U.S. Department of Housing and Urban Development
451 Seventh Street, SW
Washington, DC 20410
www.hud.gov
espanol.hud.gov

Environmental Assessment
Determinations and Compliance Findings
for HUD-assisted Projects
24 CFR Part 58

Project Information

Project Name: Rio-Mercado-Apartments

HEROS Number: 900000010117207

Responsible Entity (RE): TUCSON, PO Box 27210 Tucson AZ, 85726

RE Preparer: Glenn Fournie

State / Local Identifier:

Certifying Officer: Liz Morales

Grant Recipient (if different than Responsible Entity):

Point of Contact:

Consultant (if applicable):

Point of Contact:

Project Location: 5761 S Park Ave, Tucson, AZ 85706

Additional Location Information:
The Rio Del Sol site is located at 5761 South Park Avenue (formerly 1020 East Drexel Road) in Tucson, Arizona and the approximate coordinates at the center of the site are N 32degrees 08' 51.66" latitude and W 110degrees 57' 19.04" longitude. The Rio Madera site is located at 5489 South Park Avenue in Tucson, Arizona and the

approximate coordinates at the center of the site are N 32degrees 09' 09.15" latitude and W 110degrees 57' 20.06" longitude.

Direct Comments to: Glenn.Fournie@tucsonaz.gov
310 N. Commerce Park Loop
Tucson AZ 85745

Description of the Proposed Project [24 CFR 50.12 & 58.32; 40 CFR 1508.25]:
Acquisition of 2 parcels of vacant land located at 5489 S. Park Avenue and 5761 S. Park Avenue, Tucson Pima County Arizona 85706. The proposed project, Rio Mercado Apartments includes excavation, trenching and grading for the new construction of 107 units of affordable multi-family residential developments at two non-contigous sites (located approximately 0.26 miles apart). The units will be 15 one bedroom single story and 92 two bedroom 2 story townhouse style buildings. The sites are identified as Rio Del Sol and Rio Madera. The Rio Del Sol site is located at 5761 South Park Avenue (formerly 1020 East Drexel Road) and consists of a proposed approximate 4.5-acre multi-family residential development with 89 units with associated paved parking areas, a playground, splash pad, and splash pad equipment building. The Rio Madera site is located at 5489 South Park Avenue and consists of a proposed approximate 1.0-acre consisting of 18 units of multi-family residential development and associated paved parking areas.

Statement of Purpose and Need for the Proposal [40 CFR 1508.9(b)]:
This project supports the City of Tucson Consolidated Plan policies to develop supportive housing including: 1) New construction and/or rehabilitation of rental units for target populations; 2) Complexes serving special target populations; 3) The preservation of existing lower income housing and/or increasing the supply of lower income housing; and 4) Self-sufficiency in lower income households. The project serves the program purpose of increasing the supply of much needed affordable workforce and family housing in the City of Tucson. This project has received a reservation of Arizona Department of Housing Low Income Housing Tax Credits. The project also supports the goals of Plan Tucson, the City of Tucson General & Sustainability Plan to provide housing, human services, public facilities, and economic development programs to address the housing needs of the most vulnerable populations.
https://www.tucsonaz.gov/pdsd/plan.

Existing Conditions and Trends [24 CFR 58.40(a)]:
5489 S. Park is comprised of one parcel (APN 140-21-002B) which covers approximately 1.02 acres and consist of undeveloped land. Based on a review of historical information, the site has never been developed. In general, the other surrounding properties have been undeveloped prior to 1958. By 1972, the surrounding properties were developed with churches to the north and west, a funeral service facility to the east, and an auto repair shop and residential developments to the south. The site is comprised of one parcel (APN 140-25-008A) which covers approximately 5-acres and consists of undeveloped land. Based on a review of historical records, the site was undeveloped

land from 1936 to 1948. By 1958, a portion of the site was developed with a trailer. By 1967, the trailer had been removed and the site was left vacant. No significant changes in use have occurred at the site since the late 1960s.

Maps, photographs, and other documentation of project location and description:
5849 S Park Rio Mercado map 1-10-20.pdf
5716 S Park Rio Mercado map 1-10-20.pdf

Determination:

✓	Finding of No Significant Impact [24 CFR 58.40(g)(1); 40 CFR 1508.13] The project will not result in a significant impact on the quality of human environment
	Finding of Significant Impact

Approval Documents:

7015.15 certified by Certifying Officer on:

7015.16 certified by Authorizing Officer on:

Funding Information

Grant / Project Identification Number	HUD Program	Program Name
M-20-MC-04-0229	Community Planning and Development (CPD)	HOME Program

Estimated Total HUD Funded, Assisted or Insured Amount: $3,050,000.00

Estimated Total Project Cost [24 CFR 58.2 (a)(5)]: $27,352,000.00

Compliance with 24 CFR §50.4, §58.5 and §58.6 Laws and Authorities

Compliance Factors: Statutes, Executive Orders, and Regulations listed at 24 CFR §50.4, §58.5, and §58.6	Are formal compliance steps or mitigation required?	Compliance determination (See Appendix A for source determinations)
STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR §50.4 & § 58.6		
Airport Hazards Clear Zones and Accident Potential Zones; 24 CFR Part 51 Subpart D	☐ Yes ☑ No	The project site is not within 15,000 feet of a military airport or 2,500 feet of a civilian airport. The project is in compliance with Airport Hazards requirements.
Coastal Barrier Resources Act Coastal Barrier Resources Act, as amended by the Coastal Barrier Improvement Act of 1990 [16 USC 3501]	☐ Yes ☑ No	This project is located in a state that does not contain CBRS units. Therefore, this project is in compliance with the Coastal Barrier Resources Act.
Flood Insurance Flood Disaster Protection Act of 1973 and National Flood Insurance Reform Act of 1994 [42 USC 4001-4128 and 42 USC 5154a]	☐ Yes ☑ No	The structure or insurable property is not located in a FEMA-designated Special Flood Hazard Area. FEMA Zone X 4019C-2289 L 6/16/11. While flood insurance may not be mandatory in this instance, HUD recommends that all insurable structures maintain flood insurance under the National Flood Insurance Program (NFIP). The project is in compliance with flood insurance requirements.
STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR §50.4 & § 58.5		
Air Quality Clean Air Act, as amended, particularly section 176(c) & (d); 40 CFR Parts 6, 51, 93	☐ Yes ☑ No	The project sites are located within a carbon monoxide (CO) maintenance area, meaning the area has monitored air quality that once did not meet the National Ambient Air Quality Standards (nonattainment), but now has been redesignated and meets the standards. The EPA de minimus level for CO emissions is 100/tons per year. According to the Pima County Department of Environmental Quality, "it is very unlikely the proposed multi-family residential developments would emit any regulated air pollutant in significant quantities that would trigger regulatory oversight." Thus, the CO emissions are not expected to exceed

