CHAPTER 6 - ENVIRONMENTAL ANALYSIS

6.1 INTRODUCTION

This section provides preliminary information about environmental resources on the Airport, the potential for project-related effects on those resources from the implementation of the Proposed Development Plan and the rules and regulations that may apply. This information should help the Airport more thoroughly evaluate design alternatives and expedite design efforts for the proposed projects and subsequent environmental processing.

The environmental resources evaluated include those typically considered under FAA guidelines for implementing the National Environmental Policy Act (NEPA) pursuant to FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions (April 2006) and Order 1050.1E, Environmental Impacts: Policies and Procedures (March 2006). This section is not a NEPA document; rather it is intended to help scope and prepare a NEPA document if/when a proposed project or action is ready for FAA decision making. This section is organized such that each key environmental consideration is reviewed and then a series of recommendations are provided.

6.2 AIR QUALITY

The operation of an airport causes emissions of Federally-regulated air pollutants and the implementation of airport improvements and changes in airport operations may affect the levels of those pollutants. For that reason, changes in air emissions resulting from the Proposed Development Plan must be carefully considered and approved before development can begin. This section discusses the air quality assessment process for airports and summarizes the type of analysis that may be required for the projects included in the Proposed Development Plan.

6.2.1 Regulatory Status

The San Antonio Metropolitan Statistical Area (MSA), including Bexar, Wilson, Guadalupe, and Comal Counties, is currently designated as being in attainment for all air pollutants. However, because ozone readings have occasionally exceeded the federal ozone standard, the Texas Commission on Environmental Quality (TCEQ) and the Environmental Protection Agency (EPA) have agreed to an Early Action Compact (EAC). The EAC allows the region to maintain an attainment designation in exchange for accelerated deployment of air pollution reduction strategies.

6.2.2 Emerging Issues

As explained earlier in Section 2.4.1, by 2011 the San Antonio MSA is likely to exit the EAC and be re-designated as nonattainment for ozone pollution. This will require TCEQ to develop a State Implementation Plan (SIP) to improve air quality in the San Antonio region. The SIP process will include development of a regional inventory of air emissions, photochemical modeling of those emissions to determine how each pollution source contributes to air quality exceedances, and development and implementation of control measures to reduce air pollution. The SIP emissions inventory that is developed for the Airport will effectively become the Airport's SIP emission budget for the purposes of compliance with Federal and state General Conformity Regulations (40 CFR 93.150 and 30 TAC 101.30).

The General Conformity regulations will be an important factor in the continued growth and development of the Airport. As such, it is important for the Airport to become an active participant in the development of an accurate emission inventory for the SIP. While TCEQ or the Alamo Area Council of Governments may offer to prepare the SIP emission inventory, other airports around the country when offered such an opportunity have instead decided to complete their own inventory to ensure a robust and accurate quantification of emissions. Those airports have determined that they are better positioned to quantify emissions based on their detailed understanding of operational activities. The Airport should carefully evaluate whether to take responsibility for inventory preparation when SIP development is initiated.

When the San Antonio MSA is reclassified to nonattainment for ozone, the Airport will become eligible for the FAA's Voluntary Airport Low Emissions Program (VALE) funding. As a medium hub airport, this would provide 75% federal funding for air quality improvement projects. Importantly, VALE grants are new money that does not reduce discretionary or entitlement funding of other Airport Improvement Program (AIP) projects. This anticipated VALE eligibility creates an incentive to defer air quality improvement projects until they can be covered with VALE funding. Typical VALE projects include:

- Installation of pre-conditioned air (PCA) and 400 Hz power at the jet bridges
- Installation of ground power at remain overnight (RON) and cargo aircraft parking positions
- Alternative fuel vehicles
- Emission control devices on stationary sources such as central cooling plants
- Rechargers for electric ground support equipment and the purchase of "eGSE" if owned and operated by the Airport.

In addition to the obvious funding incentives, VALE projects are eligible for airport emissions reduction credits (AERCs) that can be "banked" by the Airport and used for the purposes of any current or future General Conformity determination under the Clean Air Act or as offsets under EPA's new source review program for projects on the Airport or associated with the Airport.

A downside to the region's re-designation as nonattainment will be increased complexity in the Airport's air service development efforts. Following re-designation, the FAA will have to consider the General Conformity regulations when reviewing applications for new or revised airline operations specifications (OpsSpecs changes). This procedure occurs prior to the start of service and applies to both new entrant air carriers and existing carriers with new equipment. As few as 10 departures per day can exceed the de minimis threshold, which requires the airline to perform more extensive review and can delay or even prevent the start-up of service.

6.2.3 Recommendations

- Monitor anticipated changes in the attainment status of the area (re-designation)
- Actively participate in the SIP development process
- Obtain and understand the SIP emissions inventories and budgets (targets)
- Consider preparing an independent Airport emissions inventory for inclusion in the SIP
- Pursue VALE-eligible projects to secure airport emissions reductions credits

6.3 BIOTIC COMMUNITIES

The Fish and Wildlife Coordination Act (FWCA) is a major Federal statute designed to protect plant and animal resources from adverse effects due to development projects. The Act requires consultation with wildlife authorities before committing resources to certain types of projects, such as converting open land to transportation use, or, in this case, converting land for airport improvements and growth. In the event that a development project would affect Federally-listed endangered or threatened species, then the Endangered Species Act (ESA) applies as well.

The Proposed Development Plan includes 200+ acres of new impervious cover affecting mostly grassland, a few isolated wooded areas, an intermittent stream (Salado Creek) and its tributaries (Lorence Creek and Mud Creek). Nevertheless, the Proposed Development Plan is not expected to cause or contribute to significant adverse effects on biotic communities. As discussed earlier in Section 2.4.2, the existing Airport property is substantially developed, the airfield is dominated by short-grass management to limit habitat suitability, and there are few, if any, aquatic communities in the area. Although no federal- or state-listed threatened or endangered species of plants or animals are known to occur at or in the vicinity of the Airport, the possibility remains that earth moving activities could disturb endangered species of the Edwards aquifer. Subterranean species known to live in the Edwards aquifer include karst dwelling species that live in the aquifer's karst formations and aquatic species that depend on the aquifer water itself.

As discussed later in Section 5.12: Water Resources, two projects on the Proposed Development Plan may require more in-depth review including Federal agency consultation, permits and/or approvals. Those projects are: installing an instrument landing system (ILS) on the approach to Runway 21, and the future extension of Runway 3-21. Both projects have the potential to encroach upon Salado Creek and its tributaries, which are designated waters of the U.S. Consultation with the US Army Corps of Engineers (USACE) and U.S. Fish & Wildlife Service (USFWS) is required for any project having the potential to alter a stream or other body of water regardless of the habitat value.

6.3.1 Recommendations

- Continue managing airport property to minimize wildlife risks to aviation and human safety while protecting valuable environmental resources to the extent practicable.
- Review, update and implement the Airport Wildlife Management Plan in accordance with FAA requirements.

6.4 COASTAL RESOURCES

Texas is a coastal state with a Federally-approved coastal zone management program administered by the Coastal Coordination Council, a public/private council chaired by the Texas Land Commissioner. The Airport is located inland approximately 140 miles from the Gulf of Mexico and approximately 120 miles from the nearest coastal zone boundary. No coastal resources are affected by the Proposed Development Plan.

6.5 CONSTRUCTION

Construction impacts are caused by and confined to the construction period. Consequently, these impacts are short-term in nature, terminating with the completion of construction and restoration of the project site. In most cases, construction impacts are additive; that is to say, the positive and negative development effects of a project are augmented or intensified by the initial construction activities. For example, based on the probable environmental impacts described in this Environmental Analysis, the following "added" effects are likely to be associated with construction phase services:

- Noise from on-site equipment and heavy vehicles
- Employment, income, and spending (a beneficial social impact)
- Air pollution from engine exhaust and soil erosion
- Water pollution caused by runoff from an exposed project site
- Vegetation and wildlife disturbances
- Traffic as workers and equipment access and egress the project site
- Light emissions from nighttime activities
- Solid waste generation and disposal needs

Only in unusual circumstances (e.g., construction in an ecologically sensitive area) do these impacts have the potential to cause significant consequences that cannot be adequately mitigated. In most cases, adverse effects due to construction can be minimized by adopting and implementing the appropriate best management practices (BMPs) and control measures. At a minimum, airport project specifications must incorporate provisions of FAA Advisory Circular 150/5370-10B, Standards for Specifying Construction of Airports: Item P-156 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control. This is in addition to state and local ordinances or permits required for construction.

6.6 COMPATIBLE LAND USE

Airports affect, and can be affected by, incompatible land uses located in neighboring areas. It is incumbent upon the Airport to work effectively with City officials and surrounding communities to be proactive at addressing existing incompatible land uses and preventing new incompatible land uses from occurring in the future.

6.6.1 Land Use Compatibility and Noise

As discussed earlier in Section 2.4.3, the Airport has an FAR Part 150 Noise Compatibility Program (NCP) and is actively managing the FAA-approved noise abatement measures recommended in the 2009 Part 150 NCP Update. For long-range planning purposes, Section 5.10: Noise, presents the results of a supplemental noise analysis prepared for this master plan to illustrate where the noise levels would be expected to change over time if aircraft activity increases as projected and the Proposed Development Plan is implemented.

6.6.2 Consistency with Local Land Use Planning

According to FAA requirements (49 USC Section 47106(a)(1)), the Airport must provide a letter from the City Planning Department and/or Bexar County stating that proposed airport projects are consistent with the applicable land use plans at the time the FAA approves the project(s).

6.6.3 Land Uses in the Airport Area

Also in accordance with FAA requirements (49 USC 47107(a)(10)), the Airport must provide written assurance verifying that action has been or will be taken to restrict land uses next to or near the Airport. In compliance with this requirement, the City of San Antonio has established an Airport Hazard Overlay District (AHOD) that imposes height restrictions near the San Antonio International Airport, as well as Stinson Municipal Airport, the former Kelly Air Force Base, and Randolph Air Force Base, to prevent airport hazards.

6.6.4 Wildlife Attractants Near the Airport

Due to aviation safety concerns, information regarding land uses that may attract wildlife is critical in FAA decision making. According to FAA AC 150/5200-33B, Hazardous Wildlife Attractants On or Near Airports, these land uses often include, but are not necessarily limited to, the following: solid waste landfills, wastewater treatment facilities, wildlife refuges, and wetlands.

