy of the GA Apron schedule, this construction is not included with the report.

The initial build shown in Figure 4-1 would tie into the northeast corner of the cargo apron near Taxiway A. The constructed taxiway is designed to accommodate Aircraft Design Group (ADG) III. The initial build would provide 62,500 SF of building space, and 68,750 SF of apron space. Landside entrance to the site would be off of SW 28th St. to the west, and off of South Frontage Road (not pictured) to the east.

The current Runway 13/31 Reconstruction - Phase 2 project will clear & grub, and remove pavement in this location. The estimated 150,000 CY of waste soil as a result of the Runway 13/31 Reconstruction project will be placed in the Corporate Hangar Park area to build a portion of the hangar, apron, and taxiway pad. It is estimated that 180,000 CY of fill soil will be needed for the Phase 1 construction of the Corporate Hangar park. Therefore, at least 30,000 CY of soil will need to be imported to construct the site.

Construction of the Corporate Hangar Park will require the relocation of existing Gate 7 and the existing fuel farm adjacent Gate 7. The proposed fuel farm design allows for petroleum tanker trucks to access the fuel farm landside.

| | | Corpora |
|--------|-----------|--------------|
| FEDEX | | |
| | | |
| | 1. | the second |
| BLDG | 29 | 12 |
| | GA | TE 7 |
| .) . | - AC | m |
| | FUEL FARM | \mathbf{D} |
| | | |
| N. | | |
| | | HAH |
| SW DE | | |
| HSI. | | |
| | | |
| 200 | 200 | |
| FE | ET | |
| ALL DE | ALE | The R |

| Corporate Hangar Park Initial | | | | | | | |
|-------------------------------|------------------------------------|------------------------------------|--------------------------------------|-----------------------------|------------------|------------------------------------|--|
| Hangar Dimensions | Hangar Size (SF) | Office Space (SF) | Door Height (FT) | Parking Spaces | Apron Dimensions | Apron Size (SF) | |
| 4 - 125'x125' | 4 - 15,625 sf Total - 62,500 sf | Can be included within hangar size | Needs to accommo- date G650 - 26' | 4 - 24 spaces Total - 96 | 2 - 275'x125' | 2 - 34,375 sf Total - 68,750 sf | |



Figure 4-1

ate Hangar Park Initial



Corporate Hangar Park Ultimate Build

KEY POINTS

- Southern 6 hangars to be phased as needed.
- 285,000 CY fill remaining to build the site.

Retaining wall
needed off of SW
28th St.

Ultimately the Corporate Hangar Park will provide space for up to ten additional box hangars, dependent on the footprint required for each corporate aviation hangar. Each pair of hangar and apron can be phased as necessary to meet demand.

An estimated 285,000 CY of fill is needed to construct the remaining six hangars. The taxiway connection at the South Cargo Apron is at elevation 950', SW 28th St. is at elevation 900', and S. Frontage is at elevation 910'. A goal was to maintain less than a 5:1 (20%) slope when tying into existing ground, however this is not achievable along SW 28th St. as shown in Figure 4-2. To ensure that all grading terminates prior to SW 28th St. an estimated 500 LF retaining wall with a maximum height of 15' is proposed. The contours in Figure 4-2 indicate that grading at a 5:1 slope prior to SW 28th St. is not achievable without a retaining wall.

There exists a drainage ditch along the north side of Economy Lot 4, which continues to the west towards the regional detention basin. When the ultimate development occurs for the Corporate Hangar Park there will need to be a large diameter pipe, or culvert, installed through the site. The alignment of this pipe should be outside of the hangar footing footprint.



| Corporate Hangar Park Ultimate | | | | | | | |
|--------------------------------|---|------------------------------------|--------------------------------------|-------------------------------|------------------|--|--|
| Hangar Dimensions | Hangar Size (SF) | Office Space (SF) | Door Height (FT) | Parking Spaces | Apron Dimensions | Apron Size (SF) | |
| 10 - 125'x125' | 10 - 15,625 sf Total - 156,250 sf | Can be included within hangar size | Needs to accom- modate G650 - 26' | 10 - 24 spaces Total - 240 | 5 - 275'x125' | 5 - 34,375 sf Total - 171,875 sf | |





Chapter 5 Storm Water Management



ExistingUltimate

Storm Water Management Existing

KEY POINTS

• Existing drainage basin designed to handle future expansion.

The existing south quadrant drainage area, shown in Figure 5-1, drains overland to a series of storm intakes, pipes and outlets all of which outlet into a regional detention basin. The regional detention basin is controlled by an outlet structure before entering a 72" pipe crossing under Army Post Road. The total drainage area is 183 acres, 59 acres of which is undevelopable area including the tree covered drainage basin as well as the approach area of a future runway. This 59 AC of undevelopable land is analyzed as pass through of existing meadow for detention calculations. The basin and outlet structure were constructed in 2001 that built a berm/dam at the south end of this large drainage area. The existing basin provides 2,010,902 CF of storage before overtopping the berm at an elevation of 888.70. This area will be utilized to provide regional detention to the South Quadrant Expansion and has been approved by the City of Des Moines (see attached letter from Adam Prilipp, PE in Appendix C).

The South Cargo Apron drainage area drains to a series of storm intakes, travels north in pipes under Runway 5/23 near Taxiway Papa 4, and outlets into Frink Creek.

The T-Hangar drainage area drains into a series of storm intakes, travels north in pipes under Runway 5/23 near Taxiway Papa 5, and outlets into Frink Creek.





Storm Water Management

Ultimate

KEY POINTS

- Approx. 33 impervious acres added to the site from expansion.
- Minor upgrades to detention basin outfall structure.

The proposed south quadrant improvements, shown in Figure 5-2, convert approximately 33 additional acres of the site into impervious area. This brings the total impervious acreage to around 76. An increased impervious area and less overland swales and ditches will require an additional storm sewer outlet into the regional detention basin from the general aviation apron development storm sewer.

The 100 year storm proposed elevation reaches 885.31 feet and requires 927,030 CF of detention in the basin, which is 2.7 feet below the top of the berm, and 1,115,987 CF less detention than the basin capacity, see Figure 5-3. During the 100 year storm, the outlet structure will release 281 CFS with the allowable release of 385 CFS. Water quality required by the Iowa Storm Water Management Manual for the 1.25" and below rain events will be provided in the basin. As south quadrant projects are constructed, the outlet structure will need minor modifications to restrict outfall during the 5 year storm to satisfy water quality requirements.

The proposed South General Aviation Apron Reconstruction project in the Cargo Apron will have to meet City of Des Moines detention requirements. Runoff from this area of apron is currently not detained prior to entering Frink Creek. Construction of a dry detention basin in the west quadrant should be considered prior to this reconstruction.

The proposed T-hangar site improvements will outfall into the detention basin constructed during the 2017 Construct T-hangar project. This detention basin was sized to accommodate the ultimate T-hangar site buildout.







Figure 5-2

Proposed Drainage Areas



Chapter 6 Site Utilities



- Communications
- Electric
- Gas
- Sanitary Sewer
- Storm Sewer
- Water
- SW 28th Street Utility Corridor

Site Utilities Communications

KEY POINTS

Create local
 loops

 Provide mainline capacity to support future expansion

• All pulling/ splicing to occur in a series of proposed manholes. It is the intent of the Airport Technical Systems Manager (TSM) to provide a robust communication network and the required infrastructure to support the redevelopment of the south quadrant. The TSM has provided the planning team a proposed communications plan as shown in Figure 6-1.

Implementation of this plan will proceed by utilizing existing single mode fiber strands and copper pairs that run along the old Army Post Road and SW 28th Street. The existing old Army post line crosses underneath proposed pavement in multiple locations. The depths of the existing line will need to be closely monitored to ensure that they are not disturbed during construction.

Proposed (2) 4" PVC conduits will be installed up the SW 28th St. extension to the General Aviation Apron Hangar sites. Building service lines, (2) 2" PVC conduits, will be installed from proposed manholes connecting the communication mainline to each proposed building. A loop will be created during the initial build by connecting into manhole 3390 near existing Building 40.

In 2018, communication pathways should be installed in conjunction with the proposed electric to reconnect supply to the Storm Water Control Building (Building 52).

At the Corporate Hangar Park (2) 4" PVC conduits will tie into the Old Army Post Rd. main to create a corridor behind the proposed buildings. Service lines, (2) 2" conduit will be installed from proposed manholes to the proposed buildings. A loop will not exist at the Corporate Hangar Park until the ultimate buildout.

Due to site grading not being complete at the T-hangar site as well as the Corporate Hangar Park, the pathways and manholes will be installed in phases as development proceeds.





Site Utilities Electric - Overview

KEY POINTS

• Mid American supply from SW 28th St. and Old **Army Post** Road.

The electric distribution system in the south quadrant requires substantial improvements to accommodate the proposed south quadrant layout as shown in Figure 6-2. The existing electrical supply feeds from SW 28th St. and Old Army Post Road, these lines will remain as the south quadrants source of electricity from Mid American Energy.

The Authority, Foth Infrastructure & Environment, P&E Engineering Company, and Mid American Energy met on two occasions to discuss the design of the future south quadrant electrical system and how to best support the planned development.

Pages 25-27 will provide a phased construction approach to achieve the overall south quadrant electrical system.





Site Utilities Electric - 2018

KEY POINTS

 Direction drill from Building 29 transformer to relocated Fed Ex.

Relocate UPS
 transformer east
 of Bldg 31 expan sion.

 Resupply power to Storm Water Control Building (Bldg 52). During the Fed Ex relocation, UPS Building 31 addition, and Building 33 relocation projects electrical systems will need to be installed. The proposed electrical construction and demolition during 2018 are shown in Figure 6-3. Sizing related to the electric system upgrades are shown in Figure A-9 and A-10 of Appendix A.

The Fed Ex relocation project will require 3 phase electric power to connect to the transformer on the northeast end of Building 29, and to be directionally drilled underneath the apron in front of the Building 29 door. A transformer in between Building 29 and Fed Ex is proposed to provide electrical service to Fed Ex.

At the UPS Building 31 site, electric will cut into an existing underground 3 phase line to a proposed transformer on the east side of the Building 31 addition. This transformer will feed a new equipment room in the building addition. The existing Building 31 panel will need to connect to the new service prior to removing the existing transformer just east of Gate 7. The sorting facility west of Building 31 is also fed from the existing transformer. It will be transferred to a new circuit to be extended from Building 31 prior to removing the transformer.

Building 33 will be relocated to the T-hangar site in 2018 which will create a power loss to the Storm Water Control Building (Building 52). It is proposed to restore power to Building 52 through a connection to an existing transformer east of Building 40. A new 3 phase loop will run from this existing transformer to a proposed transformer near the future location of relocated Building 52. The deicing mix tanks (Bldgs 53 & 54, not shown) do not need to be back fed from the proposed transformer, these buildings are currently powered by the high mast light circuits. However, in 2019 the deicing mixing tanks will be relocated to their final location, and they will be powered from the proposed transformer.





Site Utilities Electric - 2019

KEY POINTS

- Construct 3
 phase loop
 through GA
 Apron site.
- Loop cabinets installed in future transformer locations.
- Remove Overhead electric and replace with underground electric.

Phase 1 construction of the General Aviation Apron and extension of SW 28th St. will occur in 2019. Proposed electric construction and demolition to support the Phase 1 tenants as well as the future tenants in the General Aviation Apron are detailed in Figure 6-4. Sizing related to the electrical system upgrades are shown on Figure A-11 and A-12 in Appendix A.

