



Appendix D

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## **DRAINAGE AND UTILITIES PLAN**

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*Ryan Airfield*

### ***INTRODUCTION***

This report has been prepared to update the Drainage and Utilities Plan prepared in the *Airport Master Plan for Ryan Airfield* that was approved in June 1999. The following discussion will summarize existing utilities located at Ryan Airfield and conceptually address future utility needs for proposed development onsite. Utilities include sanitary sewer, electricity, gas, telephone, water, and drainage structures.

The utilities depicted on the following exhibits are based on information provided by the various utility companies and the Tucson Airport Authority (TAA). Best effort has been made to depict the utilities, but these locations should be considered approximate.

### ***DRAINAGE***

The “Ryan Airfield Airport-Wide Basin Study Update,” (Master Drainage Plan) dated March 20, 2006, identifies seven upstream watersheds impacting the subject property's southern boundary line. Offsite runoff is conveyed north in a network of braided channels and sheet flow to Ajo Highway. Runoff enters the site via existing culverts located under Ajo Highway. It is then conveyed onsite in a northerly manner via existing earthen channels and sheet flow located east and west of the airport-related

development areas. Onsite, a portion of the site gently slopes to the northeast as the remainder of the parcel generally slopes to the northwest.

The study area is located within a Federal Emergency Management Agency (FEMA) mapped Special Flood Hazard area (100-year floodplain) per the current Flood Insurance Rate Map (FIRM), Community Panel No. 04019C-2200K, dated February 8, 1999 for Pima County and Incorporated Areas. The parcel is located within Zone AO with associated depth of flow of one foot as well as Zone A (Special Flood Hazard Area, no base flood elevations determined).

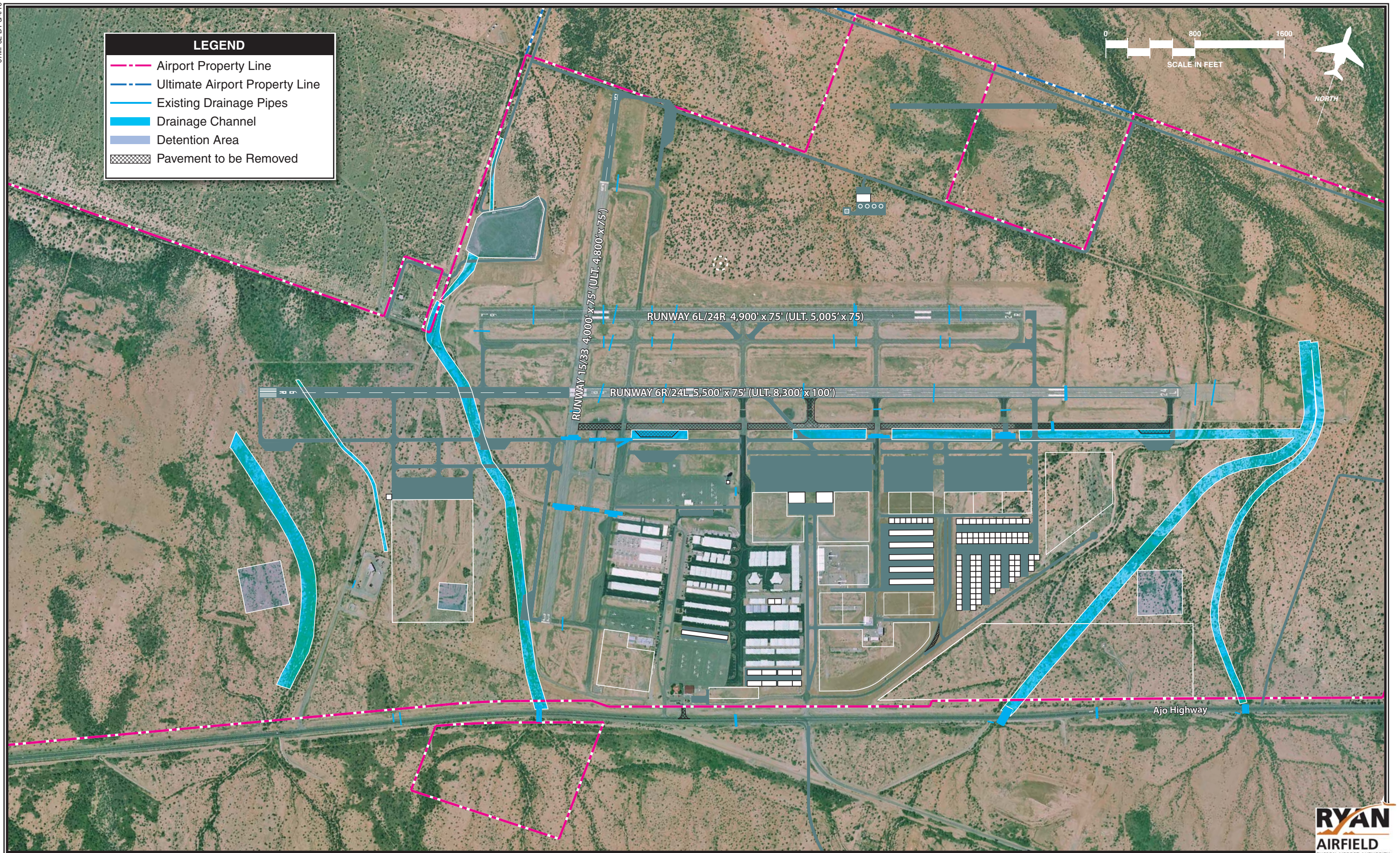
On the eastern portion of the site, runoff enters from the south via culverts under Ajo Way. Relocation of an existing levee located approximately 700 feet east of Airfield Drive, just north of Ajo Highway, was presented in the Master Drainage Plan, and the proposed location is shown on **Exhibit D1**. The existing levee confines the 100-year flow for a tributary to the Black Wash; however, the existing earthen levee does not have the freeboard required by FEMA standards and is not certified per FEMA standards. An uncertified levee is assumed to fail by FEMA standards; therefore, the 100-year floodplain for the tributary would extend with the adjacent airport-related development areas and airfield operations areas and flow north into the airfield. The 100-year peak discharge for the tributary to Black Wash was obtained from HEC-1 modeling and is 4,578 cfs, for an approximately 16 square mile watershed. A new levee alignment has been designed (30%) and a request for a Conditional Letter of Map Revision (CLOMR) has been submitted (December 22, 2009) to FEMA to remove the airfield and aviation support areas from the A and AO Zones. In addition, construction of a low flow channel for the tributary wash is proposed in conjunction with the levee.