For the purposes of this discussion, there are no active municipal solid waste (MSW) landfills within five miles of the airport. Although classified as a landfill, the Bitter's Brush Recycling Center, a.k.a Bidders Shredding Site (P635), located on Airport property along E. Bitters Road, is restricted to brush and yard waste, construction and other demolition debris, and other non-putrescible wastes, so birds and other hazardous wildlife are not a major concern. As stated earlier in Section 1.4.5, two commercially-operated landfills serve the San Antonio area. They are: Tessman Road Landfill located eight miles southeast of the Airport, and Covel Gardens located 16 miles southwest of the Airport. If a new or expanded MSW landfill is proposed near the Airport, the landfill operator must notify the airport operator and the FAA of the proposal as early as possible pursuant to 40 CFR 258, Criteria for Municipal Solid Waste Landfills, Section 258.10, Airport Safety.

No active wastewater treatment facilities are located on Airport property and there are no plans for such. The Airport is served by the San Antonio Water System (SAWS). Wastewater from the Airport and the surrounding area is collected and treated at the Dos Rios Water Recycling Center nearly 20 miles south of the Airport.

According to the USFWS Refuge List by State, there are no wildlife refuges within 50 miles of the Airport, and, as discussed later in Section 5.13: Wetlands, there are no known jurisdictional or non-jurisdictional wetlands on Airport property and few, if any, wetland areas near the Airport.

6.6.5 Recommendations

- Continue to implement FAA-approved Noise Abatement Measures as listed in the Part 150 NCP Update (2009) and, in the future, update the NCP as necessary.
- Periodically review and confirm that the projects shown on the Airport Layout Plan, as amended, are consistent with the San Antonio Master Plan, as amended, as well as the applicable plans and programs authorized by the San Antonio-Bexar County Metropolitan Planning Organization (MPO), as amended.
- Enforce existing policies and regulations in support of airport compatible land use goals and objectives; establish and enforce new policies as appropriate.

- Review, update and implement the Airport Wildlife Management Plan in accordance with FAA requirements.

6.7 FLOODPLAINS

In March 2010, the Federal Emergency Management Agency (FEMA) approved new Digital Flood Insurance Rate Maps (DFIRMS) for Bexar County. Based on more up-to-date flood studies, floodplain maps for the Salado Creek Watershed including SAT changed substantially since originally mapped in the 1970s. Due to flood control projects along the Salado Creek and its tributaries, floodplain boundaries located on the north side of the airport are considerably smaller than before. Floodplain boundaries also changed along the Airport Tributary located on the southeast side of the airport, east of Interstate 281; however, major differences do not begin to appear until the tributary crosses south of Interstate 410. Finally, a new floodplain boundary not previously mapped (identified as Salado Tributary D) is now shown southeast of the airport near Broadway and Tesoro Dr.

Minimizing the amount of impervious surface (pavement, roofing, etc.) on a development site is an elemental requirement for controlling runoff and reducing flood damage. All development sites—but particularly those in floodplains—should retain as much vegetation and natural ground cover as possible.

6.7.1 Added Impervious Surface

One near-term project encroaches upon the 100-year floodplain boundary (revised in 2010). The relocation of an instrument landing system (ILS) on the approach end of Runway 21 includes an approach lighting system located between the runway threshold and Starcrest Drive (proposed Wurzbach Parkway). The approach lighting system is 2,400 feet in length (12 light bars positioned at 200 foot intervals) and the last five light stanchions are located within the 100-year floodplain boundary. Typically, each light stanchion would be mounted on a six-foot diameter concrete foundation. The net increase in impervious surface is less than 200 square feet, which is not likely to significantly increase the risk of flooding in the area.

Except for the approach lighting system, there are no other foreseeable project-related impacts on the 100-year floodplain boundary (revised in 2010). Continued expansion of the North Aircraft Maintenance Complex is not expected to encroach upon a mapped floodplain because the revised boundary no longer extends south of Skyplace Blvd. Continued expansion of the East Cargo Complex is not expected to encroach upon a mapped floodplain because the revised boundary no longer extends south of the airport's perimeter road. There are no projects or plans affecting floodplains associated with the Airport Tributary or Salado Tributary D.

The only other project on the Proposed Development Plan that encroaches upon a 100-year floodplain is the future extension of Runway 3-21 but that project is not expected to be implemented until after 2030. As shown in **Figure 6-1**, several stream segments would be affected including the confluence of Salado Creek, Lorence Creek and Mud Creek. Based on the topography in this area, it is presumed that the embankment would extend the project's limit of disturbance into the floodway(s) and affect base flood elevations ranging from 729 to 742 feet above mean sea level (MSL).

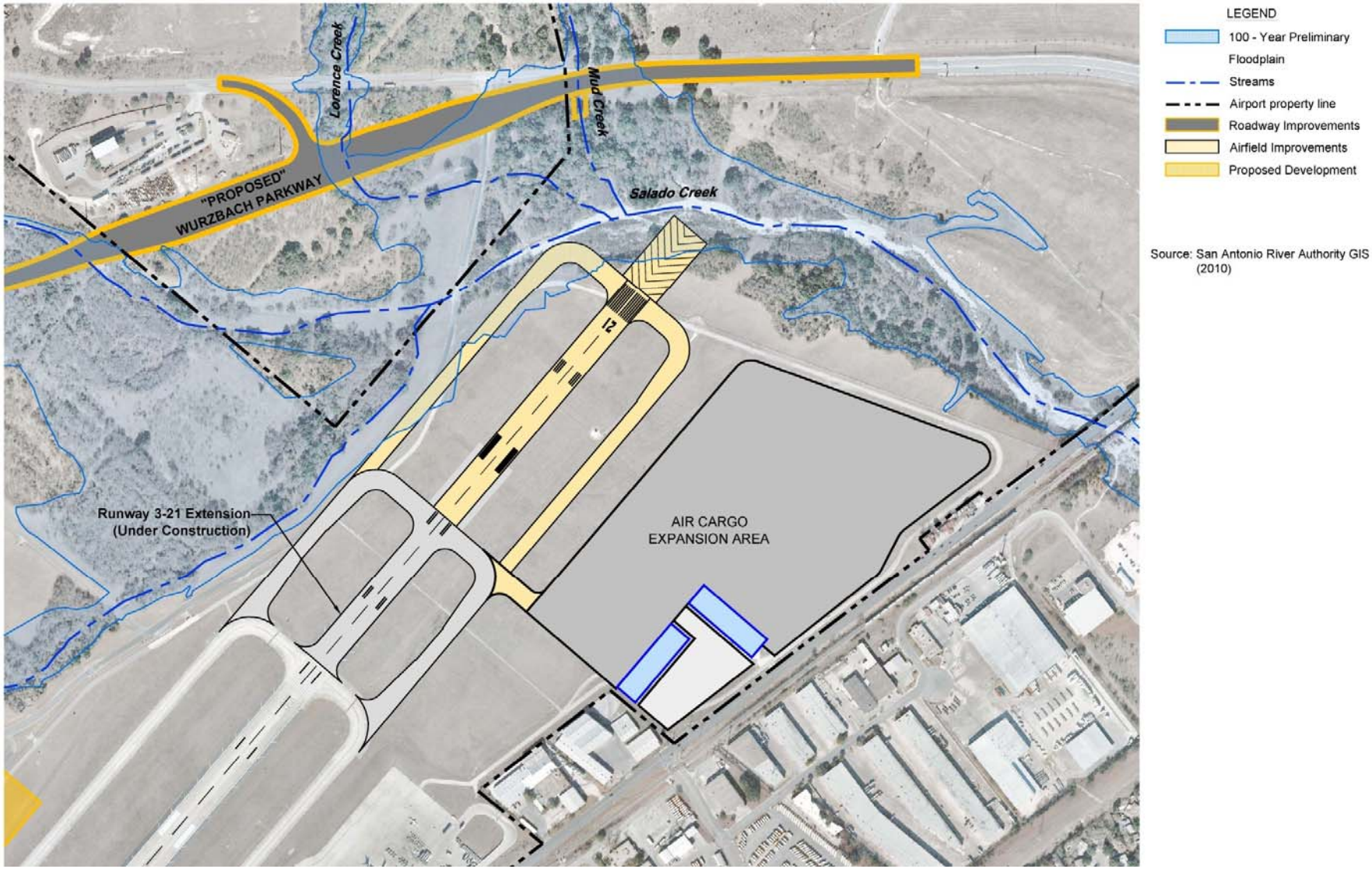
It is also worth noting that the proposed Wurzbach Parkway affects the same base floodplain as the future extension of Runway 3-21, which could give rise to environmental concerns about the potential cumulative effects that these two important infrastructure projects would have on this floodprone area. Both projects should be planned together to ensure that the first project to be implemented does not hinder plans to implement the other project later on.

For future reference, under Executive Order 11988, Floodplains, and U.S. Department of Transportation (DOT) Order 5650.2, Floodplain Management and Protection, all airport development actions must avoid floodplains to the extent practicable. If significant encroachment on the floodplain cannot be avoided, no further action can be taken until the FAA issues a Federal finding that the proposed significant encroachment is the only practicable alternative and that the proposed action complies with applicable State and/or local floodplain standards.

6.7.2 Recommendations

- Storm water retention/detention basins, if and when needed for the Preferred Development Plan, must comply with FAA AC 150/520-33B, Hazardous Wildlife Attractants On or Near Airports or should not be constructed at all.
- Coordinate with Bexar County and the City of San Antonio regarding TxDOT plans for the completion of the Wurzbach Parkway to ensure there is adequate flood storage capacity for the (future) extension of Runway 3-21.

Figure 6-1: Stream Encroachment



6.8 HAZARDOUS MATERIALS AND WASTE

There are no Federally-listed Comprehensive Environmental Response, Compensation, and Liability Act/Resource Conversation and Recovery Act (CERCLA/RCRA) sites and no state-listed equivalent sites at or near the Airport, and there are no known significant concerns with respect to leaking petroleum storage tanks (LPSTs). One industrial waste site adjacent to the Airport is currently under investigation. The Green Light Property located along Wetmore Road has a history of illicit discharges of hazardous substances and it has been determined that subsurface contamination has migrated onto Airport property. There are no land use controls in place at this time however the ongoing investigation could lead to further remedial activities and possible land use restrictions.