To support the ultimate development of the GA Apron, a small enclosure will be bolted to transformer pads at the location of the ultimate hangar sites. These small enclosures will serve as loop cabinets for the future transformer. Mid American has agreed to this installation method, detailed in Figure A-7 of Appendix A to allow installing a transformer pad with cable looped for future transformer installation.

A fused switchgear will be installed between the Fed Ex tractor-trailer parking lot and the SW 28th St. extension where the proposed General Aviation Apron electric ties into the main loop.

The existing overhead electric from SW 28th St. to the Thangar site will be removed and replaced with 3 phase underground power.





Site Utilities Electric - Future

KEY POINTS

 Remove loop cabinets and install transformers.

- Additional transformer to service T-hangar site.
- Corporate Park
 transformer
 loop extension
 system.

As mentioned in the General Aviation Apron and Corporate Hangar Park sections of the report, hangar expansion will occur as demand requires. As additional hangar construction occurs, additions to the electric infrastructure will be needed. The future electric layout is shown in Figure 6-5. Sizing related to the electrical system upgrades are shown on Figure A-13 and A-14 of Appendix A.

In the General Aviation Apron the loop cabinet boxes installed in 2019 will be replaced with transformers when the secondary is needed.

Electrical service to the Corporate Hangar Park will cut into the existing underground electric on the airport service road south of Building 31. The MEC approved plan is to install transformers as shown in Figure A-8 in Appendix A. This would allow the incremental extension to each transformer by cutting into the loop without requiring a fuse cabinet.

At the T-hangar site an additional transformer is proposed to provide secondary feeds to future hangar construction.




Site Utilities

Gas

KEY POINTS

Utilize existing
 Old Army Post
 Road main

• Proposed 4" main along SW 28th Street extension.

 MidAm evaluating initial and ultimate demand to determine existing capacity. The existing gas system in the south quadrant consists of a 4-inch main that runs along the south side of old Army Post Road as shown in Figure 6-6. The main provides all of the gas service to the south quadrant, and dead ends at the T-hangar site. There are several service laterals that extend from the main to provide gas service to the existing buildings. These laterals range in size from 1 to 2 inches.

It is proposed to leave the existing 4-inch main in place during and after construction, as well as the laterals that extend to the Airport Maintenance buildings as shown in Figure 6-6. Laterals north of the main that service existing buildings that will be demolished will be removed or abandoned in place. A new service main will be connected to the existing main and run along the proposed SW 28th St. extension. From this main service laterals will connect to the new buildings.

Mid American is the natural gas service provider to the Airport. Mid American has been notified of the proposed gas service expansion in the south quadrant. The Mid American engineering team is currently working with the planning team to determine if the existing 4-inch main has the capacity to service the ultimate proposed buildout. There is an estimated maximum load of 53,100 Cubic Feet per Hour to accommodate the south quadrant ultimate buildout. As of January 23, 2018 Mid American has indicated that an upgrade to the distribution system of some kind will be necessary. A proposal with scope of work and cost for the upgrades has not been sent from Mid American to Foth at this time. Gas design calculations are included on Pages 43-44 of Appendix A.





Site Utilities Sanitary Sewer

KEY POINTS

 Remove Force Main

 Relocate all but UPS (Bldg 31) to the South **East Airport Lift** Station.

The existing sanitary sewer service in the south quadrant is made up of two separate systems; a figure of the existing conditions are on Figure A-3 of Appendix A. A majority of the existing buildings flow by gravity to a lift station that is centrally located landside by Airfield Maintenance near Gate 12. From the lift station sewage is pumped easterly to a manhole near existing Building 31 (UPS). From this manhole it continues to flow easterly by gravity into the Fleur Drive system.

The second sanitary system in the south quadrant connects several buildings and the deicing water storage tanks. This sanitary runs south through the site to Army Post Road where it ultimately enters the South East Airport Lift Station.

The proposed sanitary sewer layout, shown in Figure 6-7, would remove the lift station all together. A proposed pipe connection from an existing manhole near the lift station to a reconstructed manhole south west of the RTR building would allow the sewage to gravity flow to the South East Airport Lift Station. Building 31 would be the only building providing sanitary sewage to the Fleur Drive system.

A majority of the proposed sanitary sewer construction will occur near the Signature site. The existing 8" deicing line is located such that it will run underneath the proposed Signature hangars, and approximately 900 LF requires relocation prior to commencing construction on the Signature hangars. The relocated pipe will be placed in a direct line through the Signature parking lot. Sanitary service laterals from Signature, DMFS, and the future corporate hangars will connect to this relocated 8" main. The 8" sanitary main will connect to the existing alignment at a manhole on the SW corner of the Signature hangar, adjacent the terminal. The existing alignment from this manhole to a manhole just south of the maintenance parking lot will need to be removed and replaced to account for the pipe's profile change.

All proposed pipes are 8 inches in diameter and run at a minimum slope of 0.6%. Maximum flow rate calculations for the infrastructure additions have been accounted for at an estimated usage rate of 5,000 Gallons/Day/Acre (SUDAS Design Manual standard rate). Figure 6-7 details the pipe capacity

to the estimated maximum flow rate at critical areas. The South East Airport Lift Station has a maximum capacity of 3.80 CFS; the post development estimated maximum flow rate at this location is only 0.47 CFS. The recommended minimum cleaning velocity of 2.0 ft/s will be met if the proposed pipes are at maximum capacity. However, it is unlikely that the pipes will reach max capacity based on the estimated sewage, and as a result clogging may occur. Flow velocities based on estimated flow rates are included on Page 46 of Appendix A. It is recommended that the Airport pressure jet the sanitary line near

Signature during initial development to better determine clogging potential. Proposed sanitary sewer calculations are included in Figure A-4 in Appendix A.

Figure 6-7

Proposed Sanitary Sewer





The proposed sanitary sewer layout has been coordinated with the Des Moines Water Reclamation Authority. The WRA has informally agreed with the removal of the lift station, force main, and diverting as much flow as possible to the South East Airport Lift Station.

Site Utilities Storm Sewer

KEY POINTS

Additional 48"
 outfall to the
 detention basin.

 Culvert required to convey Econ Lot 4 under Corporate Hangar Park. The existing storm sewer systems in the south quadrant lead to several drainage outlet areas as detailed in Chapter 5. The cargo apron and the T-hangar area collect into separate systems that convey storm water underneath Taxiway P and Runway 5/23 to Frink Creek, while the remainder of the site storm water is collected and conveyed to the regional detention basin as detailed below.

Existing storm sewer near existing Buildings 33 & 34 and Airfield Maintenance outlet at an unnamed creek just south of Maintenance Building 47; this is conveyed to the regional detention basin.

Existing storm sewer near existing Building 29, Building 31, Building 32, Old Army Post Road, and Taxiway A convey water to the SW 28th St. system and ultimately into the regional detention basin.

Proposed building and landside runoff in the General Aviation Apron will collect into proposed storm sewer and convey down the SW 28th St. extension. The existing capacity of the existing pipe along SW 28th St. is not satisfactory, therefore, a new 48" pipe section is proposed to convey this runoff to the regional detention basin. Proposed pipe sizes are included in Figure 6-8. Storm sewer capacity profiles for the proposed storm sewer are on Figures A-5 and A-6 of Appendix A.

Proposed airside apron runoff in front of Signature and DMFS will flow to a new storm sewer run and drain to an existing system between Runway 5/23 and Taxiway P. This runoff ultimately conveys to Frink Creek. Apron runoff by the future corporate hangars will enter the system that outlets to the south of Building 47.

The existing Corporate Hangar Park site and new Economy Lot 4 drainage areas sheet flow to an intake that conveys the water to the regional detention basin. Storm water collected on S. Frontage Road also travels through storm sewer to the regional detention basin.

Proposed storm sewer within the Corporate Hangar Park will continue to convey water to the existing 60" outfall structure. As the Corporate Hangar Park expands south, the Economy Lot 4 drainage ditch will be removed. A proposed culvert underneath a portion of the Corporate Hangar Park would convey runoff from the Economy Lot 4 site to the 60" outfall structure. The pipe under 28th St. will be upsized as capacity in that run is limited. Estimated pipe sizes in the Corporate Hangar Park are also shown in Figure 6-8. In the future a third outlet to the detention basin may be beneficial to relieve the





Corporate Hangar Park system. This third outfall location would be south of the Corporate Hangar Park outfall and cross SW 28th St. near S. Frontage Road. This system would convey runoff from S. Frontage Road and the Economy Lot 4 addition to the regional detention basin. This addition is not shown in the Figure 6-8.

Site Utilities Water

KEY POINTS

- Fire flow supply rates satisfy IFC 2015.
- 12" supply loop constructed in 2018.
- GA Apron loop constructed in 2019.
- Average supply rate of 3,600 gpm @ 20 psi.

The existing water supply in the south quadrant enters from a 12" main along SW 28th St., and from an 8" main from Fleur Drive. These supply routes connect to a series of 12", 8", and 6" water mains that distribute water throughout the south quadrant. Updates to the existing pipe network will be necessary to account for the proposed changes to the site layout, and to increase allowable fire flow supply to future development. A combined layout of the proposed and existing water system is shown in Figure 6-9.

On December 18, 2017, Des Moines Water Works (DMWW) performed flow tests to determine existing fire flow rates along the main south quadrant supply routes. During the flow tests supply readings from the booster pump station near the Coca-Cola Company on Army Post Road were attained. From the data it was reasonably calculated that that the booster pump can supply 3,300 gpm station flow, discharge pressure of 64.5 psi, and a suction pressure of 35 psi. However, approx. 800 gpm of this supply is concurrent demand (demand needed elsewhere throughout the network), and cannot be dedicated to fire flow. These pump characteristics were used to calculate fire flow rates for the future water network in the south quadrant.

Improvements to the existing network will be made through a 12" connection to Army Post Road. The site would then have a 12" supply loop. Intermediate loops will be created through the General Aviation Apron and the Corporate Hangar Park sites. Construction of the General Aviation Apron water main loop will occur during the Relocate Fed Ex, and SW 28th St. extension projects (2018-2019). On average, flow rates of 2,500 gpm at 42 psi will be attained throughout the proposed network (3,600 gpm @ 20 psi). The lowest achievable fire flow rate of 2,500 gpm at 36 psi will occur at J-53 near the T-hangar site (3,100 gpm @ 20 psi). Supply water to the future deicing mix tanks was modeled at 500 gpm @ 43 psi. Figure A-15 in Appendix A shows the modeled supply results at different locations throughout the proposed south quadrant.

The 2015 International Fire Code (2015 IFC) general rule is any fire area over 12,000 sf shall include a sprinkler system. Fire protection for new buildings will be the responsibility of the future tenant.

Aircraft hangar construction types are typically classified as Type II-B; the included table relates fire areas to the minimum fire flow rate per the 2015 IFC for the hangar construction type. Based on the included table the available water supply to the south quadrant will support the proposed hangar fire areas; hangar sizes are detailed in the General Aviation Apron and Corporate Hangar Park sections of the report.





| Fire-Flow Calculation Area | Fire-Flow (gallons |
|----------------------------|--------------------|
| Type II-B | per minute) |
| 0-5,900 | 1,500 |
| 5,901-7,900 | 1,750 |
| 7,901-9,800 | 2,000 |
| 9,801-12,600 | 2,250 |
| 12,601-15,400 | 1,000* |
| 15,401-18,400 | 1,000* |
| 18,401-21,800 | 1,000* |
| 21,801-25,900 | 1,000* |
| | |

*Sprinkler Required

KEY POINTS

- Limit utility mains under pavement.
- Separation requirements between utilities.
- Fire hydrant & fire apparatus road requirements.