On the western portion of the site, runoff also enters from the south via culverts under Ajo Way. Per the Master Drainage Plan, the 100-year floodplains for the unnamed streams which lie west of the airfield operations areas do not impact the existing airfield and aviation support areas. The Master Drainage Plan addressed the possibility of channelizing the 100-year flow for two streams (channels 1 and 2) on the western portion of the site to provide additional developable area and conveyance to proposed culverts for future runway and taxiway expansion.

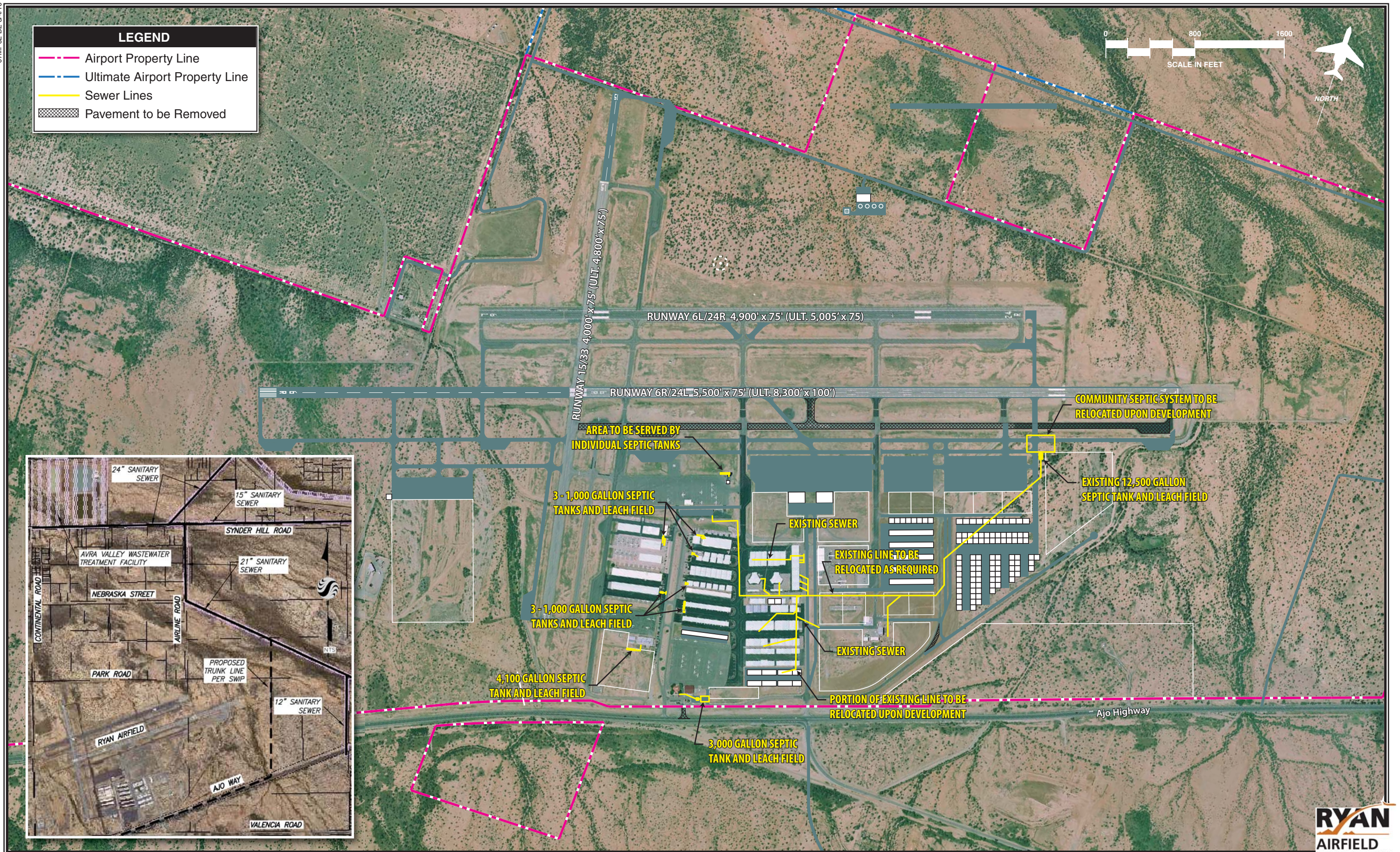
## ***SANITARY SEWER***

Existing sewage disposal is by septic system. The existing system consists of eight onsite individual septic systems as well as one community septic system, as shown on **Exhibit D2**. These systems were reported to be in good condition, per the 1996 Parson Brinckerhoff *Sanitary Sewer Study*. Soil conditions were found to be suitable for utilization of a sanitary septic system.











The disposal of sewage east of an onsite topographic ridge line is provided predominantly by the community septic system. The western portion is mostly provided through the individual septic systems. At the completion of the sanitary sewer study, the remaining life of the 12,500-gallon tank of the community septic system was projected to be 37 years, and it was estimated that approximately 30 acres of future development could be added to the collective system. However, depending on the density of the development proposed, this information could change with respect to the 30 acres of additional use. The septic tank and leach field will also need to be evaluated each time a sewer connection is added.

Four alternatives were presented in the previously mentioned report to address future sewer needs. They included:

1. Individual septic tanks
2. Connection to the existing Snyder Hill Treatment Facility
3. Community septic tank/leach field system
4. On-airport treatment facility

The first alternative consisted of maintaining the existing individual septic systems for each leasehold. The connection to the Snyder Hill Facility consisted of connecting directly to the treatment facility or connecting to the existing 21-inch sewer main. The third option considered was to build a community sewage system throughout the airfield, identical to the system currently in place for the east side of the airfield. The last alternative studied the possibility of constructing an onsite sewage disposal system.