		100 tons per year. CO is the sole criteria pollutant in a maintenance area for the project locations.The project is in compliance with the Clean Air Act.
Coastal Zone Management Act Coastal Zone Management Act, sections 307(c) & (d)	☐ Yes ☑ No	This project is located in a state that does not participate in the Coastal Zone Management Program. Arizona has no coastal areas. Therefore, this project is in compliance with the Coastal Zone Management Act.
Contamination and Toxic Substances 24 CFR 50.3(i) & 58.5(i)(2)]	☐ Yes ☑ No	Site contamination was evaluated as follows: ASTM Phase I ESA. On-site or nearby toxic, hazardous, or radioactive substances that could affect the health and safety of project occupants or conflict with the intended use of the property were not found. No evidence of hazardous, toxic, or radioactive materials and substances were reported on the sites in the Terracon Phase I ESA dated 2/4/2020. Based on available records reviewed, the sites are not located within the immediate vicinity of hazardous, toxic or radioactive materials and substances. Recognized Environmental Conditions (RECs) were not identified associated with the sites.The project is in compliance with contamination and toxic substances requirements.
Endangered Species Act Endangered Species Act of 1973, particularly section 7; 50 CFR Part 402	☐ Yes ☑ No	Terracon utilized the United States Fish and Wildlife Service (USFWS) Information, Planning, and Conservation (IPAC) system to generate a list of potentially federally endangered species that may be mapped in the vicinity of each site. Based on review of IPAC information for both sites, a total of six threatened, endangered or candidate species and six birds on the migratory birds of concern list were identified as potentially occurring the vicinity of the sites. No critical habitat was identified on the IPACs. Terracon also utilized the Arizona Game and Fish Department (AZGFD) Online Environmental Review

		Tool which identified six species and a bat colony occurring within three miles of the project vicinity. None of the federally or state protected species were identified during Terracon's site reconnaissance. Terracon concluded the project will have no effect on federally listed or endangered species, or result in the modification of any designated or proposed critical habitat. Terracon contacted the AZGFD and the AZGFD replied with general recommendations regarding the Arizona Native Plant Page 3 of 26 REV. 11-2015 Law. Since the proposed ground disturbance exceeds 0.25 acres and native plants were observed on the Rio Del Sol and Rio Madera sites, the recipient must comply with the Arizona Native Plant Law regulations. The AZGFD also replied with general recommendations regarding invasive species and western burrowing owls, protected under the Migratory Bird Treaty Act (MBTA). The AZGFD recommended conducting an occupany survey for western burrowing owls to determine if the species occurs within the project footprint if suitable habitat is present. Western burrowing owls do not have a specific habitat in Arizona (they may utilize desert land, agricultural land, vacant land that has been previously developed, etc. for burrows). Thus, Terracon completed a burrowing owl survey for both sites. Although burrows were observed on the Rio Del Sol site, no evidence of burrowing owl activity was observed and the burrows were considered to be inactive over the course of the two surveys (March 27, 2019 and April 3, 2019). No burrows or signs of burrowing owl activity were observed on the Rio Madera site at the time of the survey (March 27, 2019). This project will have No Effect on listed species based on a

		letter of understanding, memorandum of agreement, programmatic agreement, or checklist provided by local HUD office. This project is in compliance with the Endangered Species Act.
Explosive and Flammable Hazards Above-Ground Tanks)[24 CFR Part 51 Subpart C	☐ Yes ☑ No	There are no current or planned stationary aboveground storage containers of concern within 1 mile of the project site. No evidence of explosive and flammable operations were reported on the site or near the site in the Terracon Phase I ESA dated 2/4/2020. Based on available records reviewed, the sites are not located within the immediate vicinity of hazardous industrial operations handling fuel or chemicals of an explosive or flammable nature. Recognized Environmental Conditions (RECs) were not identified associated with the sites.The project is in compliance with explosive and flammable hazard requirements.
Farmlands Protection Farmland Protection Policy Act of 1981, particularly sections 1504(b) and 1541; 7 CFR Part 658	☐ Yes ☑ No	This project does not include any activities that could potentially convert agricultural land to a non-agricultural use. The site does not meet the definition of farmland per 7 CFR Park 658.2 a (1) "Farmland" does not include land already in or committed to urban development or water storage. The project is in compliance with the Farmland Protection Policy Act.
Floodplain Management Executive Order 11988, particularly section 2(a); 24 CFR Part 55	☐ Yes ☑ No	This project does not occur in a floodplain. FEMA Zone X 4019C-2289 L 6/16/11. The project is in compliance with Executive Order 11988.
Historic Preservation National Historic Preservation Act of 1966, particularly sections 106 and 110; 36 CFR Part 800	☐ Yes ☑ No	A memo with the determination that the project is in compliance with 36 CFR Part 800 from the Tucson Historic Preservation Office dated 1/30/2020. Terracon completed a State Historic Preservation Office (SHPO) cover letter and Survey Report Summary Form (SRSF) for the project with a finding of

		no historic properties affected. Mary-Ellen Walsh from SHPO concurred with Terracon's recommendation. Terracon drafted consultation letters for the 10 tribes identified by the Tribal Directory Assessment Tool (TDAT) for Pima County, Arizona. Greg Moore sent the tribal letters on February 4, 2019. The San Carlos Apache Tribe, Tohono O'odham Nation, and White Mountain Apache Tribe replied with no issues or concerns. The project is in compliance with Section 106.
Noise Abatement and Control Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978; 24 CFR Part 51 Subpart B	☑ Yes ☐ No	A Noise Assessment was conducted by Terracon as part of the Phase I ESA dated 2/4/2020. The noise level was normally unacceptable: 71.4 db. A mitigation plan has been developed by Spendiarian & Willis Acoustics and Noise Control, LLC. The project is in compliance with HUD's Noise regulation with mitigation.
Sole Source Aquifers Safe Drinking Water Act of 1974, as amended, particularly section 1424(e); 40 CFR Part 149	☐ Yes ☑ No	The project is located on a sole source aquifer. The region has an MOU or other working agreement with EPA for HUD projects impacting a sole source aquifer, and the MOU or working agreement excludes the project from further review. Terracon contacted the Environmental Protection Agency (EPA) and the EPA replied stating the the proposed project will not adversely effect the sole source aquifer.The project is in compliance with Sole Source Aquifer requirements.
Wetlands Protection Executive Order 11990, particularly sections 2 and 5	☐ Yes ☑ No	Based on the project description this project includes no activities that would require further evaluation under this section. The project sites are not located within or adjacent to wetlands, marshes, wet meadows, mud flats or natural ponds.The project is in compliance with Executive Order 11990.
Wild and Scenic Rivers Act Wild and Scenic Rivers Act of 1968, particularly section 7(b) and (c)	☐ Yes ☑ No	This project is not within proximity of a NWSRS river. Tucson and southern Arizona have no NWSRS rivers. The

		project is in compliance with the Wild and Scenic Rivers Act.
HUD HOUSING ENVIRONMENTAL STANDARDS		
ENVIRONMENTAL JUSTICE		
Environmental Justice Executive Order 12898	☐ Yes ☑ No	No adverse environmental impacts were identified in the project's total environmental review. The project is in compliance with Executive Order 12898.