The SW 28th Street extension will include the primary utility corridor for the General Aviation Apron Development.

The Airport Authority and the utility owners have the following installation requirements that shall be followed during utility construction.

- SUDAS requires 10 feet of horizontal separation between sewer and water main.
- Water and sewer crossovers require 18 inches of vertical separation. During construction water main will step down to achieve this requirement.
- Mid American Energy requires at least an 18" separation distance between their gas main and other utilities.
 When parallel, it is recommended that gas and electric along SW 28th street be installed at this 18" minimum to alleviate conflicts between light pole or landmark sign foundations.
- Des Moines Water Works (DMWW) requires a clearance of 12 inches between their service lines and all other utilities. DMWW requires a minimum bury depth of 5.5 feet.

Approximate fire hydrant locations are shown in Figure 6-10. Based on the International Fire Code (2015), hydrant separation shall be no greater than 400', and a portion of the proposed buildings shall be no further than 400' from a hydrant on an approved fire apparatus road. It is anticipated that acceptable fire apparatus roads would include SW 28th street until it tees at DMFS, and at the Gate 8 entrance.

Figure 6-10 satisfies the listed requirements under the current IFC hydrant code. However, if the local Fire Marshall requires greater hydrant protection, auxiliary water main can be extended to provide airside access to hydrants.







Chapter 7 Program Schedule



- Overview
- 2017
- 2018
- 2019
- 2020
- Project Specific Schedules

Overview

KEY POINTS

- Initial Build: 2017-2020
- Future Build: Demand based construction.
 - Current: Construct T-Hangar & Econ. Lot 4.

Figure 7-1 shows the order of construction operations in the south quadrant broken down by initial build, future build, and currently under construction.

The initial build highlighted in teal on Figure 7-1 includes the minimum amount of infrastructure needed to relocate Signature and DMFS to the south quadrant. Construction of the initial build will occur between years 2017-2020. Therefore, the proposed relocation of Signature and DMFS could occur as early as the summer of 2020. A high level, year by year breakdown of construction projects needed to complete the initial build is located on Pages 34-37. A Gantt Chart attached to Appendix D shows a detailed timeline of all construction activities necessary to complete the initial build.

Future build items such as the Signature & DMFS expansion and corporate expansion will be constructed on an as needed basis in the order that they appear in the legend of Figure 7-1. The order of future construction will appear as follows:

- 1. Signature, DMFS and Corporate GA expansion.
- 2. Corporate Hangar Park Phase 1.
- 3. Corporate Hangar Park Ultimate.

A schedule for the future construction was not included in the report as those facilities will be constructed when required by demand.

Two projects within the south quadrant are currently under construction. The 2017 Construct T-hangar project will provide enough GA expansion to allow for relocation of tenants in Building 34. This project also includes the construction of the footings that Building 33 will be relocated to. The Construct Economy Lot 4 project will provide additional long term terminal parking. This project is exclusive from the South Quadrant planning and programming.





2017

KEY POINTS

- Bldg. 42 Foundation, Relocate Building 33 in 2018
- T-Hangar (Bldg. 41 Completion: April 2018
- Economy Lot 4
 Completion:
 November 2017

Two projects within the south quadrant are currently under construction; 2017 Construct T-hangar and Construct Economy Lot 4.

The 2017 Construct T-hangar project will add 18 hangar units for ADG I aircraft. General Aviation tenants within Building 34 will relocate to this T-hangar once the project is completed. The Building 33 tenant will then relocate into Building 34 after the Building 34 tenants relocate to the T-hangar. Additionally, this project will construct a building foundation and apron adjacent to the T-hangar for Building 33 to relocate to in 2018. The project completion date for the T-hangar is April 27, 2018. The projected completion date for the building foundation was December 15, 2017.

The Construct Economy Lot 4 project will add 750 economy vehicle parking spaces. The project does not impact the schedule of other south quadrant development. The project completion date for the parking lot was November 2017. This parking lot alleviates a shortage in passenger parking during peak periods, as well as provide space for a cell phone waiting lot.





KEY POINTS

- Construct UPS: May 2018 - February 2019
- Construct Fed Ex: July 2018 -May 2019
 - Relocate Bldg. 33: June 2018
 - Demolish Bldgs. 33 & 34: Dec. 2018 -**March 2019**

In April of 2018, the T-hangar will be operational, Building 34 tenants will have relocated to the T-hangar, and Building 33 tenants will have relocated to Building 34 by June of 2018.

Building 33 is to be relocated to the building foundation adjacent to the T-hangar, this relocated building will be renamed Building 42. An office extension will be constructed on the northeast end of Building 42. Upon completion the tenant currently occupying Building 33, Air Methods, will relocate to Building 42.

Once the shuffling of tenants has been completed the Building 33 & 34 site can be demolished. Building 33 and 34 demolition will be packaged with the Building 35 demolition; work will most likely occur in early to mid 2019.

Fed Ex operations need to remain active during the construction of the new building and apron. Thus, Building 32 must be operational until Fed Ex has fully relocated into the new building. It would be advantageous to install a temporary

Figure 7-3 2018 Construction

2018 CONSTRUCTION 29 34 33 31 ECONOMY IOT



UPS facility construction at Building 31 needs to occur in 2018 to allow for the future demolition of Building 35. All UPS operations will ultimately occur at the Building 31 location. Both UPS and Fed Ex expressed that they will not be able to relocate their operations into the new facilities

AOA fence outside of the construction limits to allow access to non-badged workers. Construction site access and future building access would occur through a temporary road installed behind Building 32.



2019

KEY POINTS

- Relocate UPS to Bldg. 31: Feb. 2019
- Relocate Fed Ex to new Bldg. 32: **June 2019**

• Demolish Bldg. 32 & Site: **July 2019**

- Demolish Bldg. 35 & Site: May 2019
- Construct Fed Ex entrance: October 2019
 - Construct SW 28th St.: Oct. 2019
 - Construct **DMFS Hangar:** Sept. 2019 -Oct. 2020
- Construct Signature Hangar: Sept. 2019 - Oct. 2020

The UPS and Fed Ex buildings and aprons are scheduled to be substantially completed in early 2019 and mid 2019, respectively.

UPS will relocate to the Building 31 site as soon as possible to begin the demolition of Building 35. The demolition of Building 35 and the surrounding pavement will create a clean site to begin General Aviation hangars construction and SW 28th St. construction. Building 35 demolition will be packaged with the Building 33 and Building 34 demolition project. Building 33 and Building 34 demolition was shown in 2018 even though most of the work will occur in early to mid 2019 with the Building 35 demolition.

When relocating Fed Ex operations, the temporary access road off of the Airport Service Road will provide building access for Fed Ex and U.S. Mail tractor trailers during Building 32 Demolition, Fed Ex entrance drive construction, and SW 28th St construction. The Fed Ex entrance drive and SW 28th St. construction shall occur at the same time; guarter 3 and quarter 4 of 2019. Considerations will be made during design to install temporary AOA fencing on the cargo apron to keep all construction activities landside.





Scheduled in concurrence with the SW 28th St. corridor extension is the Signature Flight Support and Des Moines Flying Service hangars. All site grading, utilities, foundations will commence in 2019. Hangar construction will continue into 2020.



2020

KEY POINTS

 GA Apron **Reconstruction:** Sept. 2020

 DMFS Apron & Taxiway: Oct. 2020

> • Signature Parking Lot: June 2020

In 2020 all work related to the Fed Ex relocation will have occurred, and the Signature and Des Moines Flying Service hangars will continue to be constructed and ultimately completed.

Apron and taxiway construction adjacent to Signature and DMFS will begin in 2020. The reconstruction of the existing apron and taxiway is necessary to tie the proposed hangar elevations to existing pavement. These airfield related projects are slated for a five and a half month construction period; project completion would occur in October 2020.

Landside construction of the Signature parking lot will also occur in 2020.

Upon completion of both airside and landside projects as shown in Figure 7-7, Signature and Des Moines Flying Service could begin to relocate their business activities to the south quadrant.





Construction of the Building 42 foundations and floor slab were completed in November 2017. Building 33 will relocate to these foundations. Design for the relocation and office addition are in progress. **Building 33 Relocation**

| | | 20 |)17 | | | 20 | 18 | | | 20 | 19 | | | 20 | 20 | | | 202 | 21 | |
|-------------------|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|
| Item | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Lease Negotiation | | | | | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Relocation | | | | | | | | | | | | | | | | | | | | |
| Demolition | | | | | | | | | | | | | | | | | | | | |

Building 33 and Building 34 demolition will occur following the tenant relocation to the T-hangar site.

Building 33 & 34 Demolition

| | | 20 |)17 | | | 20 | 18 | | | 20 | 19 | | | 20 | 20 | | | 20 | 21 | |
|-------------------|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Item | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Lease Negotiation | | | | | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Relocation | | | | | | | | | | | | | | | | | | | | |
| Demolition | | | | | | | | | | | | | | | | | | | | |

UPS has began to design the Building 31 addition to allow for their relocation from Building 35.

UPS Relocation

| | | 20 | 17 | | | 20 | 18 | | | 20 | 19 | | | 20 | 20 | | | 20 | 21 | |
|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Item | Q1 | Q2 | Q3 | Q4 |
| Lease Negotiation | | | | | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Relocation | | | | | | | | | | | | | | | | | | | | |
| Demolition | | | | | | | | | | | | | | | | | | | | |



Building 35 can be demolished once UPS has relocated their operations from Building 35 to Building 31. **Building 35 Demolition**

| - | | | | | | | | | | | | | | | | | | | | |
|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | 20 | 17 | | | 20 | 18 | | | 20 | 19 | | | 20 | 20 | | | 20 | 21 | |
| Item | Q1 | Q2 | Q3 | Q4 |
| Lease Negotiation | | | | | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Relocation | | | | | | | | | | | | | | | | | | | | |
| Demolition | | | | | | | | | | | | | | | | | | | | |

Design for the Fed Ex relocation kicks off in January 2018. Quarter 3 relocation in 2018 includes a temporary relocation of aircraft parking positions to the NW. Quarter 2 relocation in 2019 includes the permanent relocation to the newly constructed building.

Construction in Q3 and Q4 of 2019 includes landside pavement of the parking lot and entrance drive. FedEx Relocation

| | | 20 | 17 | | | 20 | 18 | | | 20 | 19 | | | 20 | 20 | | | 20 | 21 | |
|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Item | Q1 | Q2 | Q3 | Q4 |
| Lease Negotiation | | | | | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Relocation | | | | | | | | | | | | | | | | | | | | |
| Demolition | | | | | | | | | | | | | | | | | | | | |

Construction of Signature Flight Support in the south quadrant cannot occur until the Building 33, 34, and 35 sites have been demolished.

Signature Flight Support Relocation

| | | 20 | 17 | | | 20 | 18 | | | 20 | 19 | | | 20 | 20 | | | 20 | 21 | |
|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Item | Q1 | Q2 | Q3 | Q4 |
| Lease Negotiation | | | | | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Relocation | | | | | | | | | | | | | | | | | | | | |
| Demolition | | | | | | | | | | | | | | | | | | | | |



Construction of Des Moines Flying Service in the south quadrant cannot occur until the Buildings 33, 34, and 35 sites have been demolished.

| Des Moines Flying | Servic | e Reloc | ation | | | | | | | | | | | | | | | | | |
|-------------------|--------|---------|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | 20 | 17 | | | 20 | 18 | | | 20 | 19 | | | 20 | 20 | | | 20 | 21 | |
| Item | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Lease Negotiation | | | | | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Relocation | | | | | | | | | | | | | | | | | | | | |
| Demolition | | | | | | | | | | | | | | | | | | | | |

Construction of the SW 28th Street extension cannot occur until Buildings 33, 34, and 35 have been demolished.