As discussed earlier in Section 1.4.5, there are four "listed" municipal solid waste (MSW) management facilities located on the Airport and another ten MSW facilities located nearby. All but two of these are closed or abandoned landfills. The two open landfills are the Bitters Shredding Site (P635) which is located on-Airport property and a privately-owned/operated MSW transfer station (P1443) which is located off-Airport property. Two "unlisted" landfills were recently discovered between Taxiway R, Skyplace Boulevard and Cessna Drive. No hazardous materials were encountered and the sites are in the process of being cleaned-up.

6.8.1 Project-Related Disturbances

Six closed/abandoned landfills are affected by projects on the Proposed Development Plan. Four landfills (P505, P634, Area 5, Area 6) are located on Airport Property and two landfills (U1187 and U2658) are located on property to be acquired. Development impacts on these closed/or abandoned landfills are not a significant concern at this time because there is no indication that any of these sites pose a significant risk to human health or the environment. Just because a site contains a landfill doesn't mean it can't or shouldn't be developed. However, it is important to identify these sites prior to construction of any buildings. Structures built over landfills can have subsistence problems or be at risk of fire from landfill gas, which can have high concentrations of methane gas generated by decomposing garbage, ground and soil contamination. Texas Administrative Code Chapter 330, Subchapter T, contains requirements that address issues related to development of land over closed MSW landfills. If further investigation or cleanup activities are needed, these requirements should be addressed on a project specific basis. Any enclosed structure that is built over a waste disposal area must be permitted. A development permit from TCEQ does not supercede local building and development permits, but is an additional permit.

The use of Airport property located in proximity to the adjacent Green Light Property is a potential concern. The air cargo expansion area is located adjacent to the Green Light Property where the residual effects of subsurface contamination have migrated onto Airport property. This area should be avoided until all investigative/remedial activities are complete and the site is approved for use.

It is not possible to know for certain if there are more unlisted/abandoned landfills located on existing Airport property or property to be acquired, or if there are other buildings or land containing hazardous materials or waste that haven't been discovered or reported. Therefore, if Airport engineering or construction-related activities result in the discovery of previously unknown hazardous materials or suspected contaminated media, then these activities should be

suspended until the appropriate level of investigative and remedial activities are completed in accordance with applicable state and local requirements.

6.8.2 Recommendations

- As a general rule, the Airport should, to the extent possible, avoid hazardous waste sites and contaminated property. If avoidance isn't possible, the Airport should minimize the use of contaminated property as much as possible.
- Before authorizing any airport development action involving land disturbance or land ownership changes, the Airport should complete the appropriate level environmental due diligence audit (EDDA), environmental site assessment (ESA) or similar investigation of the subject property. The EDDA/ESA process offers a reasonable assurance that no hazardous wastes, other wastes, or unacceptable hazards exist on the property, or that any existing hazardous wastes are reasonably manageable. Of equal importance, the ESA process constitutes appropriate inquiry into previous ownership and uses of the property thus satisfying the main requirement to qualify for the "innocent landowner defense" to CERCLA/RCRA liability.
- Project plans and specifications should include a standard proviso referencing TCEQ regulations to be followed in the event that hazardous materials or suspected contaminated media is encountered.

6.9 LIGHT EMISSIONS/VISUAL EFFECTS

The Proposed Development Plan includes new facility installations and other sources of light emissions. Aviation lighting is required for safe and efficient airport operations at night and during inclement weather conditions. Only in unusual circumstances (e.g., when high intensity strobe lights would shine directly into people's homes) will these light systems create annoyance among people in the vicinity of the installation.

Light systems and/or components are normally not stand-alone projects. More often, they are part of larger projects, such as pavement edge lighting for a new runway or taxiway. The following types of lighting systems are included in the Proposed Development Plan.

- Pavement edge lighting
- Visual approach aids/approach lighting systems
- Obstruction lighting
- Terminal and facilities lighting
- Roadway and parking lot lighting

Generally, the Airport facilities are adequately buffered by commercial and light industrial land uses surrounding the Airport, so there is very little potential for annoyance from existing or future light emissions.

6.10 NOISE

The Airport has a FAR Part 150 Noise Study including FAA-approved Noise Exposure Maps (NEMs) and a Noise Compatibility Program (NCP). The study is entitled Noise Exposure Map Report and Noise Compatibility Program Update for San Antonio International Airport (Wyle

Labs, 2009). It was prepared to ensure that the Airport continues to be eligible for Federal funding for the ongoing Resident Acoustical Treatment Program (RATP) which is based on the FAA-approved 2009 and 2014 Noise Exposure Maps (NEMs) included in the study.

For long-range planning purposes, a supplemental noise analysis was prepared and the results presented under separate cover in a Noise Technical Memorandum. Unlike the Part 150 Study which looks at near-term (2009-2014) changes in noise, the supplemental analysis provides a theoretical look at how the NEMs might be affected by the airfield improvements and operational changes associated with the Proposed Development Plan, including the forecasted growth in aviation activity, runway extensions and the resulting changes in runway utilization. This section provides background information about the FAA's approach to assessing airport noise, describes the statutory requirements for preparing a noise analysis and the process used to determine noise exposure impacts, presents existing (2009) and future (2030) noise exposure contours in comparative form, and discusses the differences between them.

6.10.1 Background

Noise is an inherent byproduct of aircraft operations and cannot be avoided, thus it is the most common environmental impact encountered at airports. Airport operators are generally considered responsible for the noise resulting from aircraft operations, despite that fact that 1) aircraft operations are regulated by the FAA—not the airport operator, 2) aircraft arrival and departure procedures are defined, regulated and controlled by the FAA's Air Traffic division, and 3) noise extends beyond the airport boundary into areas over which the airport operator has no authority.

Airport-related noise emanates primarily from aircraft takeoffs and landings. Taxiing aircraft, engine maintenance, and other ground operations also contribute to ambient noise levels. The impact of airport noise on neighboring communities is usually analyzed in terms of the extent to which the noise annoys people by interfering with their normal activities, such as sleep, relaxation, speech, television, school, entertainment, and business operations. When noise occurs at night, (between 10:00 p.m. and 7:00 a.m.) and those sound levels exceed 65 decibels, individuals report a noticeable increase in annoyance. For this reason, the federally-agreed upon and approved method for assessing aircraft noise assigns an additional weight (penalty) to night-time operations.

Noise assessments are prepared at various stages in the planning process to determine how an airport's noise signature could change over time, with and without proposed projects or actions. Statutory requirements for preparing airport noise assessments are defined in FAA Order 1050.1E, Policies and Procedures for Considering Environmental Impacts; FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions; and Federal Aviation Regulations (FAR) Part 150, Airport Noise Compatibility Planning.

6.10.2 Noise Assessment Process

Federal Aviation Regulation (FAR) Part 150, Airport Noise Compatibility Planning is the primary federal regulation that guides planning for aviation noise compatibility on and around airports. Part 150 establishes a standard noise forecasting methodology and metric, specifies a simulation model, and identifies land uses that are normally compatible or incompatible with various levels of airport noise.

The FAA has adopted the Day-Night Average Sound Level (DNL) as the single system for determining cumulative noise exposure of individuals to airport noise. DNL, symbolized L_{dn}, is the 24-hour average sound level, in decibels, obtained from the accumulation of all events over a one-year period, with 10 decibels added to sounds occurring between 10 p.m. and 7 a.m. The weighting of nighttime events accounts for the aforementioned increased annoyance factor associated with noise during the night, when ambient levels are lower and people are trying to sleep.

Detailed aircraft noise analysis must be performed using the most current version of the FAA's Integrated Noise Model (INM). The FAA developed the INM for evaluating noise impacts in the vicinity of airports. The INM has many uses, such as assessing the noise impact resulting from new or extended runways, changes in traffic demand or fleet mix, or other operational procedures. The INM program includes standard aircraft-noise and performance data for more than 250 aircraft types, which can be tailored to the characteristics of the airport being studied. Physical characteristics include runway coordinates, airport altitude, and temperature. Operational characteristics include aircraft activity levels and fleet mix, flight paths or tracks, and approach profiles.

The INM identifies points having the same DNL and connects them to form noise contours, i.e., a series of lines geographically related and placed on maps to estimate the average noise impact at any given location. Noise contours are the principal tool for analyzing land use compatibility in the vicinity of airports. Typical mapped contours are DNL 65, 70, and 75. Although not typically shown on the maps, noise contours become more distinct as noise levels increase. For example, a lower DNL contour, such as DNL 55, would be relatively "fuzzy" or imprecise, while a higher DNL contour, such as DNL 75, would be more precise.

FAR Part 150 provides a standard reference for land uses compatible with various levels of airport noise. Generally, Part 150 identifies compatible, incompatible, and conditionally-compatible land uses in the areas between the DNL 65 and 70 dB contours, 70 and 75 dB contours, and 75-plus dB contours. Land uses located in noise contours below DNL 65 dB are compatible with airport operations. Only transportation and agriculture (except livestock) land uses are acceptable above DNL 85 dB.

6.10.3 INM Input Data and Assumptions

The Airport authorized Wyle Labs to provide AECOM with the INM input models for the 2009 and 2014 scenarios from the Part 150 Noise Study. No changes were made to the 2009 INM input model. For the purpose of this noise analysis, the 2009 NEM still represents existing (baseline) conditions. AECOM prepared a new INM input model to represent the future 2030 conditions based on the master plan forecasts and proposed improvements and changes. The operational changes and/or assumptions applicable to the future conditions 2030 noise contours are listed in the Noise Technical Memorandum.

6.10.4 2009 and 2030 Noise Compatibility

Figure 6-2 depicts the existing and future noise contours with local zoning information. By comparing the existing conditions 2009 noise contours to the future conditions 2030 noise contours, the results of the analysis illustrates where the aircraft noise levels would be expected

to change over time if aircraft activity increases as projected and the Proposed Development Plan is implemented. **Table 6-1** summarizes the estimated noise impact areas for both the existing and future conditions.

Table 6-1: 2009 and 2030 Noise Impact Area

Case Year	Noise Impact Area (acres)			
	65-70 DNL	70-75 DNL	75 DNL and Above	Total 65 DNL and Above
Existing 2009 Conditions*	1,865	668	513	3,046
Future 2030 Conditions	2,052	685	696	3,433

Source: AECOM
*Note: Preliminary results have not been refined and may differ from those previously reported in the 2009 NEMs.