The following issues need to be considered in the evaluation of sewer alternatives:

1. Right-of-way
2. Environmental permitting requirements
3. Construction phasing flexibility
4. System capacity utilization

Advantages and disadvantages of the alternatives are summarized in **Table D1**. The recommended option of the *Sanitary Sewer Study* consists of the community septic tank/leach field system.

In the new term, the sewage disposal will continue to be by septic system (individual or collective system). The possibility of connecting to the existing 21-inch main which is located 1,250 feet to the northeast of the airport and discharges into the Avra Valley Wastewater Treatment Plant is still a feasible alternative. However, it is not currently an economical alternative.

The option could become economical if the Southwest Infrastructure Plan (SWIP) is constructed as it currently is planned. The SWIP has a trunk line which ties into

the existing 21-inch main and runs southerly near the eastern portion of Ryan Airfield until reaching Ajo Way. At Ajo Way, the trunk line turns and parallels Ajo Way's right-of-way in a southwesterly direction past Ryan Airfield. If and when the SWIP is realized, the possibility of connecting into the 21-inch main which runs into the Avra Valley Wastewater Treatment Plant will be more economical.

In addition, the "Sanitary Sewer Study" recommended that any new leach fields should not be placed adjacent to existing airfield pavement. TAA has indicated that it may tie into sewer facilities serviced by Pima County Waste Water once available via private development and if economically feasible.

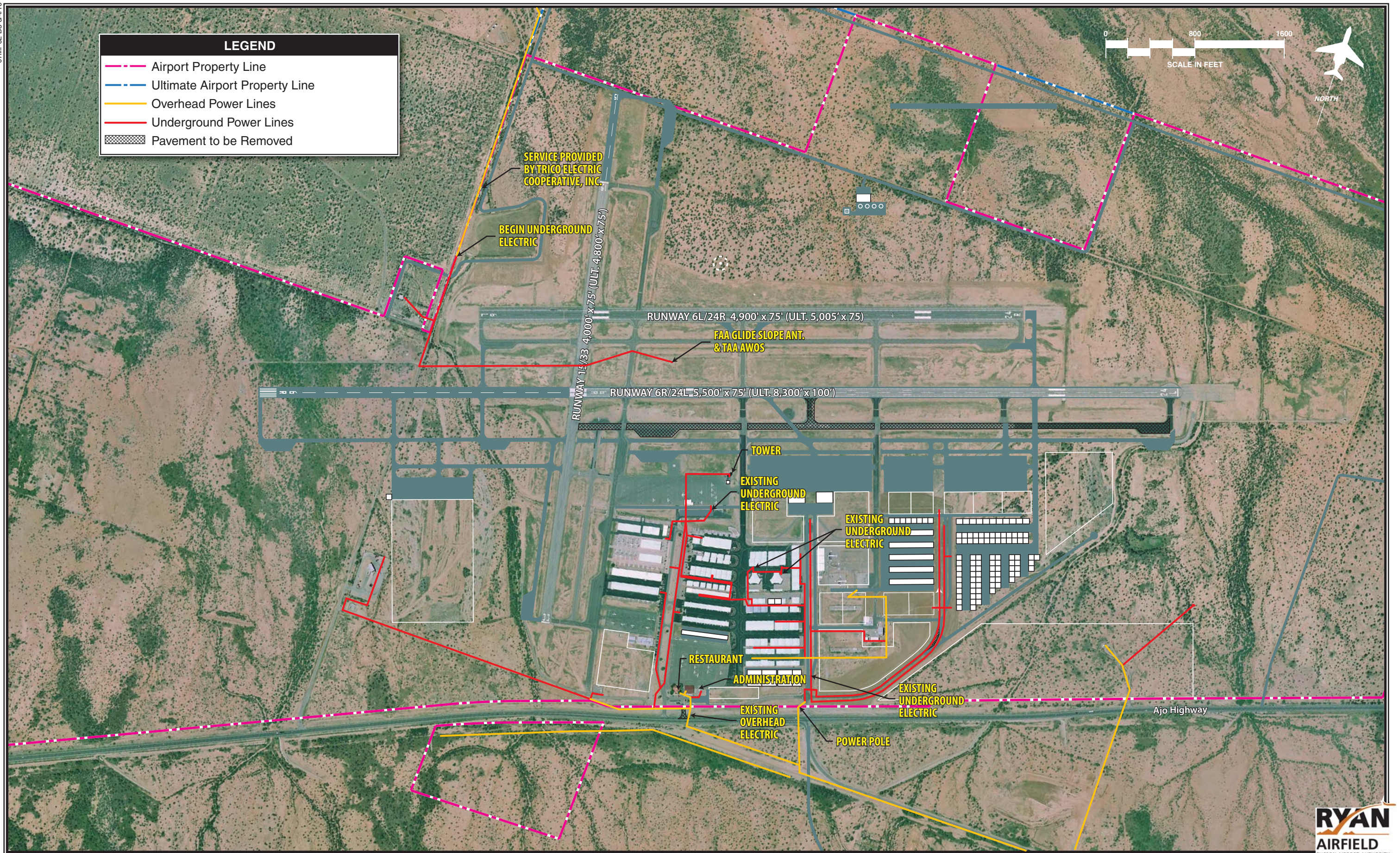