Environmental Assessment Factors [24 CFR 58.40; Ref. 40 CFR 1508.8 &1508.27]

Impact Codes: An impact code from the following list has been used to make the determination of impact for each factor.
(1) Minor beneficial impact
(2) No impact anticipated
(3) Minor Adverse Impact – May require mitigation
(4) Significant or potentially significant impact requiring avoidance or modification which may require an Environmental Impact Statement.

Environmental Assessment Factor	Impact Code	Impact Evaluation	Mitigation
LAND DEVELOPMENT			
Conformance with Plans / Compatible Land Use and Zoning / Scale and Urban Design	2	The site is consistent with local and regional planning efforts, and has received planning and zoning approval from the City of Tucson. The project sites are zoned C-2 Commercial with residential permitted. The surrounding properties of the sites are commercial and residential and the multi-family residential developments are expected to fit in well with the surroundings. The project is not expected to alter established views, obscure landmarks, or impair existing trails or bikeways. SOURCE: Bright Design Associates / Rick Bright / Project Architect / 520-529-1878, Andrew Connor City of Tucons PDSD.	
Soil Suitability / Slope/ Erosion / Drainage and Storm Water Runoff	2	According to the Pattison Engineering, LLC Geotechnical Engineering Evaluation for the Rio Del Sol site, ''the surface soils were predominately silty sands and clayey sands with varying amounts of gravel. For both sites: ''The site's subsurface soil and other conditions are suitable for support of the proposed developments provided the designers, contractors, and owners followed the report recommendations.''No evidence of erosion, drainage/storm	

Environmental Assessment Factor	Impact Code	Impact Evaluation	Mitigation
LAND DEVELOPMENT			
		water runoff on site visit by HCD staff 2/3/2020. Geotechnical Report by Patterson Engineering dated 1/26/18 and updated 10/28/19. Phase I ESA by Terracon dated 2/4/2020.	
Hazards and Nuisances including Site Safety and Site-Generated Noise	2	No evidence of onsite hazards or nuisances including soil contamination; proximity to high pressure pipe lines or other volatile and explosive products; high-voltage transmission lines; radio/TV transmission towers; excessive smoke, fumes, odors subsidence, ground water, inadequate surface drainage, flood, etc. Electric Power transformers on/near the site show no leaking or stains. The site has no vegetation or natural features. There are no poisonous plants or animals on the site. No known natural hazards exist. The site has access to intersections with traffic lights and cross walks for residents to cross the street, street lighting, sidewalks, and other safety features. Phase I environmental site assessment by Terracon dated 2/4/2020 and site visit by HCD staff 2/3/2020.	
Energy Consumption /Energy Efficiency	2	Minor increase in energy consumption by 107 new units of housing on 2 sites. Tucson Electric Power currently supplies electricity and will continue service. All utilities are available to the site. Buildings will be constructed with energy efficient and low water usage appliances. Tucson Electric Power / Camilla Martins Bekat / 520-237-8943. The project have approximately 2800 sq. ft. of rooftop solar panes, bringing electric usage to near net zero. Letter from Greg Moore dated 12/11/19.	
SOCIOECONOMIC			
Employment and Income Patterns	2	The target population for the project will be low income individuals and families with children. It is anticipated that no new permanent employees will be hired for this project. Due to the site being located within a commercial area, employment opportunities are likely to exist for future residents. Furthermore, infrastructure development is likely to be beneficial socioeconomically, as more jobs will be created and workers will potentially have an increased income.The Developer, anticipates hiring approximately 10-20 subcontractors during the construction phase of the project. The project will follow Section 3 and Davis Bacon in all of employment and construction/subcontracting activities.	
Demographic	2	Project area is a moderate income, mixed race (87%	

Environmental Assessment Factor	Impact Code	Impact Evaluation	Mitigation
LAND DEVELOPMENT			
Character Changes / Displacement		minority), mixed use area with approximately 36% of the housing units currently being used as rentals. The target population for the project will be low income individuals and families with children. The new units are being constructed on vacant/ uninhabited land so no displacements will occur. https://geomap.ffiec.gov/FFIECGeocMap/GeocodeMap1.aspx	
COMMUNITY FACILITIES AND SERVICES			
Educational and Cultural Facilities (Access and Capacity)	2	The sites are located within the Sunnyside Unified School District and educational facilities are located within close proximity to the project sites. Sunnyside School District has an open enrollment plan https://www.susd12.org/enroll. The target population for the project is low income individuals and families with children. Also within 5 miles are a number of colleges and adult education resources including Pima Community College, University of Arizona and other education programs. Educational and cultural enrichment opportunities are available at nearby community centers, libraries, recreation centers, theaters, museums, parks and a number of veteran organizations.	
Commercial Facilities (Access and Proximity)	2	Site is within 1 1/2 mile of major grocery stores, pharmacies, retail and service businesses, discount stores, medical providers and thrift stores. For example, Fry's Food and Drug, Bank of America, AutoZone Auto Parts, and Walgreens are an approximate five minute drive from both sites.The project is the Suntran Route 25 connecting to transit hubs and the Sunlink streetcar line. Google maps.	
Health Care / Social Services (Access and Capacity)	2	The project site is within 6 miles of 4 major medical centers, including the Southern Arizona VA Health Care campus. Numerous emergency facilities, clinics, and physician services are within an easy commute on public transit. Local non-profit social service and mental health providers including Las Familias Center, CODAC, COPE and La Frontera are nearby. Google maps.	
Solid Waste Disposal and Recycling (Feasibility and Capacity)	2	The City of Tucson Environmental Services Department provides onsite waste disposal and recycling services. The City of Tucson provides extensive recycling options, including construction debris handling and recycling, landfills, green waste recycling and household hazardous waste disposal services. The City of Tucson solid waste disposal system can adequately service the proposed multi-family residential	