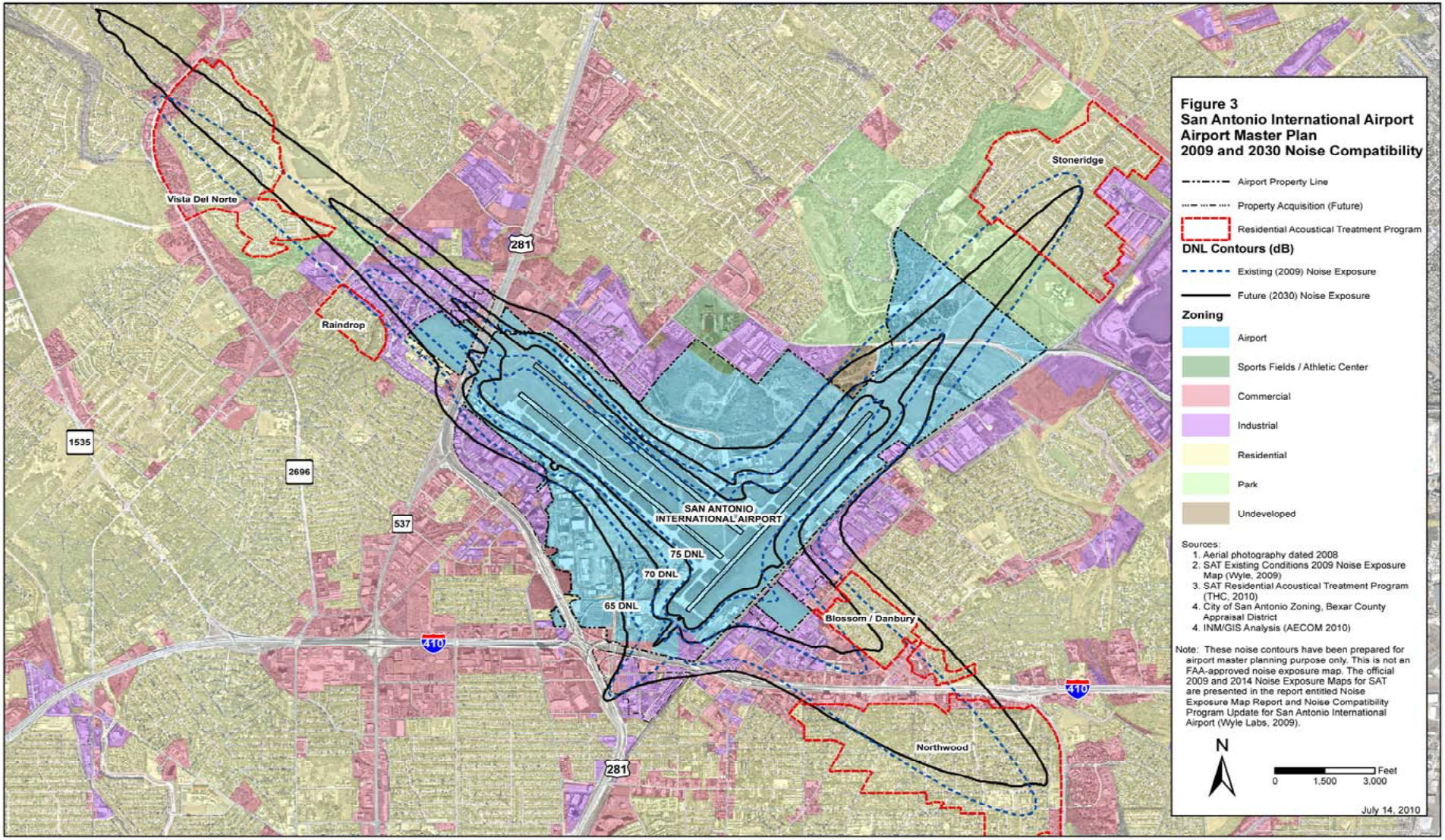
The DNL 65 dB noise contour is approximately 13 percent larger in 2030 than depicted in 2009. The aircraft fleet mix is virtually the same in both scenarios; therefore, it can be concluded that the increase in the size of the DNL 65 dB contour is due in large part to the projected 25 percent increase in total aircraft operations, which includes a near 50 percent increase in passenger airline operations, a near 100 percent increase in cargo airline operations, and a two percent increase in night-time operations, according to the master plan forecasts. The shape of the DNL 65 dB noise contour also changes in 2030 when compared to 2009. Under the proposed airfield runway allocation model, more noise is concentrated around the dual parallel Runway 12L-30R and Runway 12R-30L and less noise is concentrated around the crosswind Runway 3-21.

From a long-range planning perspective, the overall size and shape of the aircraft noise contours do not change dramatically when compared to existing conditions. The future 2030 contours are the same general shape albeit slightly larger. It should be noted, however, that the future conditions 2030 noise contours presented in this analysis are for discussion purposes only. Any forecast of aircraft operations, fleet mix, flight tracks, or noise exposure levels, 20 years in the future is speculative at this time.

6.10.5 Recommendations

- Prepare a more detailed noise analysis (for significance) of the noise impacted areas.
- Continue to review and update the Part 150 Noise Study, as necessary.
- Refer to the Recommendations listed in Section 5.6: Compatible Land Use.

Figure 6-2: 2009 and 2030 Noise Compatibility



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6.11 SOCIAL IMPACTS

The principle social impacts to consider are associated with relocating or disrupting a residential or business community, transportation capability, planned development, or employment. Other considerations include whether the Proposed Development Plan would cause disproportionately high and adverse effects on minority populations or low-income populations, or cause health and safety risks to children.

6.11.1 Land Acquisition/Business Relocation

Over time, the Airport will need to acquire land for expansion, to protect the approaches to the runways, and to reduce the effects of aircraft overflights and noise on incompatible land uses. The Preferred Development Plan identifies five areas for land acquisition over the next 20 years and beyond. As listed in **Table 6-2** and shown in **Figures 6-3** through **6-6**, the affected areas include 211 individual parcels encompassing 232 acres of land.

Except for one isolated parcel listed as a residential land use, all the remaining property to be acquired is currently listed as commercial or industrial use. It follows that emphasis should be placed on social impact assessment and mitigation associated with land acquisition and business relocation. Business impacts to be considered include: jobs and income levels lost due to relocating or permanently closing those businesses; relocation effects on the local economy and neighborhoods supporting the relocated or closed businesses; and, the availability of adequate locations for displaced businesses.

Land acquisition necessary for Airport Improvement Program- (AIP-) funded airport development or noise mitigation must be accomplished in accordance with 49 CFR Part 24, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs, also known as the Uniform Act. The Uniform Act is the Federal law that provides minimum real property acquisition policies and requires the uniform and equitable treatment of persons displaced as a result of a federally assisted project. These rules provide uniform policy and procedures for the acquisition of real property by all Federal, state and local government agencies (and certain private sponsors) that receive financial assistance for any program or project from the U.S. Government.

The acquisition itself does not need to be federally funded for the rules to apply. If Federal funds are used in any phase of the project, the rules of the Uniform Act apply. An AIP-funded airport project cannot proceed or receive FAA approval until SAT provides assurance of conformance to the Uniform Act. FAA AC 150/5100-17, Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects, provides guidance to assist airport sponsors in meeting these requirements and supporting their assurances to the FAA.

Although it is unlikely that the social impacts associated with the relocation of any single business or group of businesses would rise to a level of significance, under FAA policies for implementing NEPA, further analysis may be needed. The analysis would determine if the airport's property acquisition plan, whole or in part, has the potential to cause or contribute to a severe economic hardship for the affected community or cause a substantial loss in the local tax base, or both. Except for unusual circumstances that are not foreseeable here, airport property acquisition/relocation assistance plans implemented in accordance with the Uniform Act (and

applicable local and State laws and ordinances) normally do not result in significant adverse effects.

6.11.2 Other Considerations

There are no foreseeable project-related changes to the local transportation system that would cause social impacts of concern. On the contrary, the Proposed Development Plan includes projects that should improve traffic management in the vicinity of the Airport.

Under FAA grant assurances, airports are required to demonstrate that proposed development projects are consistent with local land use plans existing at the time FAA approves the project (49 USC Section 47106(a)(1). There are no known conflicts between the Preferred Development Plan and local land use and transportation planning initiatives. The Airport should continue ongoing efforts to coordinate with other City departments and regional planning agencies to ensure consistency between each organization's respective plans for near-term and long-term improvements and changes.

The Proposed Development Plan involves a substantial amount of property to be acquired over time and a major runway extension that could affect the size and shape of noise exposure contours. Accordingly, environmental documents should consider the potential of airport development actions to cause disproportionate and adverse effects on low-income or minority populations. Environmental justice ensures no protected class bears a disproportionate burden of effects resulting from a Federal action. Generally, this is an emerging issue for airports in Texas for two reasons. First, Texas is a border state with a high percentage of minority residents. Second, airports are often surrounded by diverse land use types that can support a wide range of socio-economic classifications.

Environmental documents should also consider the potential for environmental health and safety risks that could disproportionately affect children. Although, these issues are not likely to be raised in this category unless concerns are raised in other impact categories such as: air, noise or water pollution; hazardous materials and waste; environmental justice, etc.

6.11.3 Recommendations

- Consult with FAA early on about the property acquisition that is associated with the Proposed Development Plan; determine the appropriate course of action to be taken and environmental documentation to be prepared.
- Consider taking a programmatic approach to land acquisition (much like the ongoing the Airport noise program) that includes early planning and assessment, public outreach and communication, and an implementation plan with mitigation requirements and monitoring for compliance.