<b>Table D1 Sanitary Sewer Alternatives Ryan Airfield</b>		
	<b>Advantages</b>	<b>Disadvantages</b>
Individual septic tanks	<ul style="list-style-type: none"> <li>• Construction phasing flexibility.</li> <li>• Developer is responsible for installation.</li> <li>• Permitting is minimal.</li> </ul>	<ul style="list-style-type: none"> <li>• Low capacity utilization.</li> </ul>
Connection to the existing Snyder Hill Treatment Facility	<ul style="list-style-type: none"> <li>• High utilization of available capacity.</li> <li>• Eliminates installation of individual septic system and its maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>• High right-of-way and construction costs.</li> <li>• Low construction phasing.</li> <li>• Environmental permit requirements.</li> </ul>
<b>Community septic tank/leach field system (Recommended)</b>	<ul style="list-style-type: none"> <li>• <b>Maximize system capacity.</b></li> <li>• <b>Construction phasing flexibility.</b></li> <li>• <b>High land availability.</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Potentially developed property needs to be dedicated to the system.</b></li> </ul>
On-airport treatment facility	<ul style="list-style-type: none"> <li>• High utilization capacity.</li> <li>• Eliminates maintenance of individual septic system.</li> </ul>	<ul style="list-style-type: none"> <li>• Permitting extensive.</li> <li>• Low potential source for disposal of effluent.</li> <li>• High maintenance requires operator and constant monitoring and is expensive to operate.</li> <li>• High construction costs due to need for closed system.</li> <li>• Potentially developed property needs to be dedicated to the system.</li> </ul>