SW 28th Street & Utility Extension

| | | 20 | 17 | | | 20 | 18 | | | 20 | 19 | | | 20 | 20 | | | 20 | 21 | |
|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Item | Q1 | Q2 | Q3 | Q4 |
| Lease Negotiation | | | | | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Relocation | | | | | | | | | | | | | | | | | | | | |
| Demolition | | | | | | | | | | | | | | | | | | | | |

Frontage Taxiway and South General Aviation Apron construction must be completed at the same time as the Des Moines Flying Service Relocation and Signature Relocation.

Frontage Taxiway, South General Aviation Apron

| | | 20 | 17 | | | 20 | 18 | | | 20 | 19 | | | 20 | 20 | | | 20 | 21 | |
|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Item | Q1 | Q2 | Q3 | Q4 |
| Lease Negotiation | | | | | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Relocation | | | | | | | | | | | | | | | | | | | | |
| Demolition | | | | | | | | | | | | | | | | | | | | |





Chapter 8 Program Budget



- Initial Build
- Future Build

Program costs for the Initial Build which require funding from the Des Moines Airport Authority are detailed in Figure 8-1.

Private investment is expected to fund the majority of the Signature and UPS projects. The Airport Authority will budget for site communication construction, building automation systems, and limited program management and construction observation.

The South General Aviation Apron & the Frontage Taxiway and Apron project are eligible to receive FAA AIP funding. CIP data sheets for these projects have been delivered to the Airport Authority. These projects may not receive AIP funding though due to higher priority runway improvement projects occurring at DSM at the same time, which will encumber the available entitlement and discretionary AIP funds.

All costs estimates carry a 28% contingency, and are based on 2017 pricing.

Figure 8-1

Initial Build - Cost Breakdown

| Project | 2017 | 2018 | 2019 | 2020 |
|--------------------------------------|-------------|--------------|--------------|-------------|
| 18 Unit T-Hangar | \$3,800,000 | | | |
| South Quadrant Planning | \$247,000 | | | |
| Building 33 Relocation & Office | | \$840,000 | | |
| Fed Ex Relocation | | \$10,085,600 | | |
| UPS Relocation | | \$440,000 | | |
| Building 33 Site & 34 Demolition | | | 748,000 | |
| Building 35 Demolition | | | \$1,532,000 | |
| Signature Hangars | | | \$1,070,000 | |
| Des Moines Flying Service Hangar | | | \$4,420,000 | |
| SW 28 th Street Extension | | | \$2,949,000 | |
| South General Aviation Apron | | | | \$5,664,000 |
| Frontage Taxiway and Apron | | | | \$3,254,000 |
| Totals | \$4,047,000 | \$11,365,600 | \$10,719,000 | \$8,918,000 |

*All va



Future capital improvement projects in the ultimate South Quadrant build out are detailed in Figure 8-2. As with the initial buildout costs, the estimates are based on 2017 dollars and contain 28% contingency. The costs represent both the required site improvements along with building construction. Building construction costs may be covered by the tenants, but the funding requirements will be worked out at the time the development occurs.

Portions of the South GA Corporate Expansion and the Corporate Hangar Park projects may be eligible to receive FAA AIP funding in today's funding model. CIP data sheets have not been delivered to the Airport Authority for these projects because they do not have an estimated date to be constructed at this time.

| | Fig | ure 8-2 | | |
|----------------------------------|-------------|------------------|------------|------------|
| Futu | ure Build · | - Cost Breakdown | | |
| Project | | | | |
| Signature Hangar Expansion | | \$4,341,000 | | |
| DMFS Hangar Expansion | | \$2,276,000 | | |
| South GA Corporate Expansion | | | 13,283,000 | |
| Corporate Hangar Park - Phase 1 | | | | 16,834,000 |
| Corporate Hangar Park - Ultimate | | | | 25,962,000 |
| | Totals | 6,617,000 | 13,283,000 | 42,796,000 |
| *All values are in 2017 dollars | | | | |





Appendices



- Appendix B Apron Elevations
- Appendix C Storm Water
 Management Letter
- Appendix D Schedule

Gas - Existing Data

KEY POINTS

• Existing Data obtained from Mid American.

 Assume gas equipment runs 8 hours per day during peak heating season

| DSM Existing Gas Load Data | | | | | | | | | | |
|--|----------------------------|--------------------|---|--------------------------|------------------------|---------------------------------|--------------------|-------------------------|---|----------------------------|
| Building Number | Address | Building Size (SF) | Max Load (Therms) | Delivery Pressure (PSIG) | Max Load (BTU) | Max Load (BTUh) | Max Load (CF) | Max Load (CFd) | Max Load (CFh) | CFh/SF |
| 7 - DMFS | 5304 Fleur Drive | 20,076 | 2,605 | 0.25 | 260, 500,000 | 1,069,815 | 260,500.00 | 8,558.52 | 1,069.82 | 0.0533 |
| 10 - Signature | 5600 Fleur Drive | 33,600 | 10627, 3812(Hangar 4), 3018(Bldg 2) | 0.25 | 1,745,700,000 | 7,169,199 | 1,745,700.00 | 57,353.59 | 7,169.20 | 0.2134 |
| 33 - Air Methods | 3101 Army Post Rd. | 9,710 | 1,900 | | 190,000,000 | 780,287 | 190,000.00 | 6,242.30 | 780.29 | 0.0804 |
| 40 - Corporate Hangar | 3305 Army Post Rd. | 7,700 | 1,075 | | 107,500,000 | 441,478 | 107,500.00 | 3,531.83 | 441.48 | 0.0573 |
| 32 - FedEx | 3023 & 3025 Army Post Road | 27,502 | 3918 (Incl. 37 for generator) & 1977 | 0.25 | 589, 500, 000 | 2,420,945 | 589,500.00 | 19,367.56 | 2,420.94 | 0.0880 |
| 29 - Endeavor Hangar | 2901 Army Post Road | 78,900 | 11,603 | 2.00 | 1,160,300,000 | 4,765,092 | 1,160,300.00 | 38,120.74 | 4,765.09 | 0.0604 |
| 31 - UPS | 2601 Army Post Road | 12,668 | 782(Unit A), 1979(Unit B), 8(Unit L) | | 276,900,000 | 1,137,166 | 276,900.00 | 9,097.33 | 1,137.17 | 0.0898 |
| 43 - Field Maintenance | 3216 Army Post Road | 12,304 | 1,778 | | 177,800,000 | 730,185 | 177,800.00 | 5,841.48 | 730.18 | 0.0593 |
| 44 - Field Maintenance | 3220 Army Post Road | 23,352 | 4,427 | | 442, 700,000 | 1,818,070 | 442,700.00 | 14,544.56 | 1,818.07 | 0.0779 |
| 45 - Field Maintenance | 3130 Army Post Road | 1,342 | 183 | | 18,300,000 | 75,154 | 18,300.00 | 601.23 | 75.15 | 0.0560 |
| 46 - Field Maintenance | 3200 Army Post Road | 16,126 | 3,652 | | 365, 200,000 | 1,499,795 | 365,200.00 | 11,998.36 | 1,499.79 | 0.0930 |
| 47 - Field Maintenance | 3210 Army Post Road | 17,471 | 3,209 | | 320,900,000 | 1,317,864 | 320,900.00 | 10,542.92 | 1,317.86 | 0.0754 |
| 65 - Elliott (New) | 2610 SW Mckinley Ave | 23,500 | 1,222 | | 122, 200,000 | 501,848 | 122,200.00 | 4,014.78 | 501.85 | 0.0214 |
| 64 - Jet Center Hangar | 2606 SW Mckinley Ave | 22,950 | 2,772 | | 277, 200,000 | 1,138,398 | 277,200.00 | 9, 107. 19 | 1,138.40 | 0.0496 |
| 67 - Elliott | 2700 SW Mckinley Ave | 62,961 | 123 | | 12,300,000 | 50,513 | 12,300.00 | 404.11 | 50.51 | 0.0008 |
| 71 - Elliott | 2800 SW Mckinley Ave | 33,473 | 8455, 1788(Unit 1), 1013(Unit 2) | | 1,125,600,000 | 4,622,587 | 1,125,600.00 | 36,980.70 | 4,622.59 | 0.1381 |
| 62 - Meredith | 2602 SW Mckinley Ave | 23,570 | 2,534 | | 253,400,000 | 1,040,657 | 253,400.00 | 8,325.26 | 1,040.66 | 0.0442 |
| *41 - T-Hangar | | | | | | 456,500 | | | 456.50 | |
| All values are estimates based on MidAm billing data | | | 24 month max, from MidAm | Data from MidAm | Therms x 100,000 = BTU | BTU/(30.4375 days * 8 hours) | Cubic FT= BTU/1000 | 30.4375 days in a month | Estimate Boiler runs 8 hours per day | Max Load per buiding SF |



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Figure A-1

Gas - Existing Data

Gas - Proposed Data

KEY POINTS

• Estimated 53,000 **CFh maximum** load.