Environmental Assessment Factor	Impact Code	Impact Evaluation	Mitigation
LAND DEVELOPMENT			
		developments. City of Tucson Environmental Services Department / Tom Scott / 520-837- 3799	
Waste Water and Sanitary Sewers (Feasibility and Capacity)	2	The sites are located within the Pima County Regional Wastewater Service Area. According to the Pima County 2016 Wastewater Facility Plan, ''the regional wastewater treatment system is equipped to adequately serve existing users and meet growing community needs well into the future. The existing capacity is sufficient for at least the next 10-15 years.'' SOURCE: Pima County 2016 Wastewater Facility Plan, pgs. 74 and 90	
Water Supply (Feasibility and Capacity)	2	The sites are located within a current Tucson water service area. The City of Tucson receives water from the Colorado River through the Central Arizona Project (CAP). According the most recent (2017) Annual Water Quality Report, ''the results from the monitoring conducted in 2017 met all standards for safe drinking water.'' Thus, a secure potable water supply will be available for the proposed multi-family residential developments. SOURCE: Tucson Water Service Area map, Tucson 2017 Annual Water Quality Report.	
Public Safety - Police, Fire and Emergency Medical	2	The site is approximately 1.5 miles from the City of Tucson Santa Cruz Substation. Response time varies depending on the type of call, but the average time for emergency response is 5 minutes or less. The project is within 2 miles of Tucson Fire Stations 10 and 14. Average response time for TFD is 4 minutes. The project site is within 6 miles of major medical centers with emergency medical care including Banner UMC South Medical Center, Southern Arizona VA Health Care Center, and numerous urgent care facilities. Tucson Fire Department Fire Stations Map, Tucson Police Department Operations Division South Map.	
Parks, Open Space and Recreation (Access and Capacity)	2	The project is within a 5 miles of 2 regional recreation centers that include sports fields, swimming pools, fitness programs, recreation classes, senior programs, basketball courts, tennis courts and open space. There are a number of small parks and open space areas within a reasonable walk of the project site. Google Maps.	
Transportation and Accessibility (Access and	2	The site is fully accessible by car and has adequate street access and is designed for off street parking. The project is the Suntran Route 25 connecting to transit hubs and the Sunlink streetcar line.	

Environmental Assessment Factor	Impact Code	Impact Evaluation	Mitigation
LAND DEVELOPMENT			
Capacity)		https://infoweb.suntran.com/hiwire?alias=iScheduleLookupSearch&LineAbbr=25&Date=02-18-2020.	
NATURAL FEATURES			
Unique Natural Features /Water Resources	2	No unique natural features or agricultural lands, or water features were identified during the site evaluations or on the topographic and aerial maps. Terracon Consultants, Inc. Phase I Environmental Site Assessments dated 2/4/2020 and site visit by HCD staff 2/3/2020.	
Vegetation / Wildlife (Introduction, Modification, Removal, Disruption, etc.)	2	Since the proposed ground disturbance exceeds 0.25 acres and native plants were observed on the Rio Del Sol and Rio Madera sites, the recipient must comply with the Arizona Native Plant Law regulations. Terracon completed a Notice of Intent to Clear Land for both sites. The AZGFD also replied with general recommendations regarding invasive species and western burrowing owls. The AZGFD recommended conducting an occupancy survey for western burrowing owls to determine if the species occurs within the project footprint if suitable habitat is present. Western burrowing owls do not have a specific habitat in Arizona (they may utilize desert land, agricultural land, vacant land that has been previously developed, etc. for burrows). Thus, Terracon completed a burrowing owl survey for both sites. Although burrows were observed on the Rio Del Sol site, no evidence of burrowing owl activity was observed and the burrows were considered to be inactive over the course of the two surveys (March 27, 2019 and April 3, 2019). No burrows or signs of burrowing owl activity were observed on the Rio Madera site at the time of the survey (March 27, 2019). SOURCES: Terracon Consultants, Inc. AZGFD Consultation Letter (Determination of No Effect) including the USFWS IPAC and AZGFD Online Review Tool Species Lists and site reconnaissance by Rita Sulkosky, Senior Staff Scientist AZGFD response with recommendations dated March 14, 2019 Terracon Consultants, Inc. Western Burrowing Owl Surveys dated April 15, 2019 including field evaluations by Emily Trimpe, Assistant Scientist.	
Other Factors			

Supporting documentation
Rio Sites Environmental Assessment_Final.pdf

SunTran Route 25 1-30-20.pdf
Rio Mercado site plans 1-3-20.pdf
Rio Mercado Public Safety 1-29-20.pdf
Rio Mercado Geotech addendum 1-3-20.pdf
Rio Mercado colleges - Google Maps 1-29-20.pdf
Rio Mercado ADOH EA factors docs 1-28-20.pdf
parks - Google Maps 1-29-20.pdf
CensDemoMap FFIEC 1-29-20.pdf

Additional Studies Performed:
Terracon Consultants, Inc. SHPO SRSF dated December 14, 2018 including site reconnaissance by Rita Sulkosky, Senior Staff Scientist Terracon Consultants, Inc. ;AZGFD Consultation Letter (Determination of No Effect) including the USFWS IPAC and AZGFD Online Review Tool Species Lists and site reconnaissance by Rita Sulkosky, Senior Staff Scientist Terracon Consultants, Inc.; Western Burrowing Owl Surveys dated April 15, 2019 including field evaluations by Emily Trimpe, Assistant Scientist; SHPO Mary-Ellen Walsh; AZGFD Online Review Tool Species Lists and site reconnaissance by Rita Sulkosky Senior Staff Scientist;

Field Inspection [Optional]: Date and completed by:
Glenn Fournie 2/3/2020 12:00:00 AM

List of Sources, Agencies and Persons Consulted [40 CFR 1508.9(b)]:
Arizona Department of Housing (ADOH)- Lori Hoffner; HUD-Stanley Toal; City of Tucson Office of the Mayor-Mayor Jonathan Rothschild; City of Tucson Housing and Community Development Department-Liz Morales, Joyce Alcantar; City of Tucson Planning and Development Services-Scott Clark, Interim Director; City of Tucson Historic Preservation Office - Allison Deih;l City of Tucson and Pima County Consortium HUD Consolidated Plan: https://www.tucsonaz.gov/files/hcd/City_of_Tucson_and_Pima_County_FFY2015-2019_5-year_HUDConsolidated_Plan.pdf City of Tucson General & Sustainability Plan; https://www.tucsonaz.gov/pdsd/plan-tucson; Pima County Department of Environmental Quality / RupeshPatel / Rupesh.Patel@pima.gov; Tucson Airport Authority / Scott Robidoux srobidoux@flytucson.com; City of Tucson Planning and Development Services, Zoning / Andrew Connor / 520-837-4896; Tucson Elecric Power / Camilla Martins Bekat / 520-237-8943; Bright Design Associates / Rick Bright / Project Architect / 520-529-1878; City of Tucson Environmental Services Department / Tom Scott / 520-837- 3799;

List of Permits Obtained:
The reviews that go into each project include but are not limited to: Planning, Zoning, Engineering, Landscape, Fire, ADA, Plumbing, Solid Waste, Right of Way Improvements, Structural, Mechanical and Plumbing, Electrical, Fire, Zoning Engineering, Wastewater, Water, Transportation. The City of Tucson Planning and Development Services Department reviews, approves and issues all permits for: zoning, site plans, grading, storm water, demolition, parking, landscape and construction trades; issues all permits; performs inspections and issues certificate of occupancy. The Department enforces building and zoning codes.

Public Outreach [24 CFR 58.43]:
Publication of the FONSI/RROF 2/19/2020 in the Arizona Daily Star, and interested parties contacted by email. The Environmental Review Record (ERR) that documents the environmental determinations for this project is available at https://www.tucsonaz.gov/hcd/environmental-review and on file at City of Tucson Housing and Community Development Department, 310 S. Commerce Park Loop, Tucson, Pima County Arizona 85745 and may be examined weekdays 8:00 a.m. to 4:00 p.m.