## **POWER**

Existing and proposed electric power lines are presented on **Exhibit D3**. Electric lines are depicted in accordance with drawings provided by Tucson Electric Power Company and information from the TAA maps. Trico Electric Cooperative has electrical facilities on the west side of Ryan Airfield.

TEP and TRICO should review all new development.







## ***GAS***

Southwest Gas Corporation, Inc. serves Ryan Airfield. The existing and proposed gas lines are depicted on **Exhibit D4**. Southwest Gas should review all new development.

The gas facilities that serve Ryan Airfield run parallel and just north of Ajo Highway (State Route 86). From this line, additional lines run parallel with and centered in both Aviator Lane and Airfield Drive. The lines running in Aviator Lane and Airfield Drive feed multiple hangars and buildings.

## ***TELEPHONE***

Qwest provides Ryan Airfield with telephone services. The existing telephone lines are depicted on **Exhibit D5**. Information relating to location of existing lines was provided solely by the TAA and was depicted according to TAA maps. For technical reasons, Qwest does not provide the public with maps depicting the location of existing services. Qwest should review all new development.

The majority of telephone facilities are underground. A portion of the airfield west of Airfield Drive has overhead lines. The telephone facilities that serve Ryan Airfield run parallel and just north of Ajo Highway. From this line, additional lines run parallel with and are centered in Aviator Lane, Airfield Drive, and Connector Road. The lines running in Aviator Lane and Airfield Drive feed multiple hangars and buildings.