 Currently being reviewed by MidAm

| South Quadrant Future Estimated Gas Load | | | | | | | | | |
|--|--------------------------|--|---------------------|----------------------|-----------------------|-------------------------------|--|--------------------------|-----------------------------------|
| | Building Size (SF) | CFh/SF | Est. Max Load (CFh) | Est. Max Load (BTUh) | Max Volume (MCF/hour) | Max Volume (MCF/day) | Max Volume (MCF/month | Delivery Pressure (PSIG) | Service Start Date |
| Initial Build | | | . , | | | | | | |
| Signature Terminal | 7.400 | 0.1 | 800 | 800.000 | 0.80 | 6.40 | 194.80 | 2 PSIG | Spring 2020 |
| Signature Hangar 1 | 24.800 | 0.08 | 2.000 | 2.000.000 | 2.00 | 16.00 | 487.00 | 2 PSIG | Spring 2020 |
| Signature Hangar 2 | 24,800 | 0.08 | 2,000 | 2,000,000 | 2.00 | 16.00 | 487.00 | 2 PSIG | Spring 2020 |
| Signature Hangar 3 | 24,800 | 0.08 | 2,000 | 2,000,000 | 2.00 | 16.00 | 487.00 | 2 PSIG | Spring 2020 |
| DMES Hangar 1 | 21,700 | 0.08 | 1.800 | 1.800.000 | 1.80 | 14.40 | 438.30 | 2 PSIG | Spring 2020 |
| Building 32 - Fed Fx (F) | 36.000 | 0.1 | 3,600 | 3,600,000 | 3.60 | 28.80 | 876.60 | 2 PSIG | Spring 2019 |
| Building 29 - Endeavor (E) | 78,900 | 0.06 | 4.800 | 4,800,000 | 4.80 | 38.40 | 1,168,80 | 2 PSIG | Current |
| Building 31 - UPS | 22,668 | 0.1 | 2.300 | 2.300.000 | 2.30 | 18.40 | 560.05 | 2 PSIG | Current - Addition by Spring 2019 |
| Building 40 (F) | 7,700 | 0.06 | 500 | 500,000 | 0.50 | 4.00 | 121.75 | 2 PSIG | Current |
| Building 41 - T-Hangar 1 | ., | | 457 | 456 500 | 0.46 | 3 65 | 111.16 | 2 PSIG | Spring 2018 |
| Building 42 (Bel Bldg 33) | 9 710 | 0.08 | 800 | 800.000 | 0.40 | 6.40 | 194.80 | 2PSIG | Spring 2018 |
| Building 43 (F) | 12 30/ | 0.06 | 800 | 800,000 | 0.80 | 6.40 | 194.80 | 2PSIG | Current |
| Building 44 (E) | 23 352 | 0.08 | 1 900 | 1 900 000 | 1.90 | 15 20 | 462.65 | 20516 | Current |
| Building 46 (E) | 16 126 | 0.00 | 1,500 | 1,500,000 | 1.50 | 13.20 | 365.25 | 21510 | Current |
| Building 47 (E) | 17,171 | 0.03 | 1,500 | 1,300,000 | 1.50 | 11.00 | 340.90 | 21310 | Current |
| Building 4F (E) | 1 24 2 | 0.06 | 1,400 | 1,400,000 | 0.10 | 0.90 | 340.50 | 2 P 3 G | Current |
| DUITUING 45 (E) | 1,342 | 0.00 | 100 | 100,000 | 0.10 | 0.80 | 24.33 | 21310 | Current |
| Total | no data | | 26,757 | 26,756,500 | 26.76 | 214.05 | 6,515.21 | | |
| | | • | , | , , | | | , | | |
| Ultimate Build | | | | | | | | | |
| Signature Hangar 4 | 24,800 | 0.08 | 2,000 | 2,000,000 | 2.00 | 16.00 | 487.00 | 2 PSIG | Future |
| Signature Hangar 5 | 14,750 | 0.08 | 1,200 | 1,200,000 | 1.20 | 9.60 | 292.20 | 2 PSIG | Future |
| DMFS Hangar 2 | 20,332 | 0.08 | 1,700 | 1,700,000 | 1.70 | 13.60 | 413.95 | 2 PSIG | Future |
| Corporate Hangar 1 | 18,750 | 0.08 | 1,500 | 1,500,000 | 1.50 | 12.00 | 365.25 | 2 PSIG | Future |
| Corporate Hangar 2 | 18,750 | 0.08 | 1,500 | 1,500,000 | 1.50 | 12.00 | 365.25 | 2 PSIG | Future |
| Corporate Hangar 3 | 18,750 | 0.08 | 1,500 | 1,500,000 | 1.50 | 12.00 | 365.25 | 2 PSIG | Future |
| Corporate Park Hangar 1 | 15,625 | 0.08 | 1,300 | 1,300,000 | 1.30 | 10.40 | 316.55 | 2 PSIG | Future |
| Corporate Park Hangar 2 | 15,625 | 0.08 | 1,300 | 1,300,000 | 1.30 | 10.40 | 316.55 | 2 PSIG | Future |
| Corporate Park Hangar 3 | 15.625 | 0.08 | 1,300 | 1,300,000 | 1.30 | 10.40 | 316.55 | 2 PSIG | Future |
| Corporate Park Hangar 4 | 15,625 | 0.08 | 1,300 | 1,300,000 | 1.30 | 10.40 | 316.55 | 2 PSIG | Future |
| Corporate Park Hangar 5 | 15.625 | 0.08 | 1.300 | 1.300.000 | 1.30 | 10.40 | 316.55 | 2 PSIG | Future |
| Corporate Park Hangar 6 | 15.625 | 0.08 | 1.300 | 1,300.000 | 1.30 | 10.40 | 316.55 | 2 PSIG | Future |
| Corporate Park Hangar 7 | 15.625 | 0.08 | 1.300 | 1.300.000 | 1.30 | 10.40 | 316.55 | 2 PSIG | Future |
| Corporate Park Hangar 8 | 15.625 | 0.08 | 1.300 | 1.300.000 | 1.30 | 10.40 | 316.55 | 2 PSIG | Future |
| Corporate Park Hangar 9 | 15.625 | 0.08 | 1.300 | 1.300.000 | 1.30 | 10.40 | 316.55 | 2 PSIG | Future |
| Corporate Park Hangar 10 | 15.625 | 0.08 | 1.300 | 1,300,000 | 1.30 | 10.40 | 316.55 | 2 PSIG | Future |
| T-Hangar 2 | 10,020 | 0.00 | 457 | 456.500 | 0.46 | 3.65 | 111.16 | 2 PSIG | Future |
| Box Hangar 1 | 7 800 | 0.08 | 700 | 700.000 | 0.70 | 5.60 | 170.45 | 2PSIG | Future |
| Box Hangar 2 | 7,800 | 0.08 | 700 | 700,000 | 0.70 | 5.60 | 170.45 | 21516 | Future |
| Box Hangar 3 | 7,800 | 0.08 | 700 | 700,000 | 0.70 | 5.60 | 170.45 | 2PSIG | Future |
| Box Hangar 4 | 7,800 | 0.08 | 700 | 700,000 | 0.70 | 5.60 | 170.45 | 21510 | Future |
| Box Hangar 5 | 8,000 | 0.08 | 700 | 700,000 | 0.70 | 5.60 | 170.45 | 21516 | Future |
| Tatal | 8,000 | 0.00 | 26 257 | 26 25 6 500 | 26.26 | 310.85 | 6 417 91 | 21310 | Tuture |
| | | | 20,557 | 20,550,500 | 20.30 | 210.85 | 0,417.81 | | |
| Grand Total | | | 53,113.00 | 53,113,000.00 | 53.11 | 424.90 | 12,933.02 | | |
| (E) - Existing Building to Building to Buildou | Remain in Ultimate It | Important Assumptions. From Existing Data | (CFh/SF) * SF | CFh * 1000 | MCFh = CFH / 1000 | MCFd = MCFh * 8 (hours a day) | MCFm = MCFd * 30.4375 (days in a month) | | |



Figure A-2

Gas - Estimated Future Loads

Sanitary Sewer - Existing Sanitary Sewer





Sanitary Sewer- Proposed Data

Figure A-4

Sanitary Sewer

Calculations

KEY POINTS

• Based on the Iowa DNR's 5,000 GPD/ Acre estimate.

| Location | Area (ACRE) | Flow Rate (GPD) | Flow Rate (GPM) | Flow Rate (CFS) | Velocity (FPS) | Pipe Size (inch) | Pipe Capacity (cfs)* | Pipe Velocity* (ft/s) |
|--------------------|-------------|-----------------|-----------------|-----------------|---|------------------|----------------------|-----------------------|
| Deicing Tanks | | | 150.00 | 0.3342 | | 8 | | |
| DMFS Hangar 1 | 0.5 | 2,500 | 1.74 | 0.0039 | | 8 | | |
| DMFS Hangar 2 | 0.47 | 2,350 | 1.63 | 0.0036 | | 8 | | |
| Signature Terminal | 0.17 | 850 | 0.59 | 0.0013 | | 8 | | |
| Signature Hangar 1 | 0.57 | 2,850 | 1.98 | 0.0044 | | 8 | | |
| Signature Hangar 2 | 0.57 | 2,850 | 1.98 | 0.0044 | | 8 | | |
| Signature Hangar 3 | 0.57 | 2,850 | 1.98 | 0.0044 | | 8 | | |
| Signature Hangar 4 | 0.57 | 2,850 | 1.98 | 0.0044 | | 8 | | |
| Signature Hangar 5 | 0.34 | 1,700 | 1.18 | 0.0026 | | 8 | | |
| Corporate Hangar 1 | 0.43 | 2,150 | 1.49 | 0.0033 | | 8 | | |
| Corporate Hangar 2 | 0.43 | 2,150 | 1.49 | 0.0033 | | 8 | | |
| Corporate Hangar 3 | 0.43 | 2,150 | 1.49 | 0.0033 | | 8 | | |
| Total | | | | 0.3733 | 2.53 at max deice, 1.3 no deice @ 0.6% | 8 | 0.6229 | 2.8740 |
| | | | | | • | | | · |
| Building 44 (E) | 0.54 | 2,700 | 1.88 | 0.0042 | | 8 | | |
| Total | | • | | 0.0042 | 0.81 @ 1.0% | 8 | 0.6229 | 2.8740 |
| | | | | | | | | |
| Building 46 (E) | 0.37 | 1,850 | 1.28 | 0.0029 | | 8 | | |
| Building 47 (E) | 0.4 | 2,000 | 1.39 | 0.0031 | | 8 | | |
| Building 40 (E) | 0.18 | 900 | 0.63 | 0.0014 | | 8 | | |
| Building 42 | 0.18 | 900 | 0.63 | 0.0014 | | 8 | | |
| GA Box Hangar 1 | 0.18 | 900 | 0.63 | 0.0014 | | 8 | | |
| GA Box Hangar 2 | 0.18 | 900 | 0.63 | 0.0014 | | 8 | | |
| GA Box Hangar 3 | 0.18 | 900 | 0.63 | 0.0014 | | 8 | | |
| GA Box Hangar 4 | 0.18 | 900 | 0.63 | 0.0014 | | 8 | | |
| GA Box Hangar 5 | 0.18 | 900 | 0.63 | 0.0014 | | 8 | | |
| Total | | | | 0.0157 | 1.00 @ 0.5% slope | 8 | 0.6229 | 2.8740 |
| | | | | | | | | |
| Building 29 (E) | 1.8 | 9,000 | 6.25 | 0.0139 | | 8 | | |
| FedEx | 0.83 | 4,150 | 2.88 | 0.0064 | | 8 | | |
| Cprk Hangar 1 | 0.36 | 1,800 | 1.25 | 0.0028 | | 8 | | |
| Cprk Hangar 2 | 0.36 | 1,800 | 1.25 | 0.0028 | | 8 | | |
| Cprk Hangar 3 | 0.36 | 1,800 | 1.25 | 0.0028 | | 8 | | |
| Cprk Hangar 4 | 0.36 | 1,800 | 1.25 | 0.0028 | | 8 | | |
| Cprk Hangar 5 | 0.36 | 1,800 | 1.25 | 0.0028 | | 8 | | |
| Cprk Hangar 6 | 0.36 | 1,800 | 1.25 | 0.0028 | | 8 | | |
| Cprk Hangar 7 | 0.36 | 1,800 | 1.25 | 0.0028 | | 8 | | |
| Cprk Hangar 8 | 0.36 | 1,800 | 1.25 | 0.0028 | | 8 | | |
| Cprk Hangar 9 | 0.36 | 1,800 | 1.25 | 0.0028 | | 8 | | |
| Cprk Hangar 10 | 0.36 | 1,800 | 1.25 | 0.0028 | | 8 | | |
| Total | | • | • | 0.0482 | Cprk outlet 1.2 @ 0.6% slope, combined 1.94 @ 1.5% slope | 8 | 0.6229 | 2.8740 |
| | | | | | | | | • |
| RAC Facility | | 10000 | 13.89 | 0.0310 | | 12 | | |
| Total | | • | | 0.0310 | 1.61 @ 1.5% slope | 12 | 3.6742 | 6.5732 |
| | | | | | - · · | | | |
| Grand Total South | | | | 0.4723 | | 8 | | |
| | | | | | | | | |
| UPS | 0.52 | 2,600 | 1.81 | 0.0040 | 0.57 @ .4% slope | 8 | | |
| | | | | | | | | |
| Grand Total Fast | | | | 0.0040 | | 8 | | |
| Statia Total East | | | | 0.0010 | | | *Pipe flowing full | *Dine flowing full |
| | | I | | | | | Pipe nowing full | Pipe nowing run |



Storm Sewer - 10yr Profile

KEY POINTS

- 10-year storm event.
- Profile begins at storm sewer by DMFS and ends at the proposed 48" outlet.