Cumulative Impact Analysis [24 CFR 58.32]:
The project will be a minor contributor to the projected increase in population, traffic and energy usage already anticipated for the area. The development is in an existing urban neighborhood and will use existing roadways, sewer systems, municipal water and other utilities already in place. No significant cumulative impacts on the environment would be anticipated from the proposed action in conjunction with other activities.

Alternatives [24 CFR 58.40(e); 40 CFR 1508.9]
Alternate locations were not feasible because they did not meet the requirements to serve the needs of the proposed project.

No Action Alternative [24 CFR 58.40(e)]
107 units of desperately needed new affordable housing units for low income individuals and families with children, would not be built. Goals of the City of Tucson Consolidated Plan would not be fulfilled. The Developer will miss the ADOH Low Income Housing Tax Credit and City of Tucson HOME funding opportunity that makes the project affordable at this time. The site will remain under-developed.The project will not provide stable affordable housing for low-to-moderate income families.

Summary of Findings and Conclusions:
The project sites located at 5761 South Park Avenue (formerly 1020 East Drexel Road) and 5489 South Park Avenue in Tucson, Pima County, Arizona are located in a

commercial and residential area. The sites are suited for the proposed multi-family residential developments and will not result in significant impacts on the environment or community facilities/services. Future residents will not be significantly impacted by existing environmental conditions such as air quality or nearby hazardous waste operations. Benefits to the proposed affordable multi-family residential developments include housing for low-to-moderate income groups and potential economic growth for the surrounding areas.

Mitigation Measures and Conditions [CFR 1505.2(c)]:

Summarized below are all mitigation measures adopted by the Responsible Entity to reduce, avoid or eliminate adverse environmental impacts and to avoid non-compliance or non-conformance with the above-listed authorities and factors. These measures/conditions must be incorporated into project contracts, development agreements and other relevant documents. The staff responsible for implementing and monitoring mitigation measures should be clearly identified in the mitigation plan.

Law, Authority, or Factor	Mitigation Measure or Condition	Comments on Completed Measures	Complete
Noise Abatement and Control	The backyards in proximity of Point C (west-central building) will be mitigated using an 8-foot privacy wall stretching from the northern side of the west-central building down along western side. The backyards in proximity of Points D and E (southwest building) will be mitigated using an 8-foot privacy wall stretching along the western side of the southwest building. Rio Madera: Points C and D using an 8-foot wall as the noise barrier. The backyards in proximity of Points C and D will be mitigated using an 8-foot privacy wall stretching along the western side of the west building. Rick Bright, Project Architect, completed HUD's Sound Transmission Classification (STraCAT) Assessment Tool calculations to demonstrate interior noise levels will meet the 45 dB using certain construction materials. Interior noise levels will be reduced to at or below 45 dB using 7/8" stucco for the walls and various door measurements/types depending on the building. Therefore, the interior noise levels for both sites can	N/A	

	be reduced to at or below 45 dB (HUD standard) using certain construction materials.		
Permits, reviews and approvals	The reviews that go into each project include but are not limited to: Planning, Zoning, Engineering, Landscape, Fire, ADA, Plumbing, Solid Waste, Right of Way Improvements, Structural, Mechanical and Plumbing, Electrical, Fire, Zoning Engineering, Wastewater, Water, Transportation. The City of Tucson Planning and Development Services Department reviews, approves and issues all permits for: zoning, site plans, grading, storm water, demolition, parking, landscape and construction trades; issues all permits; performs inspections and issues certificate of occupancy. The Department enforces building and zoning codes.	N/A	
Mitigation Measures Recommended [24 CFR 58.40(d), 40 CFR 1508.20]	Mitigation Measures Recommended [24 CFR 58.40(d), 40 CFR 1508.20] (Recommend feasible ways in which the proposal or external factors relating to the proposal should be modified in order to eliminate or minimize adverse environmental impacts.) Mitigation 1 - Migratory Birds (Migratory Bird Treaty Act): The proposed project will be less likely to have impacts to migratory birds if construction activities occur outside of the bird nesting/breeding season (mid-March through mid-June). If active nests are identified within or in the vicinity of the project site, avoid the site until nestlings have fledged or the nest fails. If the activity must occur, establish a buffer zone around the nest and no activities will occur within that zone until nestlings have fledged. The dimension of the buffer zone will depend on the proposed activity, habitat type, and species present. The buffer should be a distance that does not elicit a flight response by the adult birds and can be 0.5 - 1 mile for hawks and eagles. Mitigation 2 -	N/A	

	Vegetation Removal : Since the proposed ground disturbance exceeds 0.25 acres and native plants were observed on the Rio Del Sol (5761 South Park Avenue) and Rio Madera (5489 South Park Avenue) sites, the recipient must comply with the Arizona Native Plant Law regulations. Thus, Terracon completed Form E-8 Notice of Intent to Clear Land for the both sites. Terracon sent the forms to the Arizona Department of Agriculture, on behalf of the developer/recipient, on April 16, 2019 and is awaiting a response.		

Mitigation Plan

Noise mitigation will be implemented and monitored by Rick Bright-Bright Design Associates, Project Architect 520-529-1878. Wildlife and Vegetation will be implemented and monitored by Gregory Moore-Southwest Nonprofit Housing 520-326-4858

Noise mitigation Rio Mercado 1-29-20.docx

Supporting documentation on completed measures

APPENDIX A: Related Federal Laws and Authorities

Airport Hazards

General policy	Legislation	Regulation
It is HUD's policy to apply standards to prevent incompatible development around civil airports and military airfields.		24 CFR Part 51 Subpart D

1. To ensure compatible land use development, you must determine your site's proximity to civil and military airports. Is your project within 15,000 feet of a military airport or 2,500 feet of a civilian airport?

✓ **No**

Based on the response, the review is in compliance with this section. Document and upload the map showing that the site is not within the applicable distances to a military or civilian airport below

Yes

Screen Summary

Compliance Determination

The project site is not within 15,000 feet of a military airport or 2,500 feet of a civilian airport. The project is in compliance with Airport Hazards requirements.

Supporting documentation

Rio Mercado ADOH airport map 1-28-20.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Coastal Barrier Resources

General requirements	Legislation	Regulation
HUD financial assistance may not be used for most activities in units of the Coastal Barrier Resources System (CBRS). See 16 USC 3504 for limitations on federal expenditures affecting the CBRS.	Coastal Barrier Resources Act (CBRA) of 1982, as amended by the Coastal Barrier Improvement Act of 1990 (16 USC 3501)	

This project is located in a state that does not contain CBRA units. Therefore, this project is in compliance with the Coastal Barrier Resources Act.

Compliance Determination

This project is located in a state that does not contain CBRS units. Therefore, this project is in compliance with the Coastal Barrier Resources Act.