## ***WATER***

The existing water system at Ryan Airfield consists of looped 12-inch and 8-inch mains; however, there are dead-end lines in the northeastern portion of the water system. The existing water facilities system is depicted on **Exhibit D6**. The proposed system will loop with the proposed extensions. The existing supply is from Tucson Water transmission mains and wells as follows:

- Existing City of Tucson 42" water transmission main along Ajo Way and Valencia Road.
- Existing City of Tucson Wells AV9 and AV8 (or AV27) with a production of 1,000 GPM (gallons per minute) and 700 GPM respectively.

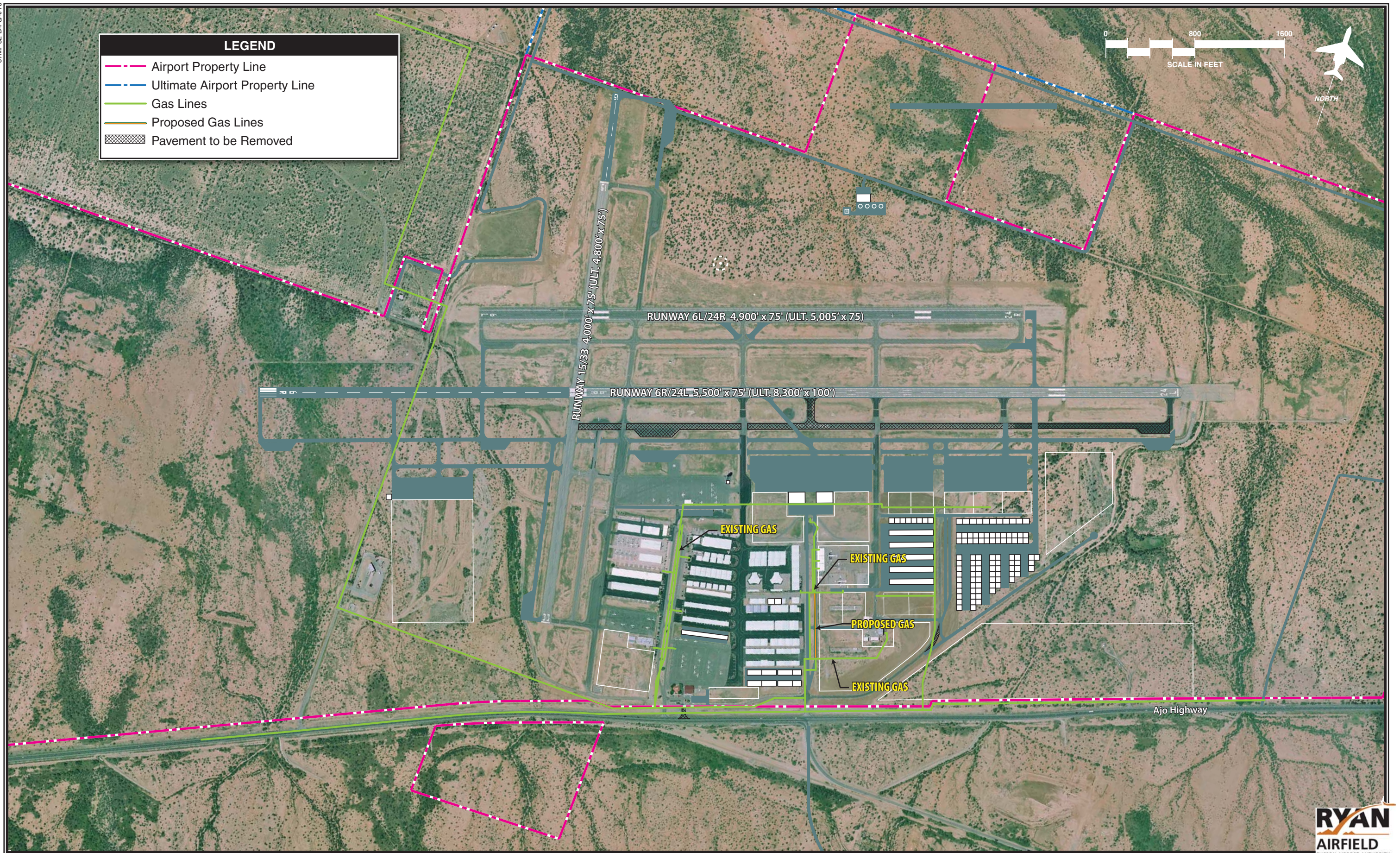
These wells and the 42" water main are located in the COT Pressure Zone "B," Highwater Elevation 2,600 feet, Service Boundaries Elevation 2,416 feet and 2,490