Table 6-2: Property Acquisition

Property Acquisition - Land Uses					
Acquisition Parcel	Land Use	Total Properties	Total Parcel Acres	Acres in RPZ	Total Appraised Property Value
1	Commercial	4	7.97	N/A	$2,665,710
	Industrial	19	9.55	N/A	$1,847,370
	Parking	1	0.14	N/A	$31,130
Sub Total		**24**	**17.66**	**N/A**	**$4,544,210**
2	Commercial	26	27.65	N/A	$21,971,517
	Easement	3	2.19	N/A	$100
	Industrial	17	19.51	N/A	$5,210,800
	R/1 Family Single Home	1	0.86	N/A	$90,260
Sub Total		**47**	**50.21**	**N/A**	**$27,272,677**
3	Commercial	8	6.55	5.76	$6,102,200
	Industrial	22	17.74	6.67	$6,864,703
Sub Total		**30**	**24.29**	**12.43**	**$12,966,903**
4	Commercial	16	8.45	3.84	$7,870,090
	Industrial	18	23.96	16.33	$9,629,220
Sub Total		**34**	**32.41**	**20.17**	**$17,499,310**
5	Commercial	42	60.57	N/A	$117,847,846
	Industrial	34	46.88	N/A	$24,277,000
Sub Total		**76**	**107.45**	**N/A**	**$142,124,846**
Total		**211**	**232.03**	**32.6**	**$204,407,946**

Source: Bexar County Appraisal District. Property Search, 2010.

Figure 6-3: Property Acquisition (Areas 1 & 2)

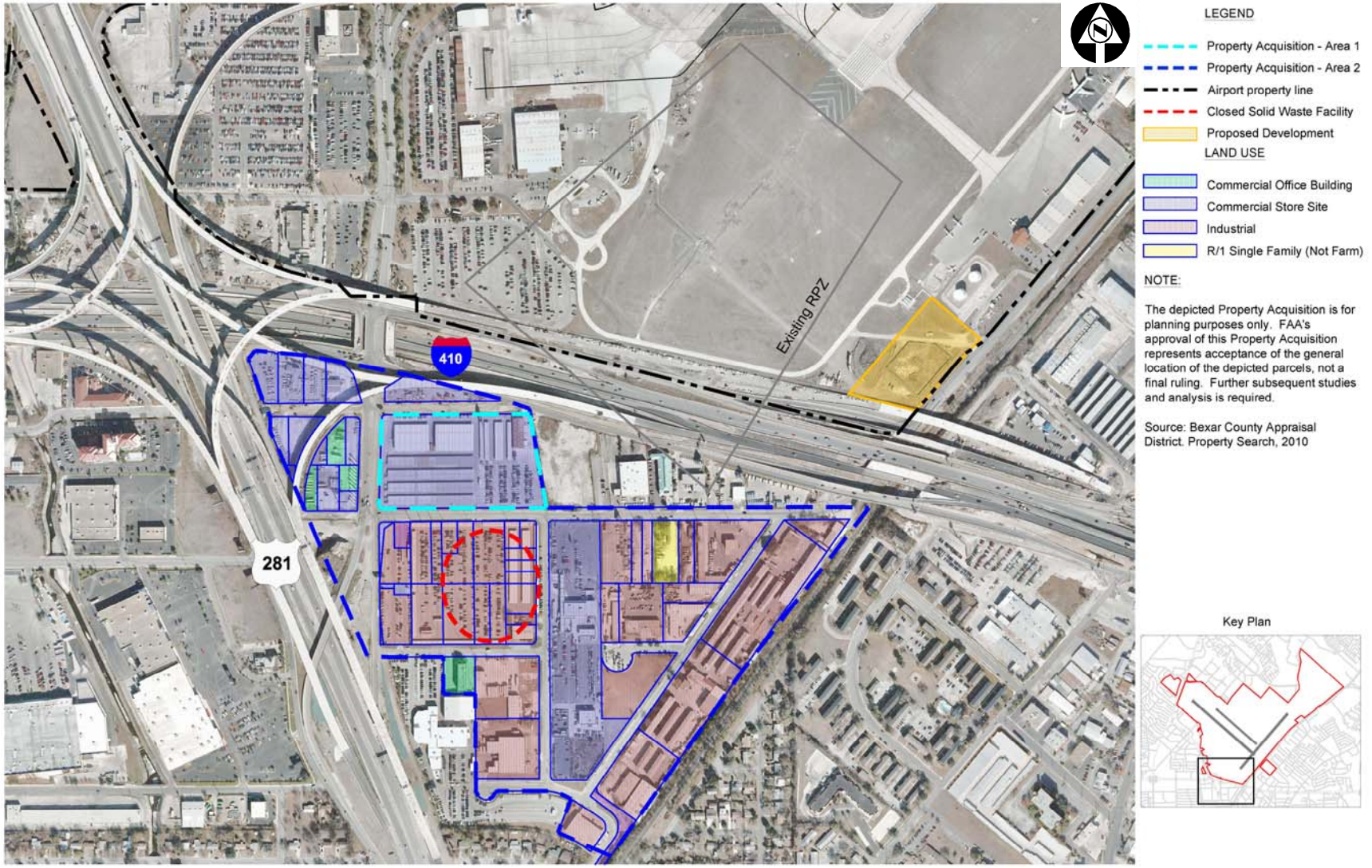


Figure 6-4: Property Acquisition (Area 3)

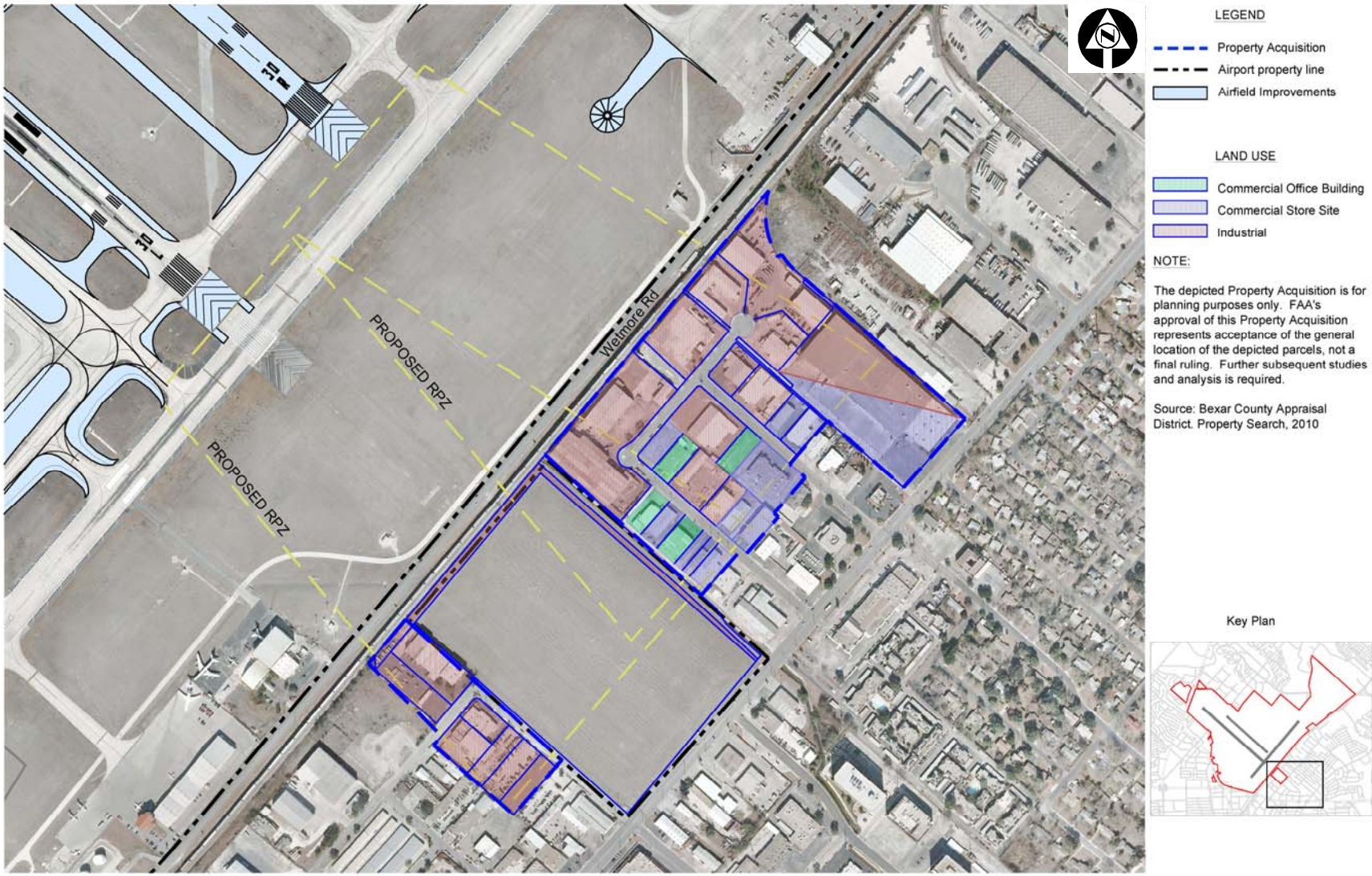


Figure 6-5: Property Acquisition (Area 4)