Label: 5-4A Type: Manhole Label: S-Mainline Profile - 10 Year ID: 518 ype: Catch Label: S-3 Label: S-6 Label: S-5 ID: 513 Label: S-7 ype: Catch Basi ype: Catch Basi ype: Catch Basi 938.00 Type: Manh: ID: 515 ID: 514 ID: 512 937 00Label: S-7A ID: 516 936 Ofre: Manhol Label: S-2 Label: P-9 ID: 531 ype: Catch Basi ID: 511 935 00 Type: Conduit ID: 532 934.00 933.00 Label S-1 932.00 Type: Manho ID: 468 931.00 930.00 Label: P-8 929.00 ype: Condu ID: 530 Label: P-7 928.00 Type: Condu 927.00 1D: 529 926.00 Label: P-6 925.00 ype: Condui ID: \$28 924.00 Label: P-5 Type: Condui ID: 527 923.00 Label: P-4 922.00 Type: Condui 1D 526 Label: P-3 921.00 Type: Conduit £ 920.00 919.00 ID: 525 5 918.00 t 917.00 916.00 Label: P-2 915.00 Type: Conduit ID: 524 914.00 913.00 912.00 911.00 910.00 909.00 908.00 907.00 906.00 905.00 904.00 903.00 902.00 901.00 900.00 899.00 898.00 897.00 500.000 600.000 0.000 100.000 200.000 300.000 400.000 700.000



Storm Sewer - SW 28th St Extension, 10 yr

Station (ft)



Storm Sewer - 100yr Profile

KEY POINTS

- 100-year storm event.
- Profile begins at storm sewer by DMFS and ends at the proposed 48" outlet.



Figure A-6



48

Electric - Loop Continuation Techniques

KEY POINTS

- Loop cabinet installation bolted to transformer pads in General Aviation Apron.
- Transformer pad installation detail at the Corporate Hangar Park.

Figure A-7





SECTION A-A





Figure A-8

Corporate Park Transformer and

Loop Extension

Appendix A - 2018 Electric Layout & Sizing



Appendix A - 2018 Electric Layout & Sizing





SOUTH QUADRANT ELECTRIC PLAN 2018 PLAN

REMOVE Â 3 PH PADMOUNT TRANSFORMER EXISTING POLE \bigtriangleup OH TRANSFORMER 1 PH PADMOUNT TRANSFORMER EXISTING SWTICHGEAR 3PH PADMOUNT TRANSFORMER PROPOSED ((_) 1PH PADMOUNT TRANSFORMER PROPOSED EXISTING OH EXISTING UG 3 PH EXISTING UG 1 PH EXISTING SECONDARY PROPOSED SECONDARY PROPOSED UG 3 PH _____

A

LEGEND

Appendix A - 2019 Electric Layout & Sizing



Appendix A - 2019 Electric Layout & Sizing





SOUTH QUADRANT ELECTRIC PLAN 2019 PLAN





LEGEND

Appendix A - Future Electric Layout & Sizing



Appendix A - Future Electric Layout & Sizing





1 PH PADMOUNT TRANSFORMER EXISTING 3PH PADMOUNT TRANSFORMER PROPOSED 1PH PADMOUNT TRANSFORMER PROPOSED

Water - Supply Model Summary

KEY POINTS

 See Figure 6-9 on Page 31 for junction locations

| Des Moines Airport Water Network Analysis Results Revised 1/11/2018 | | | | | | | |
|--|-----------------------------------|---|-----------------------------------|--|--|--|--|
| Junction Number | Water Demand at Junction (GPM) | Minimum Pressure (PSI) Anywhere in Network | Junction with Minimum Pressure | | | | |
| J-9 | 2,500 | 45 | J-12 | | | | |
| J-14 | 2,500 | 46 | J-12 | | | | |
| J-22 | 2,500 | 37 | J-22 | | | | |
| J-33 | 2,500 | 44 | J-12 | | | | |
| J-34 | 2,500 | 43 | J-12 | | | | |
| J-40 | 2,500 | 45 | J-12 | | | | |
| J-41 | 2,500 | 44 | J-12 | | | | |
| J-45 | 2,500 | 42 | J-56 | | | | |
| J-46 | 2,500 | 30 | J-56 | | | | |
| J-50 | 2,500 | 42 | J-50 | | | | |
| J-51 | 2,500 | 41 | J-51 | | | | |
| 1-53 | 2,500 | 35 | J-53 | | | | |
| J-54 | 2,500 | 37 | J-54 | | | | |
| J-56 | 500 | 43 | J-56 | | | | |

Figure A-15

Water Supply Model - Summary



Appendix B

Proposed Apron Elevations - Signature

KEY POINTS

- Assume initial three hangars for Signature FBO have the same floor elevation.
- Maximum slope on the apron is 1.5%.





PAT 911.58 940. 94.92 941.28 941.64 942.19 981.34 939.63 ATLE 970.07 94488 942.70 1.92% 938.74 455.0 931.87 931 931 131 939.30

Appendix B

DMFS Apron & Frontage Taxiway Proposed Elevations



DMFS Apron & Frontage Taxiway Elevations





Proposed Apron Elevations - Fed Ex



Figure B-3





Apron Elevations - Overview

Figure B-4

DMFS Apron & Frontage Taxiway Elevations




Storm Water Management Plan



August 23, 2017

Sent via e-mail:

Tyler Anderson, P.E. Tyler.Anderson@foth.com

To whom it may concern -

The intent of this letter is to provide guidance on stormwater management requirements for future projects at the Des Moines International Airport. A request was made for this letter by Tyler Anderson, P.E. on August 10, 2017.

As projects move forward at the airport, each phase will need to verify that the regional stormwater basin has enough capacity for large storm detention. Based on information provided in the most recent Stormwater Management Plan (SWMP), it is evident that there is an abundance of storage volume available in the basin. You will be able to utilize this for future projects, but there may come a point where additional storage is needed.

Water quality volume (WQv) treatment will be required for each project. As projects move forward, treatment of the WQv will likely need to be provided upstream of the regional basin unless the basin outlet structure is modified.

It should be understood that as the City of Des Moines stormwater management requirements change over time, each new project after the date of said changes would be required to meet the new requirements. This letter in no way acts as a waiver from future ordinance changes that may implement stricter stormwater management requirements.

If you have any questions, please do not hesitate to contact me.

Respectfully, Adam Prilipp, P.E.

Civil Engineer II 515-283-4096 apprillpp@dmgov.org



Figure C-1

Storm Water Management Letter





South Quadrant Programming Report

| ID | Task Name | Duration | Start | Finish | Predecessors | 2017 | 2018 | | 2019 | | | 20 | 20 | | 2021 | | | 202 | 22 | |
|----|--|-----------|--------------|---------------|--------------------|-------------------------------|---------------|-----------------|-------------|--------|--------|-----------|--------------|---------------|-------|-------|---------|------------|-----------|-----------|
| 1 | | | | | | Qtr 1 Qtr 2 Qtr 3 Qtr 4 | Qtr 1 Qtr 2 | Qtr 3 Qtr 4 | Qtr 1 Qtr | ·2 C | Qtr 3 | Qtr 4 Q | tr 1 Qtr 2 | Qtr 3 Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 (| Qtr 4 Qt | r 1 Qtr | 2 Qtr 3 |
| | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | |
| 2 | LIDE Delegation | 179 days2 | Tue 0/1/17 | Wed 5 /20 /10 | | _ | | | | | PS Re | location | | | | | | | | |
| 5 | UPS Relocation | 478 days? | Tue 8/1/17 | wed 5/29/19 | | | | | 1 | 1 01 | | location | | | | | | | | |
| 4 | Building 31 Improvements | 391 days | Tue 8/1/17 | Mon 1/28/19 | | | | | - Buildir | ng 3: | 1 Imj | oroveme | nts | | | | | | | |
| 5 | Lease Agreement | 51 days | Tue 8/1/17 | Tue 10/10/17 | | Leas | se Agreemer | it | | | | | | | | | | | | |
| 6 | Design & Bidding | 140 days | Wed 10/11/17 | Mon 4/23/18 | 5 | | De | sign & Bidding | g | | | | | | | | | | | |
| 7 | Site Work | 90 days | Tue 4/24/18 | Mon 8/27/18 | 6 | | | Site Wo | rk | | | | | | | | | | | |
| 8 | Building Renovations/Addition | 200 days | Tue 4/24/18 | Mon 1/28/19 | 6 | | | | Buildin | ng Re | enova | ations/Ac | ldition | | | | | | | |
| 9 | UPS Relocation | 20 days | Thu 1/31/19 | Wed 2/27/19 | 8 | | | | UPS I | Relo | ocatio | n | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | |
| 11 | Building 35 Demolition | 125 days? | Thu 12/6/18 | Wed 5/29/19 | | | | - | | Bu | uildin | ig 35 Der | nolition | | | | | | | |
| 12 | Design & Bidding | 60 days | Thu 12/6/18 | Thu 2/28/19 | 13SF-5 days | | | | Desig | gn & | د Bido | ling | | | | | | | | |
| 13 | Install Security Fence | 20 days | Thu 3/7/19 | Wed 4/3/19 | 9FS+5 days | | | | Ins [| stall | Secu | rity Fenc | e | | | | | | | |
| 14 | Demolish Building 35 | 40 days | Thu 4/4/19 | Wed 5/29/19 | 13 | | | | | De | emoli | sh Buildi | ng 35 | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| 16 | Bldg 33 Relocation | 406 days? | Tue 9/5/17 | Mon 3/25/19 | | r | | | ——I Blo | dg 3 | 3 Rel | ocation | | | | | | | | |
| 17 | Construct T-Hangars | 150 days | Tue 9/5/17 | Fri 3/30/18 | | | Con | struct T-Hanga | ars | | | | | | | | | | | |
| 18 | Relocate Tenants Bldg 34 | 20 days | Mon 4/2/18 | Fri 4/27/18 | 17 | | Re | elocate Tenants | s Bldg 34 | | | | | | | | | | | |
| 19 | Relocate Tenants Bldg 33 to Bldg 34 | 20 days | Mon 4/30/18 | Fri 5/25/18 | 18 | | | Relocate Tenar | nts Bldg 3 | 13 to | Bldg | 34 | | | | | | | | |
| 20 | Prepare Foundation & Site | 55 days | Tue 9/5/17 | Sat 11/18/17 | 17SS | | Prepare Foun | dation & Site | | | | | | | | | | | | |
| 21 | Design & Bidding | 138 days | Mon 10/2/17 | Tue 4/10/18 | | | De | sign & Bidding | 9 | | _ | _ | | | | | | | | |
| 22 | Relocate power & comm to deice tank shack | 25 days | Mon 4/30/18 | Mon 6/4/18 | 21,23SF-10 days | | | Relocate powe | er & comn | m to | deic | e tank sh | ack | | | | | | | |
| 23 | Relocate Hangar | 20 days | Mon 6/18/18 | Fri 7/13/18 | 20,19,21 | | | Relocate Ha | angar | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |