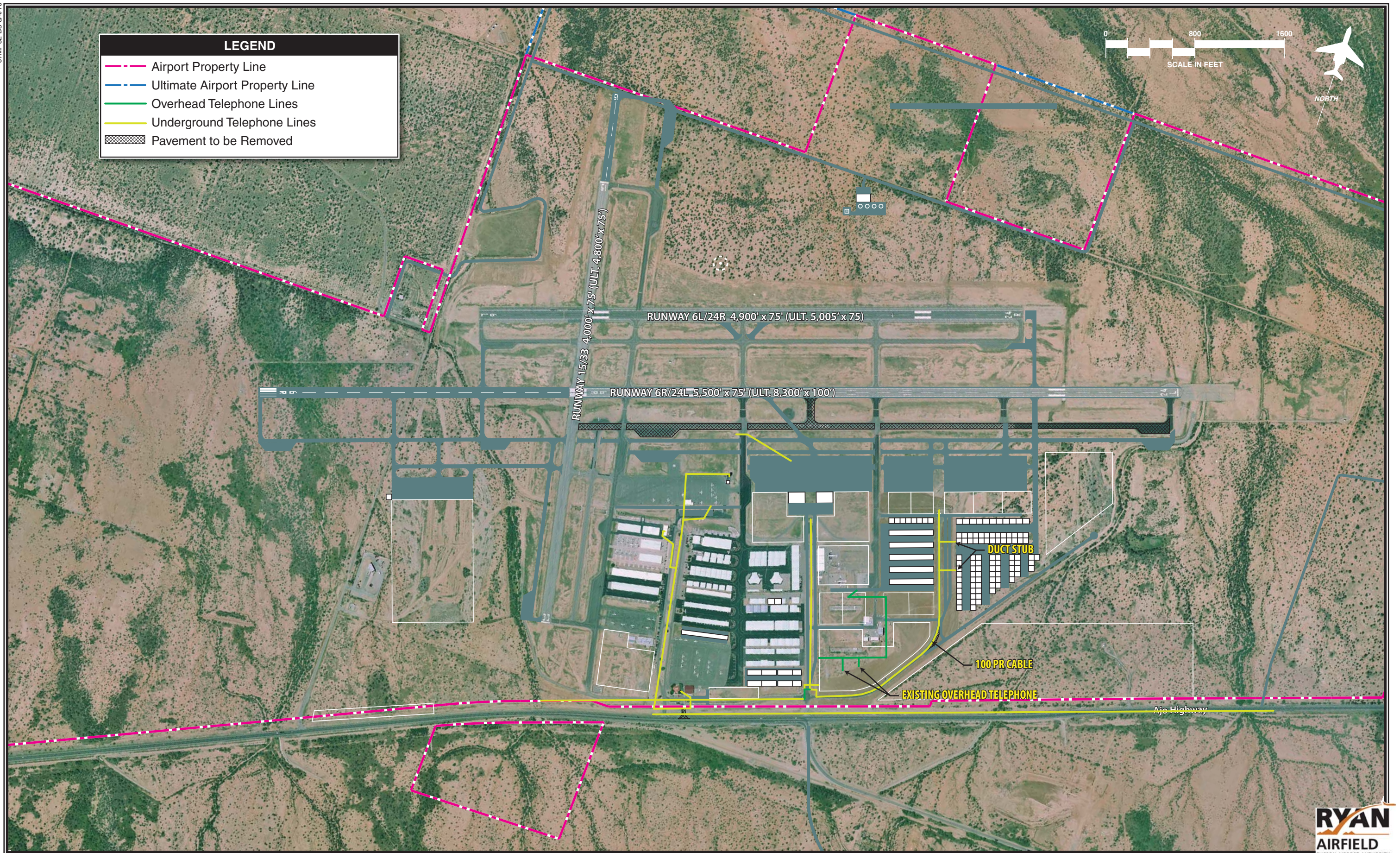
feet (80 and 48 pounds per square inch [psi]). Site Average Elevation is 2,420 feet. Estimated average pressure at the site is approximately 71-78 psi.