Supporting documentation

Coastal Barriers Template 11-1-19.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Flood Insurance

General requirements	Legislation	Regulation
Certain types of federal financial assistance may not be used in floodplains unless the community participates in National Flood Insurance Program and flood insurance is both obtained and maintained.	Flood Disaster Protection Act of 1973 as amended (42 USC 4001-4128)	24 CFR 50.4(b)(1) and 24 CFR 58.6(a) and (b); 24 CFR 55.1(b).

1. Does this project involve financial assistance for construction, rehabilitation, or acquisition of a mobile home, building, or insurable personal property?

No. This project does not require flood insurance or is excepted from flood insurance.

✓ Yes

2. Upload a FEMA/FIRM map showing the site here:

Rio Mercado flood map 1-29-20.pdf

The Federal Emergency Management Agency (FEMA) designates floodplains. The FEMA Map Service Center provides this information in the form of FEMA Flood Insurance Rate Maps (FIRMs). For projects in areas not mapped by FEMA, use the best available information to determine floodplain information. Include documentation, including a discussion of why this is the best available information for the site. Provide FEMA/FIRM floodplain zone designation, panel number, and date within your documentation.

Is the structure, part of the structure, or insurable property located in a FEMA-designated Special Flood Hazard Area?

✓ No

Based on the response, the review is in compliance with this section.

Yes

Screen Summary

Compliance Determination

The structure or insurable property is not located in a FEMA-designated Special Flood Hazard Area. FEMA Zone X 4019C-2289 L 6/16/11. While flood insurance may not be

mandatory in this instance, HUD recommends that all insurable structures maintain flood insurance under the National Flood Insurance Program (NFIP). The project is in compliance with flood insurance requirements.

Supporting documentation

Are formal compliance steps or mitigation required?

Yes

✓ No

Air Quality

General requirements	Legislation	Regulation
The Clean Air Act is administered by the U.S. Environmental Protection Agency (EPA), which sets national standards on ambient pollutants. In addition, the Clean Air Act is administered by States, which must develop State Implementation Plans (SIPs) to regulate their state air quality. Projects funded by HUD must demonstrate that they conform to the appropriate SIP.	Clean Air Act (42 USC 7401 et seq.) as amended particularly Section 176(c) and (d) (42 USC 7506(c) and (d))	40 CFR Parts 6, 51 and 93

1. Does your project include new construction or conversion of land use facilitating the development of public, commercial, or industrial facilities OR five or more dwelling units?

✓ Yes

No

Air Quality Attainment Status of Project's County or Air Quality Management District

2. Is your project's air quality management district or county in non-attainment or maintenance status for any criteria pollutants?

No, project's county or air quality management district is in attainment status for all criteria pollutants.

✓ Yes, project's management district or county is in non-attainment or maintenance status for the following criteria pollutants (check all that apply):

✓ Carbon Monoxide

Lead

Nitrogen dioxide

Sulfur dioxide

Ozone

Particulate Matter, <2.5 microns

Particulate Matter, <10 microns

3. What are the *de minimis* emissions levels (40 CFR 93.153) or screening levels for the non-attainment or maintenance level pollutants indicated above

Carbon monoxide 100.00 ppm (parts per million)

Provide your source used to determine levels here:
Richard Grimaldi, Deputy Director Pima County Environmental Quality memo

4. **Determine the estimated emissions levels of your project. Will your project exceed any of the de minimis or threshold emissions levels of non-attainment and maintenance level pollutants or exceed the screening levels established by the state or air quality management district?**

✓ No, the project will not exceed *de minimis* or threshold emissions levels or screening levels.

Enter the estimate emission levels:

Carbon monoxide 1.00 ppm (parts per million)

Based on the response, the review is in compliance with this section.

Yes, the project exceeds *de minimis* emissions levels or screening levels.

Screen Summary

Compliance Determination

The project sites are located within a carbon monoxide (CO) maintenance area, meaning the area has monitored air quality that once did not meet the National Ambient Air Quality Standards (nonattainment), but now has been redesignated and meets the standards. The EPA de minimus level for CO emissions is 100/tons per year. According to the Pima County Department of Environmental Quality, "it is very unlikely the proposed multi-family residential developments would emit any regulated air pollutant in significant quantities that would trigger regulatory oversight." Thus, the CO emissions

are not expected to exceed 100 tons per year. CO is the sole criteria pollutant in a maintenance area for the project locations.The project is in compliance with the Clean Air Act.

Supporting documentation
Air quality memo 12-19-19.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Coastal Zone Management Act

General requirements	Legislation	Regulation
Federal assistance to applicant agencies for activities affecting any coastal use or resource is granted only when such activities are consistent with federally approved State Coastal Zone Management Act Plans.	Coastal Zone Management Act (16 USC 1451-1464), particularly section 307(c) and (d) (16 USC 1456(c) and (d))	15 CFR Part 930

This project is located in a state that does not participate in the Coastal Zone Management Program. Therefore, this project is in compliance with the Coastal Zone Management Act.

Screen Summary

Compliance Determination

This project is located in a state that does not participate in the Coastal Zone Management Program. Arizona has no coastal areas. Therefore, this project is in compliance with the Coastal Zone Management Act.

Supporting documentation

Coastal zones template 11-1-19.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Contamination and Toxic Substances

General requirements	Legislation	Regulations
It is HUD policy that all properties that are being proposed for use in HUD programs be free of hazardous materials, contamination, toxic chemicals and gases, and radioactive substances, where a hazard could affect the health and safety of the occupants or conflict with the intended utilization of the property.		24 CFR 58.5(i)(2) 24 CFR 50.3(i)

1. How was site contamination evaluated? Select all that apply. Document and upload documentation and reports and evaluation explanation of site contamination below.

- ✓ American Society for Testing and Materials (ASTM) Phase I Environmental Site Assessment (ESA)
- ASTM Phase II ESA
- Remediation or clean-up plan
- ASTM Vapor Encroachment Screening
- None of the Above

2. Were any on-site or nearby toxic, hazardous, or radioactive substances found that could affect the health and safety of project occupants or conflict with the intended use of the property? (Were any recognized environmental conditions or RECs identified in a Phase I ESA and confirmed in a Phase II ESA?)

- ✓ No

Explain:
Phase I ESA and site visit by HCD staff

Based on the response, the review is in compliance with this section.

Yes

Screen Summary

Compliance Determination

Site contamination was evaluated as follows: ASTM Phase I ESA. On-site or nearby toxic, hazardous, or radioactive substances that could affect the health and safety of project occupants or conflict with the intended use of the property were not found. No

evidence of hazardous, toxic, or radioactive materials and substances were reported on the sites in the Terracon Phase I ESA dated 2/4/2020. Based on available records reviewed, the sites are not located within the immediate vicinity of hazardous, toxic or radioactive materials and substances. Recognized Environmental Conditions (RECs) were not identified associated with the sites.The project is in compliance with contamination and toxic substances requirements.