| ID | Task Name | Duration | Start | Finish | Predecessors | 2017 Otr 1 | Otr 2 | Otr 3 | Otr 4 | 2018 Otr 1 0 | tr 2 0t | r 3 Otr | 2019 | r 2 Otr 3 C | 2020 |
|----|--|-----------|-------------|--------------|--------------|---------------|-------|-------|-------|-----------------|---------|-------------|--------------|-----------------|----------------|
| 24 | Build Office Addition | 60 days | Mon 7/16/18 | Fri 10/5/18 | 23 | QUII | | QUIJ | Qui | | | Bui | ild Office A | ddition | |
| 25 | Relocate Tenants Building 34 to Relocated Building 33 | 20 days | Mon 10/8/18 | Fri 11/2/18 | 24 | | | | | | | R | lelocate Te | nants Buildi | ng 34 to Relo |
| 26 | | | | | | | | | | | | | | | |
| 27 | Building 33, 34 Demolition | 181 days | Mon 7/16/18 | Mon 3/25/19 | | | | | | | - | | В | uilding 33, 3 | 34 Demolitio |
| 28 | Design & Bidding | 80 days | Mon 7/16/18 | Fri 11/2/18 | 25FF | | | | | | | | Design & B | idding | |
| 29 | Install Security Fence | 21 days | Mon 12/3/18 | Mon 12/31/18 | 28FS+20 days | | | | | | | | Install S | ecurity Fenc | e |
| 30 | Relocate power & comm to deice tank shack | 21 days | Mon 12/3/18 | Mon 12/31/18 | 28FS+20 days | | | | | | | | Relocat | e power & c | omm to deic |
| 31 | Demolish Bldg 33, 34 Site | 60 days | Tue 1/1/19 | Mon 3/25/19 | 29,25,24 | | | | | | | | De | emolish Bldg | g 33, 34 Site |
| 32 | | | | | | | | | | | | | | | |
| 33 | FedEx Relocation | 580 days? | Tue 8/1/17 | Fri 10/18/19 | | | | | | | | | | i | FedEx Reloo |
| 34 | Lease Agreement | 110 days | Tue 8/1/17 | Fri 12/29/17 | | | | | ŀ | Lease A | greem | ent | | | |
| 35 | Design & Bidding | 117 days | Mon 1/1/18 | Tue 6/12/18 | 34 | | | | ì | | Des | ign & B | Bidding | | |
| 36 | FedEx Relocate to Existing Position 2 and 3 | 30 days | Mon 7/2/18 | Fri 8/10/18 | 35FS+13 days | | | | | | - | FedEx | Relocate to | Existing Po | sition 2 and 3 |
| 37 | Install Security Fence | 10 days | Mon 8/13/18 | Fri 8/24/18 | 36 | | | | | | ì | Install | Security F | ence | |
| 38 | Temporary Construction Access | 10 days | Mon 8/13/18 | Fri 8/24/18 | 36 | | | | | | ì | Temp | orary Cons | truction Acc | ess |
| 39 | Future Site Demolition | 10 days | Mon 8/27/18 | Fri 9/7/18 | 38 | | | | | | | Futu | re Site Dem | olition | |
| 40 | Utilities | 40 days | Mon 8/27/18 | Fri 10/19/18 | | | | | | | | 1 U | Itilities | | |
| 41 | Water | 40 days | Mon 8/27/18 | Fri 10/19/18 | 38 | | | | | | | w | ater | | |
| 42 | Electric | 40 days | Mon 8/27/18 | Fri 10/19/18 | 38 | | | | | | | El« | ectric | | |
| 43 | San. Sewer | 40 days | Mon 8/27/18 | Fri 10/19/18 | 38 | | | | | | | Sa | an. Sewer | | |
| 44 | Gas | 40 days | Mon 8/27/18 | Fri 10/19/18 | 38 | | | | | | | Ga | as | | |
| 45 | Communications | 40 days | Mon 8/27/18 | Fri 10/19/18 | 38 | | | | | | | Co | ommunicat | ions | |
| 46 | Storm Sewer/Subdrain | 40 days | Mon 8/27/18 | Fri 10/19/18 | 38 | | | | | | | St | orm Sewer | /Subdrain | |
| | | | | | | | | | | | | | | | |

| | r 2 | Otr 3 | Otr 4 | 2021 Otr 1 | Otr 2 | Otr 3 | Otr 4 | 2022 Otr 1 | Otr 2 | Otr 3 |
|----------|------|---------|--------|---------------|-------|-------|-------|---------------|-------|-------|
| <u> </u> | 12 | Quij | Quit | QuII | Quiz | QUIJ | Quit | QUIT | Quz | Quis |
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| ID | Task Name | Duration | Start | Finish | Predecessors | 2017 2018 2019 2020 2021 2022 Otr 1 Otr 2 Otr 3 Otr 4 Otr 4 Otr 4 Otr 3 Otr 4 Otr 4 Otr 3 Otr 4 Otr 4 Otr 3 Otr 4 Otr 4 </th |
|----------|--|-----------|--------------|--------------|----------------|--|
| 47 | Construct Facility | 180 days | Mon 8/27/18 | Fri 5/3/19 | | |
| 48 | Footings/Floor Slab | 40 days | Mon 8/27/18 | Fri 10/19/18 | 38 | Footings/Floor Slab |
| 49 | Building | 140 days | Mon 10/22/18 | Fri 5/3/19 | 48 | Building |
| 50 | Semi Truck Apron/Docks | 60 days | Mon 10/22/18 | Fri 1/11/19 | 48 | Semi Truck Apron/Docks |
| 51 | Install Tie Downs, GPU's, ACARS | 30 days | Mon 10/22/18 | Fri 11/30/18 | 48 | Install Tie Downs, GPU's, ACARS |
| 52 | Stripe FedEx Positions On Cargo Apron | 5 days | Mon 10/22/18 | Fri 10/26/18 | 48 | Stripe FedEx Positions On Cargo Apron |
| 53 | Construct Temporary Truck Access (Gate 8) | 40 days | Mon 5/28/18 | Fri 7/20/18 | 19 | Construct Temporary Truck Access (Gate 8) |
| 54 | Relocate FedEx Operations | 20 days | Mon 5/6/19 | Fri 5/31/19 | 47 | Relocate FedEx Operations |
| 55 | Demolish FedEx Building and Site | 40 days | Mon 6/3/19 | Fri 7/26/19 | 54 | Demolish FedEx Building and Site |
| 56 | Construct FedEx Entrance Driv | e 60 days | Mon 7/29/19 | Fri 10/18/19 | 55 | Construct FedEx Entrance Drive |
| 57 | Construct Site Parking | 60 days | Mon 7/29/19 | Fri 10/18/19 | 55 | Construct Site Parking |
| 58 | | | | | | |
| 59 | Construct SW 28th Street Extension | 201 days | Mon 1/21/19 | Mon 10/28/1 | 9 | Construct SW 28th Street Extension |
| 60 | Design & Bidding | 111 days | Mon 1/21/19 | Mon 6/24/19 | | Design & Bidding |
| 61 | Grading | 20 days | Tue 6/25/19 | Mon 7/22/19 | 11,27,60 | Grading |
| 62 | Utilities | 50 days | Tue 7/23/19 | Mon 9/30/19 | 61SS+20 days | VS Utilities |
| 63 | Paving | 40 days | Tue 9/3/19 | Mon 10/28/19 | 9 62FS-20 days | s Paving |
| 64 | | | | | | |
| 65 | Des Moines Fly Service Relocation | 950 days? | Tue 8/1/17 | Fri 3/19/21 | | Des Moines Fly Service Relocation |
| 66 | Lease Agreement | 260 days | Tue 8/1/17 | Fri 7/27/18 | | Lease Agreement |
| 67 | Design & Bidding | 180 days | Mon 5/7/18 | Fri 1/11/19 | 66FS-60 days | S Design & Bidding |
| 68 | Temporary Perimeter Fence | 10 days | Mon 7/29/19 | Fri 8/9/19 | 55,67,31 | Temporary Perimeter Fence |
| 69 | Site Prep | 20 days | Mon 8/12/19 | Fri 9/6/19 | 68 | Site Prep |
| | | 1 | | | | |
| <u> </u> | | | | | | |