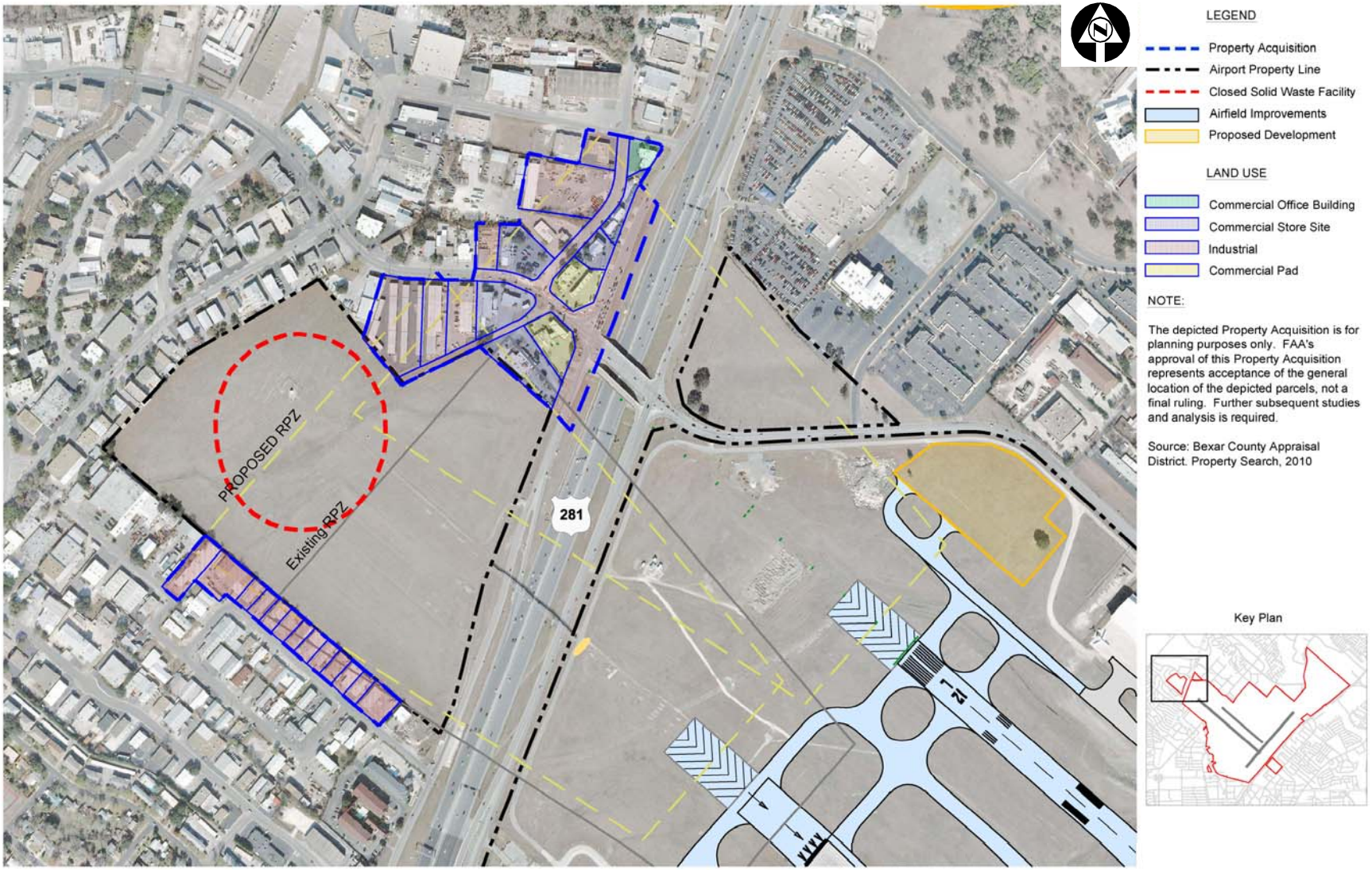
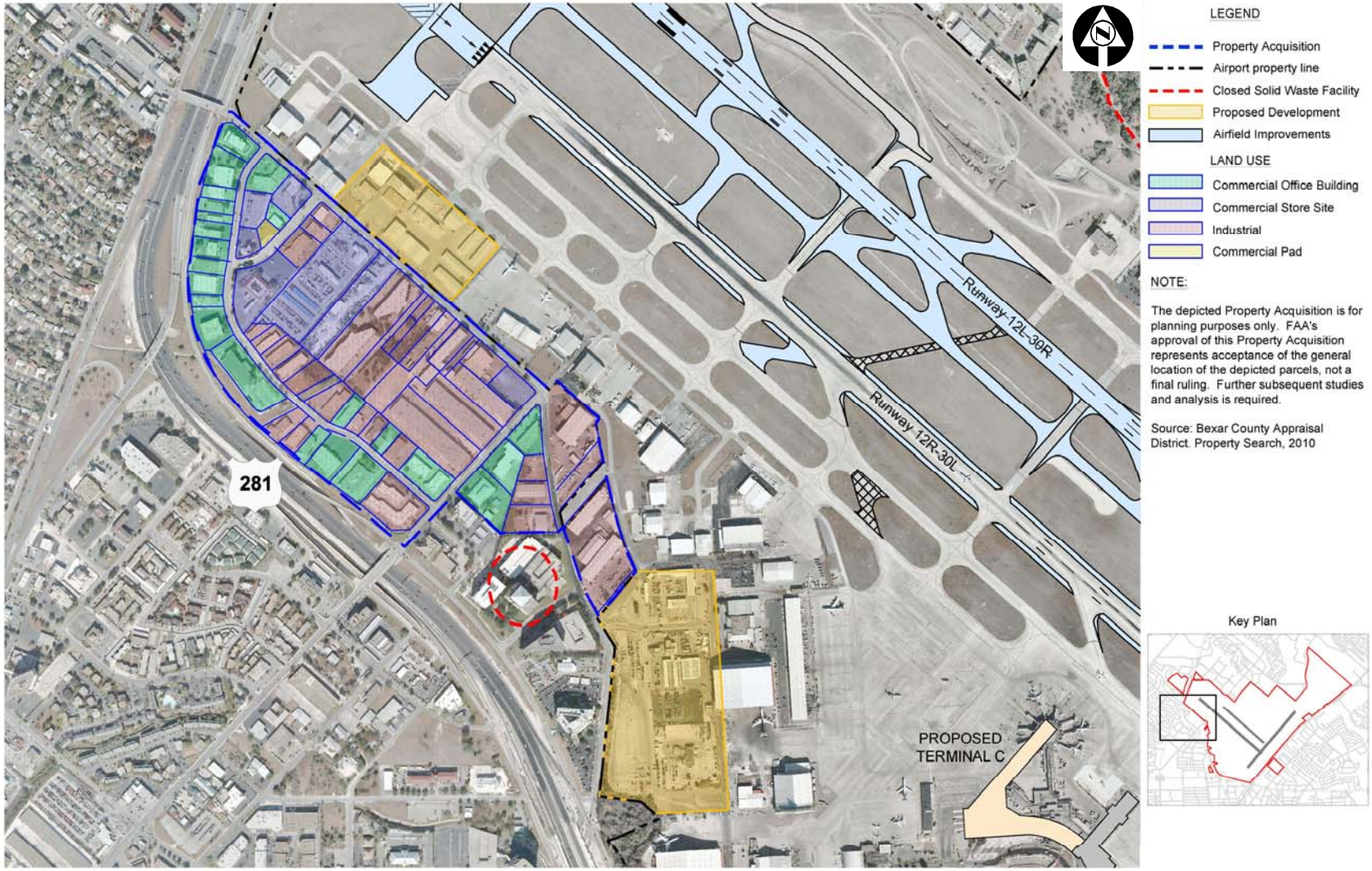


Figure 6-6: Property Acquisition (Area 5)



6.12 WATER RESOURCES

Surface water features in the project study area collect and convey storm runoff towards downstream receiving waters. Groundwater beneath the Airport is plentiful and contributes to local drinking water supplies. Runoff from airport activities could have harmful effects on surface water and groundwater resources unless managed correctly. Therefore, federal, state and local laws apply to any project or activity that has the potential to affect the quality or quantity of water resources, surface or subsurface.

6.12.1 Non-Point Source Pollution

The primary environmental concern associated with the Proposed Development Plan relates to the loss of natural ground cover. More than 200 acres of undeveloped land would be converted for airfield improvements, buildings, aircraft parking areas, roads, vehicle parking lots, and so forth. As impervious cover increases, groundwater recharge is reduced because less precipitation is able to infiltrate through topsoils to the groundwater table below. In addition to the loss of recharge capability, new impervious cover increases the volume of storm runoff and the risk of flooding.

As runoff increases, so does the potential for nonpoint source pollution. Potential pollution sources include erosion and sedimentation from construction, wastes from fueling and cleaning operations, fuel and oil spills, wastes from chemicals used for ice removal, and fertilizers and pesticides used for insect and vegetation control. Storm runoff from the Airport eventually flows to the Salado Creek, either directly or by way of local tributaries. According to TCEQ, Salado Creek is the most natural water course flowing through San Antonio and has been proposed as a permanent greenbelt.

Best management practices (BMPs) for urban runoff and erosion control are normally needed to comply with water quality standards under the federal Clean Water Act (CWA) and the Texas Pollution Discharge Elimination System (TPDES). The CWA is the principal law governing pollution control and water quality of the Nation's waterways. The objective of the Act is to restore and maintain the chemical, physical and biological integrity of the Nation's waters. The EPA established a nationwide permitting program under Section 402 of the CWA referred to as the National Pollutant Discharge Elimination System (NPDES). Authority to administer this program has been delegated to the states; in Texas, this program is referred to as the Texas Pollutant Discharge Elimination System (TPDES) and is under the authority of the TCEQ.

The Airport discharges storm water under a Multi-Sector General Permit issued by TCEQ. The permit requires the Airport to develop and implement a storm water management plan (SWMP) for the area contributing to the municipal storm sewer system. The SWMP includes structural and non-structural best management practices for controlling storm water pollution. These practices include, but are not necessarily limited to, the following: public education and outreach; public involvement or participation; detection and elimination of illicit discharges; controls for storm water runoff from construction sites; post-construction storm water management in areas of new development and redevelopment; and, a storm water pollution prevention plan (SW3P) for municipal operations.

Under the SW3P, all airport businesses with a Standard Industrial Code (SIC) must file a notice of intent to manage storm runoff under the Airport's SW3P, or under a plan of their own. All

users of anti-icing or deicing fluid (ADF) must cooperate in the recapture of ADF in accordance with the soon to be released EPA effluent limitation guidelines. In addition, the SW3P for municipal operations includes a spill prevention, control, and countermeasures (SPCC) plan that prescribes steps to be taken to avoid hazardous material spills and tells how to minimize the risk of harm to surface waters in the event of an accidental release or spill.

TCEQ issues a general permit specifically for construction activities. When a proposed project disturbs one acre of land or more, the contractor must comply with the General Permit by implementing a SW3P for construction. The SW3P identifies potential sources of runoff pollution and implements BMPs to avoid, minimize, and/or control pollutants in stormwater discharges. This includes a soil erosion and sedimentation plan to be implemented during the excavation, grading, and construction phases of each project to reduce or minimize the potential for water pollution that could be caused by construction-related activities.

When a construction activity disturbs five acres or more, the contractor must notify TCEQ prior to commencement of construction by filing a Notice of Intent (NOI). Compliance with TCEQ's, rules, regulations and permitting requirements ensures that storm water is treated to the maximum extent practicable.

6.12.2 Stream Encroachment

Two projects depicted on the Proposed Development Plan may require more in-depth review including federal agency consultation, permits and/or approvals. The installation of an instrument landing system (ILS) on the approach end of Runway 21 includes an approach lighting system located between the runway threshold and Starcrest Drive (proposed Wurzbach Parkway). The approach lighting system is 2,400 feet in length (12 light bars positioned at 200 foot intervals) and the last five light stanchions encroach upon Salado Creek (designated waters of the U.S.) and the surrounding 100-year floodplain. The location of the approach lighting system is fixed by function and therefore it may not be possible to avoid impacting the stream(s).