Tucson Water does not have a future plan regarding Ryan Airfield. Tucson Water growth is based on new development. Proposed additions should be presented to Tucson Water as they are identified.

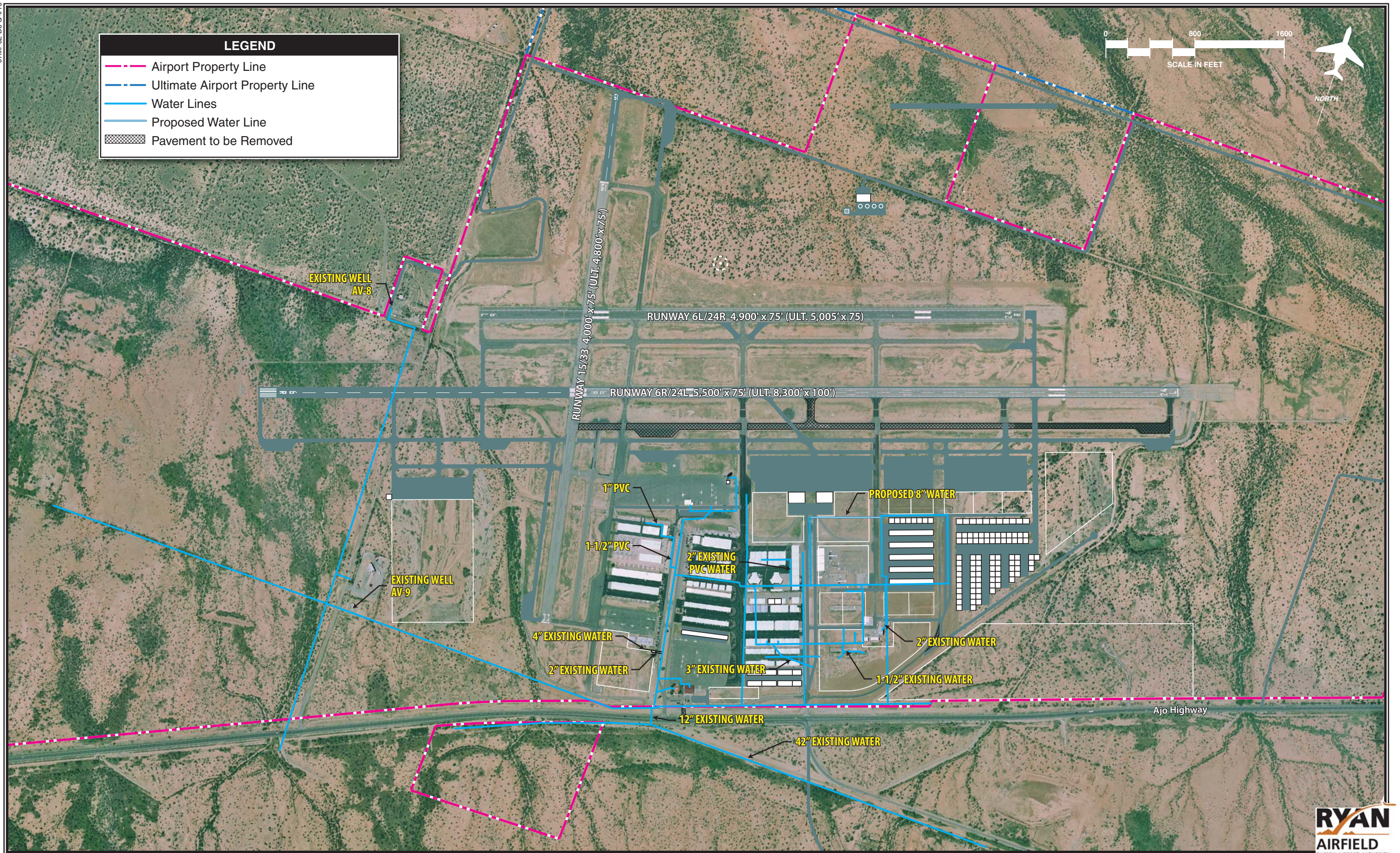
















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