| Task Name | Duration | Start | Finish | Predecessors | 2017 Otr 1 | Otr 2 Otr 3 | Otr 4 | 2018 Otr 1 0 | otr 2 Otr | 3 Otr 4 | 2019 Otr 1 | Otr 2 | Ot | r 3 | Otr 4 | 2020 |
|---|---|---|---|--|---|---|---|---|--|---|--|---|---|--|---|--|
| Utilities | 50 days | Mon 9/9/19 | Fri 11/15/19 | | | | Q (| | | <u> </u> | Q. 2 | <u> </u> | | I | | Utilities |
| Gas | 50 days | Mon 9/9/19 | Fri 11/15/19 | 69,62SS | | | | | | | | | | | | Gas |
| Comm | 50 days | Mon 9/9/19 | Fri 11/15/19 | 69,62SS | | | | | | | | | | | | Comm |
| Electric | 50 days | Mon 9/9/19 | Fri 11/15/19 | 69,62SS | | | | | | | | | | | | Electric |
| San. Sewer | 50 days | Mon 9/9/19 | Fri 11/15/19 | 69,62SS | | | | | | | | | | | - | San. Sewo |
| St. Sewer/Subdrain | 50 days | Mon 9/9/19 | Fri 11/15/19 | 69,62SS | | | | | | | | | | | | 5t. Sewer |
| Construct Facility | 280 days | Mon 9/9/19 | Fri 10/2/20 | | | | | | | | | | | r | | |
| Hangars/Office | 280 days | Mon 9/9/19 | Fri 10/2/20 | | | | | | | | | | | - | | |
| Footings/Floor Slab | 60 days | Mon 9/9/19 | Fri 11/29/19 | 69 | | | | | | | | | | | - | Footings |
| Hangar Building | 220 days | Mon 12/2/19 | Fri 10/2/20 | 78 | | | | | | | | | | | ì | - |
| Site Work | 90 days | Tue 6/25/19 | Mon 10/28/19 | | | | | | | | | r | | | - S | ite Work |
| Parking Lot (Included in SW 28th St. Extension) | 90 days | Tue 6/25/19 | Mon 10/28/19 | 60 | | | | | | | | | | | Pa | arking Lo |
| Relocate DMFS Into New Building | 20 days | Mon 10/5/20 | Fri 10/30/20 | 76,80,89FF | | | | | | | | | | | | |
| Relocate Existing DMFS Bldg. 7 | 60 days | Mon 10/5/20 | Fri 12/25/20 | 82FS-20 days | | | | | | | | | | | | |
| Existing DMFS Demolition and Restoration | 60 days | Mon 12/28/20 | Fri 3/19/21 | 83 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Frontage Taxiway & Apron | 210 days | Wed 1/8/20 | Tue 10/27/20 | | | | | | | | | | | | | |
| Design & Bidding | 90 days | Wed 1/8/20 | Tue 5/12/20 | | | | | | | | | | | | | |
| Frontage Taxiway & Connector | 120 days | Wed 5/13/20 | Tue 10/27/20 | 87,31 | | | | | | | | | | | | |
| DMFS Apron | 120 days | Wed 5/13/20 | Tue 10/27/20 | 8855 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Signature Flight Support Relocation | 930 days? | Tue 8/1/17 | Fri 2/19/21 | | | | | | | | | | | | | |
| Lease Agreement | 200 days | Tue 8/1/17 | Fri 5/4/18 | | | | | | Lease | Agreem | ent | | | | | |
| | Task Name Utilities Gas Gas Comm Electric San. Sewer St. Sewer/Subdrain Construct Facility Hangars/Office Footings/Floor Slab Hangar Building Site Work Parking Lot (Included in SW 28th St. Extension) Relocate DMFS Into New Building Relocate Existing DMFS Bldg. 7 Existing DMFS Demolition and Restoration Frontage Taxiway & Apron Design & Bidding Frontage Taxiway & Connector DMFS Apron Lease Agreement | Task NameDurationUtilities50 daysGas50 daysComm50 daysElectric50 daysSan. Sewer50 daysSt. Sewer/Subdrain50 daysConstruct Facility280 daysHangars/Office280 daysFootings/Floor Slab60 daysGas220 daysSite Work90 daysParking Lot (Included in SW 28th St. Extension)90 daysRelocate Existing DMFS Bldg. 760 daysExisting DMFS Demolition and Restoration60 daysFrontage Taxiway & Apron210 daysDesign & Bidding90 daysDMFS Apron120 daysDMFS Apron120 daysSignature Flight Support Relocation930 days?Lease Agreement200 days | Task NameDurationStartUtilities50 daysMon 9/9/19Gas50 daysMon 9/9/19Comm50 daysMon 9/9/19Electric50 daysMon 9/9/19San. Sewer50 daysMon 9/9/19St. Sewer/Subdrain50 daysMon 9/9/19Construct Facility280 daysMon 9/9/19Hangars/Office280 daysMon 9/9/19Footings/Floor Slab60 daysMon 9/9/19Hangar Building220 daysMon 12/2/19Site Work90 daysTue 6/25/19Parking Lot (Included in SW Building90 daysTue 6/25/19Relocate DMFS Into New Building20 daysMon 10/5/20Existing DMFS Demolition and Restoration60 daysMon 12/28/20Frontage Taxiway & Apron210 daysWed 1/8/20DMFS Apron120 daysWed 5/13/20Signature Flight Support Relocation930 days?Tue 8/1/17Lease Agreement200 daysTue 8/1/17 | Task NameDurationStartFinishUtilities50 daysMon 9/9/19Fri 11/15/19Gas50 daysMon 9/9/19Fri 11/15/19Comm50 daysMon 9/9/19Fri 11/15/19Electric50 daysMon 9/9/19Fri 11/15/19San. Sewer50 daysMon 9/9/19Fri 11/15/19San. Sewer/Subdrain50 daysMon 9/9/19Fri 11/15/19Construct Facility280 daysMon 9/9/19Fri 10/2/20Hangars/Office280 daysMon 9/9/19Fri 10/2/20Footings/Floor Slab60 daysMon 9/9/19Fri 10/2/20Site Work90 daysTue 6/25/19Mon 10/28/19Parking Lot (Included in SW Building20 daysMon 10/5/20Fri 10/30/20Relocate DMFS Into New Building20 daysMon 10/5/20Fri 12/25/20Frontage Taxiway & Apron210 daysWed 1/8/20Tue 5/12/20Design & Bidding90 daysWed 1/8/20Tue 10/27/20DMFS Apron120 daysWed 5/13/20Tue 10/27/20Signature Flight Support Relocation930 days?Tue 8/1/17Fri 2/19/21Signature Flight Support Relocation200 daysTue 8/1/17Fri 2/19/21 | Task NameDurationStartFinishPredecessorsUtilities50 daysMon 9/9/19Fri 11/15/1969,6255Gas50 daysMon 9/9/19Fri 11/15/1969,6255Comm50 daysMon 9/9/19Fri 11/15/1969,6255Electric50 daysMon 9/9/19Fri 11/15/1969,6255San. Sewer50 daysMon 9/9/19Fri 11/15/1969,6255San. Sewer/Subdrain50 daysMon 9/9/19Fri 11/15/1969,6255Construct Facility280 daysMon 9/9/19Fri 10/2/207Hangars/Office280 daysMon 9/9/19Fri 10/2/2078Footings/Floor Slab60 daysMon 12/2/19Fri 10/2/2078Site Work90 daysTue 6/25/19Mon 10/28/1960Parking Lot (Included in SW 28th St. Extension)20 daysMon 10/5/20Fri 10/30/2076,80,89FFRelocate DMFS Into New Building20 daysMon 10/5/20Fri 3/19/218383Frontage Taxiway & Apron210 daysWed 1/8/20Tue 10/27/2087,31Design & Bidding90 daysWed 1/8/20Tue 10/27/208855Signature Flight Support Relocation930 daysTue 8/1/17Fri 2/19/21Signature Flight Support Relocation930 daysTue 8/1/17Fri 5/4/18 | Task Name Duration Start Finish Predecessors 2017 Ott. 1 of Ott. 1 of Utilities 50 days Mon 9/9/19 Fri 11/15/19 69,6255 Gas 50 days Mon 9/9/19 Fri 11/15/19 69,6255 Comm 50 days Mon 9/9/19 Fri 11/15/19 69,6255 Electric 50 days Mon 9/9/19 Fri 11/15/19 69,6255 San. Sewer 50 days Mon 9/9/19 Fri 11/15/19 69,6255 San. Sewer 50 days Mon 9/9/19 Fri 11/15/19 69,6255 Construct Facility 280 days Mon 9/9/19 Fri 11/15/19 69,6255 Hangars/Office 280 days Mon 9/9/19 Fri 11/15/19 69,6255 Footings/Floor Slab 60 days Mon 9/9/19 Fri 11/22/10 78 Site Work 90 days Tue 6/25/19 Mon 10/28/19 60 Parking Lot (Included in SW 201 days 90 days Mon 10/5/20 Fri 3/19/21 83 Relocate DMFS Into New Building 200 days Mon 10/5/20 Fri 3 | Task Name Duration Start Finish Predecessors 2017 Ort 2 Ort 3 Utilities 50 days Mon 9/9/19 Fri 11/15/19 69,625S Ort 3 Ort 4 Ort 2 Ort 3 Comm 50 days Mon 9/9/19 Fri 11/15/19 69,62SS San Sewer 50 days Mon 9/9/19 Fri 11/15/19 69,62SS San Sewer 50 days Mon 9/9/19 Fri 10/2/20 69,62SS San Sewer S0 days Mon 9/9/19 Fri 10/2/20 Fri 10/2/20 Hangars/Office 280 days Mon 9/9/19 Fri 10/2/20 Fri 10/2/20 78 Site Work 90 days Tue 6/25/19 Mon 10/28/19 60 280 days Mon 10/52/0 Fri 10/30/20 76,80,89FF Building 210 days Mon 10/52/0 Fri 10/30/20 76,80,89FF Site Work 90 days Mon 12/28/20 Fri 3/19/21 83 < | Task Name Duration Start Finish Predecessors 2017 Out 1 Out 2 Out 3 Out 4 Utilities 50 days Mon 9/9/19 Fri 11/15/19 69,6255 Out 1 Out 1 | Task Name Duration Start Finish Predecessors 2027 2017 2017 2011 Otr 2 Otr 3 Otr 1 Otr 3 Otr 3 <th< td=""><td>Task Name Duration Start Finish Predecessors 2017 Our 1 Our 1<td>Task Name Duration Start Finish Predecessor 2017 012 1 013 1 021 1</td></td></th<> <td>Task Name Duration Start Pineh Predecessors DDT // Dot 2 DDT 3 DDT 4 DDT 3 <thdt 3<="" th=""> <thdt 3<="" td=""><td>Task Name Duration Start Finish Predecessors 2127 2128</td><td>Task Name Duration Start Finish Producessors 2017 Curl C</td><td>Task Name Fundion Suit Finsh Predectoson 2011 Or 1 2013 Or 1 2013 Or</td><td>Tack Rune: Duration Start Prind Predectorion 2001 Ort Or</td></thdt></thdt></td> | Task Name Duration Start Finish Predecessors 2017 Our 1 Our 1 <td>Task Name Duration Start Finish Predecessor 2017 012 1 013 1 021 1</td> | Task Name Duration Start Finish Predecessor 2017 012 1 013 1 021 1 | Task Name Duration Start Pineh Predecessors DDT // Dot 2 DDT 3 DDT 4 DDT 3 DDT 3 <thdt 3<="" th=""> <thdt 3<="" td=""><td>Task Name Duration Start Finish Predecessors 2127 2128</td><td>Task Name Duration Start Finish Producessors 2017 Curl C</td><td>Task Name Fundion Suit Finsh Predectoson 2011 Or 1 2013 Or 1 2013 Or</td><td>Tack Rune: Duration Start Prind Predectorion 2001 Ort Or</td></thdt></thdt> | Task Name Duration Start Finish Predecessors 2127 2128 | Task Name Duration Start Finish Producessors 2017 Curl C | Task Name Fundion Suit Finsh Predectoson 2011 Or 1 2013 Or | Tack Rune: Duration Start Prind Predectorion 2001 Ort Or |



| ID | Task Name | Duration | Start | Finish | Predecessors | 2017 Otr 1 |)tr 2 Otr 3 Otr 4 | 2018 Otr 1 | Otr 2 Otr 3 Otr 4 | 2019 Otr 1 Otr 2 | Otr 3 | 2 2 | 020 Otr 1 |
|-----|---|----------|--------------|--------------|---------------|---------------|-------------------|---------------|-------------------|---------------------|---------|---------|--------------|
| 93 | Design & Bidding | 180 days | Mon 5/7/18 | Fri 1/11/19 | 92 | | | | | Design & I | Bidding | | QUII |
| 94 | Temporary Perimeter Fence | 10 days | Mon 7/29/19 | Fri 8/9/19 | 92,93,55,31 | | | | | | Tem | porary | y Per |
| 95 | Site Prep | 30 days | Mon 8/12/19 | Fri 9/20/19 | 94 | _ | | | | | S | ite Pre | ep |
| 96 | Utilities | 40 days | Mon 9/23/19 | Fri 11/15/19 | | _ | | | | | r | - Uti | ilities |
| 97 | Gas | 40 days | Mon 9/23/19 | Fri 11/15/19 | 95,62SS | | | | | | | Gas | 5 |
| 98 | Comm | 40 days | Mon 9/23/19 | Fri 11/15/19 | 95,62SS | | | | | | | Cor | nm |
| 99 | Electric | 40 days | Mon 9/23/19 | Fri 11/15/19 | 95,62SS | | | | | | | Elec | ctric |
| 100 | San. Sewer | 40 days | Mon 9/23/19 | Fri 11/15/19 | 95,62SS | | | | | | | San | . Sev |
| 101 | St. Sewer/Subdrain | 40 days | Mon 9/23/19 | Fri 11/15/19 | 95,62SS | | | | | | | St. S | Sewe |
| 102 | Construct Facility | 280 days | Mon 9/23/19 | Fri 10/16/20 | | | | | | | r | | |
| 103 | Footings/Floor Slab | 60 days | Mon 9/23/19 | Fri 12/13/19 | 95 | _ | | | | | | F | ootir |
| 104 | FBO Office | 180 days | Mon 2/10/20 | Fri 10/16/20 | 103,105FF | _ | | | | | | | + |
| 105 | Hangars X3 | 220 days | Mon 12/16/19 | Fri 10/16/20 | 103 | | | | | | | | |
| 106 | Site Work | 60 days | Wed 4/1/20 | Tue 6/23/20 | | | | | | | | | |
| 107 | Parking Lot | 60 days | Wed 4/1/20 | Tue 6/23/20 | 96 | | | | | | | | • |
| 108 | Signature Flight Support Relocation | 30 days | Mon 10/19/20 | Fri 11/27/20 | 102,106,96 | | | | | | | | |
| 109 | Existing Signature Demolition and Restoration | 60 days | Mon 11/30/20 | Fri 2/19/21 | 108 | | | | | | | | |
| 110 | | | | | | | | | | | | | |
| 111 | General Aviation Apron Reconstruction | 80 days | Wed 5/13/20 | Tue 9/1/20 | | | | | | | | | |
| 112 | Apron (Remove & Replace) | 80 days | Wed 5/13/20 | Tue 9/1/20 | 103FS-60 days | s | | | | | | | |