The other project is the future extension of Runway 3-21 but that project is not expected to be implemented until after 2030. As shown earlier in Figure 6-1, several stream segments could be affected including the confluence of Mud Creek, Lorence Creek and Salado Creek. Based on the topography in this area, it can be presumed that the necessary embankment would require altering all three streams.

Previous studies indicate that the primary function of the affected streams is to collect and convey storm runoff. These stream beds are typically dry except for periods during and immediately after precipitation. There are no known wetlands or aquatic species, and the habitat value is low. Regardless of the condition or value of the streams, consultation with the USACE and USFWS is required for any airport project having the potential to alter a stream or other body of water. The USACOE must issue a Section 404 permit authorizing dredge or fill activities in the waterway, and for any project requiring a Section 404 permit, the FAA must coordinate with the USFWS (and the applicable state agency) to identify means to prevent the loss or damage to wildlife resources resulting from the project. See Section 5.3: Biotic Communities. In addition, if significant encroachment on a base floodplain cannot be avoided, floodplain management regulations must be enforced. See Section 5.7: Floodplains.

It is also worth noting that, depending on the timing of the installation of the approach lighting system and the future extension of Runway 3-21, these streams may have already been altered by the proposed development of the Wurzbach Parkway, which could give rise to environmental concerns about the potential cumulative effects of continued development and encroachment on surface water resources in this area.

6.12.3 Aquifer Protection

Despite the proximity of the Airport to public drinking water supplies, including a sole source aquifer and municipal drinking water wells, water quality degradation and/or ground water deprivation are not major issues or concerns at this time. There are no foreseeable Airport projects or activities that would be likely to contaminate the Edwards Aquifer transition/artesian zone, adversely impact drinking water wells or wellhead protection areas, or otherwise conflict with the goals or activities of the Texas Groundwater Protection Committee. Compliance with the Safe Drinking Water Act and applicable state and local rules and regulations enacted to protect the Edwards Aquifer will ensure that groundwater resources are adequately protected.

It should be noted that Property Acquisition Area 4 (see Figure 6-5) includes two gas stations with underground fuel storage tanks that should be managed or otherwise removed in accordance with land use laws and regulations applicable to the Edwards Aquifer.

6.12.4 Recommendations

- Review and update the TPDES permit accordingly.
- Ensure that project-related water quality BMPs comply with FAA AC 150/520-33B, Hazardous Wildlife Attractants On or Near Airports.
- Coordinate with Bexar County and the City of San Antonio regarding TxDOT plans for the completion of the Wurzbach Parkway to ensure there is adequate flood storage capacity for the (future) extension of Runway 3-21.

6.13 WETLANDS

Except for potential fringe wetlands located along intermittent streams on or near the Airport, there are no known jurisdictional or nonjurisdictional wetlands on airport property or property to be acquired. Therefore, there are no foreseeable project-related impacts on wetlands.

The only project depicted on the Proposed Development Plan with the potential to encroach upon wetlands is the future extension of Runway 3-21 but that project is not expected to be implemented until after 2030. As shown previously in Figure 6-1, several stream segments would be affected including the confluence of Mud Creek, Lorence Creek and Salado Creek, which may or may not involve fringe wetlands. Under the Clean Water Act, a Section 404 permit is required to place dredged or fill material in waters of the U.S. including jurisdictional wetlands. Wetland impacts, if any, would be dealt with at that time.

For future reference, Executive Order 11990, Protection of Wetlands, sets the standard for a Federal agency action involving a wetland, and Order DOT 5660.1, Preservation of Wetlands, sets forth DOT policy for all transportation projects including projects at airports. Wetlands must be avoided unless there is no practicable alternative. If it is not possible to avoid impacting a wetland then an EA or an EIS must be prepared and a Section 404 permit must be obtained.

When applying for a 404 permit, the Airport must follow these steps in order: avoid impacts to wetlands; minimize potential impacts to wetlands; and, provide compensation in the form of wetlands mitigation for impacts that cannot be avoided. Note: If wetlands mitigation is necessary to compensate for unavoidable wetland disturbances, wetland mitigation must be designed so that it does not create a wildlife hazard. See FAA AC 150/5200-33B, Hazardous Wildlife Attractants On or Near Airports.

6.14 WILD AND SCENIC RIVERS

According to the National Park Service (NPS), Nationwide Rivers Inventory, there are no designated wild or scenic rivers in the vicinity of the Airport or in Bexar County.

6.15 SUSTAINABILITY

The City of San Antonio has established the Mission Verde sustainability plan based on a simple principle: in meeting our needs today we cannot compromise the ability of future generations of San Antonians to meet their needs. Sustainability is an important tenet of modern airport management and when embraced in facility design and operations, can provide substantial efficiency and financial benefits over the life of a facility. Continuing to improve sustainability implementation at the Airport is consistent with the Mission Verde plan.

6.15.1 Sustainability Management

Sustainability has been embraced by airport operators around the globe as a way to ensure that near term decisions recognize and protect long term business strategies. In making sustainable decisions, an airport operator needs to prioritize the environmental and social issues that are most likely to inhibit the realization of the airport's strategic plan. Each environmental and social issue identified as a potential impediment needs to be actively managed and efforts made to minimize the airport's "footprint" in that impact category. Effectively minimizing the airport footprint is not typically achieved by a single executive decision, but requires the daily participation of all airport staff as routine decisions are made. The following tools have been established as effective approaches for airports to adopt sustainability.

Life Cycle Cost Analysis

An underlying principle of sustainability is to make decisions that may be more complicated or costly in the short term but provide long term cost and operational savings. Some examples include avoiding the construction of limited purpose facilities, investing in high efficiency systems, or considering the cost of demolition/retirement of a facility. The financial justification for these examples is achieved through life-cycle cost analysis (LCCA).

As an example, the adoption of LCCA changes a business decision from a) how to value engineer a project so it will meet the project objective and the capital budget of the project, to b) a strategic analysis of how proposed value engineering cuts will affect the operational cost of a project, the capital costs of future projects, the ability to satisfy the project objective and the capital budget of the project. This additional level of analysis expands the decision criteria to ensure that long term issues are fully reflected in a business decision. It requires the involvement of all internal stakeholders to clearly identify the ancillary costs and impacts of a decision.

Maximize Use of Existing Assets

An important approach for accommodating airport growth is the strategic use of existing facilities and assets. Some examples include:

- Using existing facilities for their maximum designed capacities and building new facilities to accommodate growth
- Re-designating the use of a facility if it can no longer satisfy its original mission
- Renovating and re-lifing facilities that are functionally obsolete
- Using innovative technology to generate additional facility capacity
- Preserving the components of a facility that have remaining useful life.

Each of these examples of optimizing the use of an existing asset carries the important fiscal benefit of avoiding, deferring, or minimizing capital investment. Further, there is the environmental benefit of reducing net new resources required to meet growth needs.

Measure and Monitor

An organization is far more effective at managing an issue where the results are measured and monitored. Thus, after an environmental or social impact has been identified as needing to be minimized, a quantification of the current impact in that category needs to be completed and potential impacts of a project need to be evaluated. Further, the airport's impact in that category needs to be monitored by airport management on a regular basis. This measuring and monitoring will ensure that airport decision making properly reflects this impact category.

Innovate

Sustainability is an emerging field, and there is the constant development of new ways to minimize the footprint of an airport. Airport decision making, facility design, and procurement, all need to change from being prescriptive (e.g. use of mercury vapor lighting) to one that states underlying objectives (e.g. energy efficiency criteria and maintenance criteria for a lighting system). Specifying objectives is more likely to lead to innovation.

Living and Breathing System

Sustainability is not a one-time decision, instead it should be a part of daily airport decision making. It needs to be a factor in decision making by individuals at every level of the organization, and the airport needs to continually update the goals and objectives for environmental and social impacts. Cumulatively, this results in a living and breathing system for sustainable decisions.

6.15.2 Adopting Sustainability

The following are examples of how an airport can adopt sustainability principles:

Site and Site Issues

The intent of making careful facility site selection decisions is to facilitate the environmental compatibility of a facility, reducing the long-term facility cost and environmental impact. The following categories provide opportunities for strategic site selection decisions:

- Site analysis for topography, solar exposure, etc. Properly selecting the location and orientation of a facility can greatly reduce the cost of operating a facility. For example, significant cooling costs can be avoided by orienting large windows so they do not receive direct sunlight. Note that specific aviation requirements may dictate facility location and orientation.
- Pools and fountains for cooling. The incorporation of pools and water fountains into the design of a facility can provide a cooling benefit to a facility, particularly in locations like San Antonio where the summer months are quite hot.
- Porous paved surfaces. The use of porous surfaces for low volume roadways, parking areas and walkways can help minimize flash flooding. Further, such materials can reduce maintenance costs by enabling the replacement of a couple of bricks rather than a large slab of concrete.

Water Resources

The intent of considering water resources in facility design decisions is to minimize the amount of water required and improve the quality of discharged water; this can reduce the long-term facility cost and environmental impact. The following categories provide opportunities for protecting water resources:

- Drainage to retention basins, landscaped areas. Runoff from rain events can be directed to basins that allow for future re-use, or for watering landscaped areas. This has additional benefits in helping to reduce flash flooding, which San Antonio can experience due to relatively non-porous regional soil conditions.
- Low flow plumbing fixtures. The Airport should specify plumbing fixtures that reduce the volume of water used for public and tenant spaces. The specification of low flow fixtures should also include performance criteria to ensure that customer service criteria continue to be met.
- Grey water system. For water needs that do not require potable water (e.g. landscaping) the airport may consider investing in a grey water system that segregates discharge sources to the sanitary sewer system. Relatively uncontaminated flows are collected and subject to primary treatment, that water is then pumped into a grey water system.
- Site husbandry during construction for erosion and pollution control. Soil disturbed during construction should be stored in a manner that minimizes erosion and sediment runoff if a rain event were to occur.
- Use Xeriscape or appropriate landscape techniques. Landscaping should make use of plants that are suited for the central Texas environment. Species that require minimal water will greatly reduce the use of irrigation water requirements.