Supporting documentation

5761 S Park Phase I ESA Report 2-11-20.pdf
5489 S Park Phase I ESA Report 2-11-20.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Endangered Species

General requirements	ESA Legislation	Regulations
Section 7 of the Endangered Species Act (ESA) mandates that federal agencies ensure that actions that they authorize, fund, or carry out shall not jeopardize the continued existence of federally listed plants and animals or result in the adverse modification or destruction of designated critical habitat. Where their actions may affect resources protected by the ESA, agencies must consult with the Fish and Wildlife Service and/or the National Marine Fisheries Service ("FWS" and "NMFS" or "the Services").	The Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq*.); particularly section 7 (16 USC 1536).	50 CFR Part 402

1. Does the project involve any activities that have the potential to affect specifies or habitats?

No, the project will have No Effect due to the nature of the activities involved in the project.

✓ No, the project will have No Effect based on a letter of understanding, memorandum of agreement, programmatic agreement, or checklist provided by local HUD office

Explain your determination:
Phase I ESA, Arizona Game and Fish Department, US department of the Interior memos. Burrowing owl surveys.

Based on the response, the review is in compliance with this section. Document and upload all documents used to make your determination below.

Yes, the activities involved in the project have the potential to affect species and/or habitats.

Screen Summary
Compliance Determination
Terracon utilized the United States Fish and Wildlife Service (USFWS) Information, Planning, and Conservation (IPAC) system to generate a list of potentially federally endangered species that may be mapped in the vicinity of each site. Based on review of IPAC information for both sites, a total of six threatened, endangered or candidate

species and six birds on the migratory birds of concern list were identified as potentially occurring the vicinity of the sites. No critical habitat was identified on the IPACs. Terracon also utilized the Arizona Game and Fish Department (AZGFD) Online Environmental Review Tool which identified six species and a bat colony occurring within three miles of the project vicinity. None of the federally or state protected species were identified during Terracon's site reconnaissance. Terracon concluded the project will have no effect on federally listed or endangered species, or result in the modification of any designated or proposed critical habitat. Terracon contacted the AZGFD and the AZGFD replied with general recommendations regarding the Arizona Native Plant Page 3 of 26 REV. 11-2015 Law. Since the proposed ground disturbance exceeds 0.25 acres and native plants were observed on the Rio Del Sol and Rio Madera sites, the recipient must comply with the Arizona Native Plant Law regulations. The AZGFD also replied with general recommendations regarding invasive species and western burrowing owls, protected under the Migratory Bird Treaty Act (MBTA). The AZGFD recommended conducting an occupany survey for western burrowing owls to determine if the species occurs within the project footprint if suitable habitat is present. Western burrowing owls do not have a specific habitat in Arizona (they may utilize desert land, agricultural land, vacant land that has been previously developed, etc. for burrows). Thus, Terracon completed a burrowing owl survey for both sites. Although burrows were observed on the Rio Del Sol site, no evidence of burrowing owl activity was observed and the burrows were considered to be inactive over the course of the two surveys (March 27, 2019 and April 3, 2019). No burrows or signs of burrowing owl activity were observed on the Rio Madera site at the time of the survey (March 27, 2019). This project will have No Effect on listed species based on a letter of understanding, memorandum of agreement, programmatic agreement, or checklist provided by local HUD office. This project is in compliance with the Endangered Species Act.

Supporting documentation

Rio Mercado ADOH Endangered Species 1-28-20.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Explosive and Flammable Hazards

General requirements	Legislation	Regulation
HUD-assisted projects must meet Acceptable Separation Distance (ASD) requirements to protect them from explosive and flammable hazards.	N/A	24 CFR Part 51 Subpart C

1. Is the proposed HUD-assisted project a hazardous facility (a facility that mainly stores, handles or processes flammable or combustible chemicals), i.e. bulk fuel storage facilities, refineries, etc.?

✓ No

Yes

2. Does this project include any of the following activities: development, construction, rehabilitation that will increase residential densities, or conversion?

No

✓ Yes

3. Within 1 mile of the project site, are there any current *or planned* stationary aboveground storage containers:

- **Of more than 100 gallon capacity, containing common liquid industrial fuels OR**
- **Of any capacity, containing hazardous liquids or gases that are not common liquid industrial fuels?**

✓ No

Based on the response, the review is in compliance with this section. Document and upload all documents used to make your determination below.

Yes

Screen Summary

Compliance Determination

There are no current or planned stationary aboveground storage containers of concern within 1 mile of the project site. No evidence of explosive and flammable operations were reported on the site or near the site in the Terracon Phase I ESA dated 2/4/2020. Based on available records reviewed, the sites are not located within the immediate vicinity of hazardous industrial operations handling fuel or chemicals of an explosive or flammable nature. Recognized Environmental Conditions (RECs) were not identified associated with the sites.The project is in compliance with explosive and flammable hazard requirements.

Supporting documentation

Are formal compliance steps or mitigation required?

Yes

✓ No

Farmlands Protection

General requirements	Legislation	Regulation
The Farmland Protection Policy Act (FPPA) discourages federal activities that would convert farmland to nonagricultural purposes.	Farmland Protection Policy Act of 1981 (7 U.S.C. 4201 et seq.)	7 CFR Part 658

1. Does your project include any activities, including new construction, acquisition of undeveloped land or conversion, that could convert agricultural land to a non-agricultural use?

Yes

✓ No

If your project includes new construction, acquisition of undeveloped land or conversion, explain how you determined that agricultural land would not be converted:

U.S. Department of Agricultural Natural Resources Conservaton Service Farmland Classification Reports for Pima County, Arizona, Eastern Part

Based on the response, the review is in compliance with this section. Document and upload all documents used to make your determination below.

Screen Summary

Compliance Determination

This project does not include any activities that could potentially convert agricultural land to a non-agricultural use. The site does not meet the definition of farmland per 7 CFR Park 658.2 a (1) "Farmland" does not include land already in or committed to urban development or water storage. The project is in compliance with the Farmland Protection Policy Act.

Supporting documentation

Rio Mercado ADOH farmland 1-29-20.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Floodplain Management

General Requirements	Legislation	Regulation
Executive Order 11988, Floodplain Management, requires federal activities to avoid impacts to floodplains and to avoid direct and indirect support of floodplain development to the extent practicable.	Executive Order 11988	24 CFR 55

1. Do any of the following exemptions apply? Select the applicable citation? [only one selection possible]

55.12(c)(3)
55.12(c)(4)
55.12(c)(5)
55.12(c)(6)
55.12(c)(7)
55.12(c)(8)
55.12(c)(9)
55.12(c)(10)
55.12(c)(11)
✓ None of the above

2. Upload a FEMA/FIRM map showing the site here:

Rio Mercado flood map 1-29-20.pdf

The Federal Emergency Management Agency (FEMA) designates floodplains. The FEMA Map Service Center provides this information in the form of FEMA Flood Insurance Rate Maps (FIRMs). For projects in areas not mapped by FEMA, use **the best available information** to determine floodplain information. Include documentation, including a discussion of why this is the best available information for the site.