Building Materials

The intent of considering building materials in facility design decisions is to select materials that place less of a burden on the environment during their manufacture, and that consider

differences in life cycle difference between various materials. This can reduce the long-term facility cost and environmental impact. The following categories provide opportunities for selecting building materials:

- Sourcing raw materials. The Airport can provide detailed specification of the material to be used in a facility. This can ensure that only materials produced in an environmentally sensitive manner are used.
- Calculate externalities for building materials. An environmental externality is an environmental consequence associated with a purchased material that would not be directly borne by the Airport. The true environmental impact of building materials should evaluate direct environmental consequences as well as other factors like the type/amount of fuel used to transport the product, the manufacturing facility characteristics, or the energy used to produce the material.
- Quantify life cycle of materials. Specification of building materials should reflect life time maintenance requirements, durability, and functionality of building materials. These factors directly affect ownership costs and are important criteria.
- Evaluate post use. It is important to understand how materials will be disposed when they have reached the end of their useful life. Life cycle costs will depend on whether a material can be recycled, biodegraded, reused, or requires special disposal requirements. For example, many airports now specify that carpet is to be recycled when it reaches replacement condition.

Waste Reduction

The intent of considering approaches to reduce waste is to avoid purchasing unnecessary materials and to minimize the amount of waste sent to landfills. This can reduce the facility cost and environmental impact. The following categories provide opportunities for reducing waste:

- Segregate/recycle demolition & construction waste. The airport should examine opportunities to manage and minimize the bulk waste produced during construction of a facility. For example, waste concrete can be crushed for use as aggregate in new concrete. Such techniques can save both disposal costs and material purchase costs.
- Sell or donate reusable materials. The Airport can avoid disposal costs by encouraging the local reuse of usable materials and fixtures.
- Use “clean builder” principles. The greatest opportunities to minimize waste during a construction project are often best realized by staff in the field. By partnering with construction firms, the Airport is more likely to achieve sustainability goals.
- Reuse existing infrastructure where possible. Reusing existing infrastructure carries the important benefit of avoiding, deferring, or minimizing capital investment. Further, there is the environmental benefit of reducing the resources required to build new infrastructure.
- Build in recycling infrastructure. Operational costs can be minimized by a robust recycling program. New facilities should have space that enables an efficient recycling program to be implemented after the facility opens.

Energy Efficiency

The intent of considering energy efficient building materials and mechanical systems is to reduce energy usage. Energy efficiency improvements have a direct impact on operational

costs through the life of a facility. Opportunities for selecting energy efficient mechanical systems and building materials include:

- Use vestibule entries with air curtains. The building design should include all opportunities to reduce cooling costs, especially given the hot summer season in San Antonio.
- Consider solar energy for site lighting, gate houses, landscape lighting. In addition to the environmental benefit of using a renewable resource, installing solar power in remote facilities can avoid the cost of lengthy utility runs to the remote facility. This avoided cost can easily exceed the cost of a solar energy installation.
- Thermal storage for HVAC chilled water. Electrical generating facilities have unused capacity at night, typically meaning reduced costs for the airport to purchase electricity during the night time. Installing a thermal storage facility can enable the airport to transfer much of the cooling demands to a period of lower cost electricity.
- Use variable speed motors. The higher purchase cost of variable speed motors can reduce long term operational costs.
- Optimize lighting. Incandescent fixtures are extremely inefficient and should be avoided when possible. LED signs are rapidly improving in functionality and should be considered for passenger wayfinding and airfield lighting.
- Submeter large loads and concessions. Making tenants financially responsible for their electrical consumption gives them an incentive to minimize power usage.

Indoor Air Quality

The intent of considering air quality in facility design decisions is to select building materials and mechanical systems that improve air quality for the building tenants and the community. This can reduce operational costs by minimizing ventilation needs and avoid the need for mitigation. Opportunities for making decisions to protect air quality include:

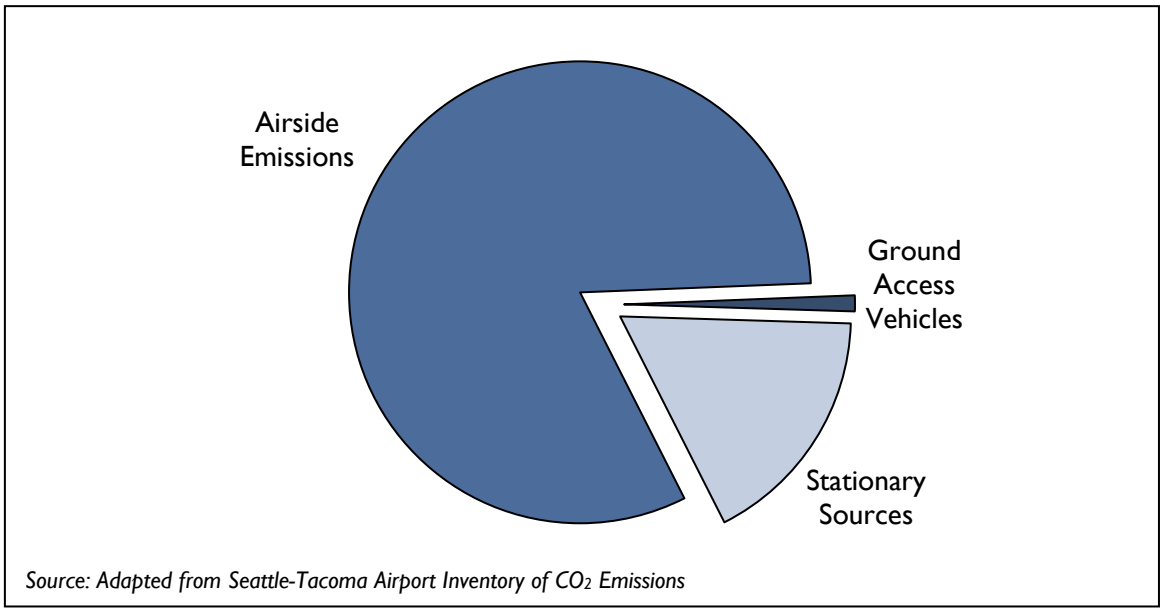
- Indoor air quality. Indoor air quality is a function of two influences; the generation of pollutants and the removal of pollutants.
- Pollutant source control. A building should be constructed with materials that minimize the release of volatile compounds, ventilation intake air should be separated from aircraft and building exhausts, and humidity and moisture in the building envelope should be controlled to reduce the risk of microbial infestation.
- HVAC operations to remove pollutants. HVAC systems should be designed to maintain indoor air quality, including appropriate filtration of air, adequate fresh air volume, and uniform distribution of air flows. In addition, regular maintenance and preventative maintenance helps maintain HVAC system efficiency.

Air Quality Sustainability Issues

As San Antonio International Airport formulates sustainability strategies that will improve air quality, it is important to recognize that the emission sources that the airport can directly control or heavily influence is a small subset of total airport emissions. In fact, emissions from aircraft arrival and departure represent nearly 90% of total airport emissions and the airport has little ability to influence those emissions.

Figure 6-7 shows a typical allocation of emission sources that an airport can control or influence. This graphic is included to illustrate that while there are many strategies for reducing ground transportation emissions, those strategies are unlikely to meaningfully reduce total emissions. The category of airside emissions provides the most opportunities for emission reductions as it includes sources such as ground support equipment (GSE) emissions, Auxiliary Power Unit (APU) emissions, operations vehicles, and aircraft taxi/delay. Figure 6-7 also illustrates that central plant emissions are typically a meaningful component of airport controlled emissions. However, in light of the San Antonio International Airport's current upgrades to the Central Utility Plant, there may not be any viable reduction opportunities in this category.

Figure 6-7: Emissions from Activity under Control or Influence of the Airport Operator



Source: Adapted from Seattle-Tacoma Airport Inventory of CO_2 Emissions

This discussion will focus on initiatives that provide the most meaningful opportunities to reduce airside emissions.

- PCA and 400 Hz power at gates. The City should ensure that PCA and 400 Hz power is maintained at all existing gates and included with any new gates. These services allow an aircraft to turn off the APU when parked at the gate. In addition to reducing air emissions, this equipment can dramatically lower airline operational costs. Some airlines have reported operational savings of as much as $100,000 per year per gate as a result of these services. Terminal planning should ensure there is adequate electrical infrastructure to support this equipment.
- Remote ground power for RON and cargo spots. The City should develop a plan to provide remote ground power at all RON and cargo aircraft parking positions that are actively used. Remote ground power allows an airline to avoid the use of diesel powered ground power units (GPUs) or having an aircraft operate the APU. In addition to reducing air emissions, this equipment can dramatically lower airline operational costs. Some airlines have reported operational savings of as much as $125,000 per year per parking spot as a result of this service. Facility planning should ensure there is adequate electrical infrastructure to support this equipment.

- Support GSE electrification. The City should encourage airlines to use and purchase electric GSE (eGSE) by ensuring vehicle recharging stations are available. eGSE can provide a dramatic reduction in air emissions and provides superior operational economics for airlines. A lack of available recharging infrastructure is often the biggest impediment for airlines acquiring this equipment. Further, rechargers can qualify for VALE funding when the San Antonio region is reclassified as nonattainment. Terminal planning should ensure there is adequate electrical infrastructure to support this equipment.

Other sustainability tactics to reduce air quality impacts include:

- Encourage transit use. Avoiding employee and passenger vehicle use can avoid the need for parking facilities. Aside from avoiding the cost of a large parking facility, this also frees up valuable land. Vision 2050 includes plans for an intermodal station to accommodate the future Austin-San Antonio commuter rail, City mass transit, and a connection to the Airport. This intermodal facility has the potential to make the Airport a primary regional transportation node, and would potentially reduce vehicle trips in the future.
- Design facilities to minimize idling. Parking lots and roadways that minimize idling and delay can reduce emissions and also improve customer satisfaction. Electronic signage that leads parking patrons to empty parking stalls has similar benefits.
- Minimize aircraft taxi time. Aircraft movements on the airfield result in air emissions. The level of emissions can be reduced and the airlines can save substantial amounts of costly fuel by optimizing the efficiency of the airfield taxi routes.

Procurement Policies

The Aviation Department should develop procurement strategies to ensure that air quality impacts are a key consideration in product specifications. Some examples include procurement strategies for fleet vehicles, renewable energy, and cleaning products.