Does your project occur in a floodplain?

✓ No

Based on the response, the review is in compliance with this section.

Yes

Screen Summary

Compliance Determination

This project does not occur in a floodplain. FEMA Zone X 4019C-2289 L 6/16/11. The project is in compliance with Executive Order 11988.

Supporting documentation

Are formal compliance steps or mitigation required?

Yes

✓ No

Historic Preservation

General requirements	Legislation	Regulation
Regulations under Section 106 of the National Historic Preservation Act (NHPA) require a consultative process to identify historic properties, assess project impacts on them, and avoid, minimize, or mitigate adverse effects	Section 106 of the National Historic Preservation Act (16 U.S.C. 470f)	36 CFR 800 "Protection of Historic Properties" http://www.access.gpo.gov/nara/cfr/waisidx_10/36cfr800_10.html

Threshold

Is Section 106 review required for your project?

No, because the project consists solely of activities listed as exempt in a Programmatic Agreement (PA). (See the PA Database to find applicable PAs.)

✓ No, because the project consists solely of activities included in a No Potential to Cause Effects memo or other determination [36 CFR 800.3(a)(1)].

Yes, because the project includes activities with potential to cause effects (direct or indirect).

Threshold (b). Document and upload the memo or explanation/justification of the other determination below:

Based on the response, the review is in compliance with this section.

Screen Summary

Compliance Determination

A memo with the determination that the project is in compliance with 36 CFR Part 800 from the Tucson Historic Preservation Office dated 1/30/2020. Terracon completed a State Historic Preservation Office (SHPO) cover letter and Survey Report Summary Form (SRSF) for the project with a finding of no historic properties affected. Mary-Ellen Walsh

from SHPO concurred with Terracon's recommendation. Terracon drafted consultation letters for the 10 tribes identified by the Tribal Directory Assessment Tool (TDAT) for Pima County, Arizona. Greg Moore sent the tribal letters on February 4, 2019. The San Carlos Apache Tribe, Tohono O'odham Nation, and White Mountain Apache Tribe replied with no issues or concerns. The project is in compliance with Section 106.

Supporting documentation

20-03 - Rio Mercado Apartments preliminary HPO Clearance Letter.pdf
Rio Mercado Historical and tribal 1-28-20.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Noise Abatement and Control

General requirements	Legislation	Regulation
HUD's noise regulations protect residential properties from excessive noise exposure. HUD encourages mitigation as appropriate.	Noise Control Act of 1972 General Services Administration Federal Management Circular 75-2: "Compatible Land Uses at Federal Airfields"	Title 24 CFR 51 Subpart B

1. What activities does your project involve? Check all that apply:

✓ New construction for residential use

NOTE: HUD assistance to new construction projects is generally prohibited if they are located in an Unacceptable zone, and HUD discourages assistance for new construction projects in Normally Unacceptable zones. See 24 CFR 51.101(a)(3) for further details.

Rehabilitation of an existing residential property

A research demonstration project which does not result in new construction or reconstruction

An interstate land sales registration

Any timely emergency assistance under disaster assistance provision or appropriations which are provided to save lives, protect property, protect public health and safety, remove debris and wreckage, or assistance that has the effect of restoring facilities substantially as they existed prior to the disaster
None of the above

4**. Complete the Preliminary Screening to identify potential noise generators in the vicinity (1000' from a major road, 3000' from a railroad, or 15 miles from an airport).**

Indicate the findings of the Preliminary Screening below:

There are no noise generators found within the threshold distances above.

✓ Noise generators were found within the threshold distances.

5. **Complete the Preliminary Screening to identify potential noise generators in the**

Acceptable: (65 decibels or less; the ceiling may be shifted to 70 decibels in circumstances described in §24 CFR 51.105(a))

✓ Normally Unacceptable: (Above 65 decibels but not exceeding 75 decibels; the floor may be shifted to 70 decibels in circumstances described in §24 CFR 51.105(a))

Is your project in a largely undeveloped area?

✓ No

Indicate noise level here: 71.4

Document and upload noise analysis, including noise level and data used to complete the analysis below.

Yes

Unacceptable: (Above 75 decibels)

HUD strongly encourages conversion of noise-exposed sites to land uses compatible with high noise levels.

Check here to affirm that you have considered converting this property to a non-residential use compatible with high noise levels.

Indicate noise level here: 71.4

Document and upload noise analysis, including noise level and data used to complete the analysis below.

6. **HUD strongly encourages mitigation be used to eliminate adverse noise impacts. Explain in detail the exact measures that must be implemented to mitigate for the impact or**

effect, including the timeline for implementation. This information will be automatically included in the Mitigation summary for the environmental review.

✓ Mitigation as follows will be implemented:

The backyards in proximity of Point C (west-central building) will be mitigated using an 8-foot privacy wall stretching from the northern side of the west-central building down along western side. The backyards in proximity of Points D and E (southwest building) will be mitigated using an 8-foot privacy wall stretching along the western side of the southwest building. Rio Madera: Points C and D using an 8-foot wall as the noise barrier. The backyards in proximity of Points C and D will be mitigated using an 8-foot privacy wall stretching along the western side of the west building. Rick Bright, Project Architect, completed HUD's Sound Transmission Classification (STraCAT) Assessment Tool calculations to demonstrate interior noise levels will meet the 45 dB using certain construction materials. Interior noise levels will be reduced to at or below 45 dB using 7/8" stucco for the walls and various door measurements/types depending on the building. Therefore, the interior noise levels for both sites can be reduced to at or below 45 dB (HUD standard) using certain construction materials.

Based on the response, the review is in compliance with this section. Document and upload drawings, specifications, and other materials as needed to describe the project's noise mitigation measures below.

No mitigation is necessary.

Screen Summary

Compliance Determination

A Noise Assessment was conducted by Terracon as part of the Phase I ESA dated 2/4/2020. The noise level was normally unacceptable: 71.4 db. A mitigation plan has been developed by Spendiarian & Willis Acoustics and Noise Control, LLC. The project is in compliance with HUD's Noise regulation with mitigation.

Supporting documentation

Noise mitigation Rio Mercado 1-29-20(1).docx
Rio Mercado ADOH DNL study 1-28-20.pdf

Are formal compliance steps or mitigation required?

✓ Yes

No

Sole Source Aquifers

General requirements	Legislation	Regulation
The Safe Drinking Water Act of 1974 protects drinking water systems which are the sole or principal drinking water source for an area and which, if contaminated, would create a significant hazard to public health.	Safe Drinking Water Act of 1974 (42 U.S.C. 201, 300f et seq., and 21 U.S.C. 349)	40 CFR Part 149

1. Does the project consist solely of acquisition, leasing, or rehabilitation of an existing building(s)?

Yes

✓ No

2. Is the project located on a sole source aquifer (SSA)?

A sole source aquifer is defined as an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. This includes streamflow source areas, which are upstream areas of losing streams that flow into the recharge area.

No

✓ Yes

3. Does your region have a memorandum of understanding (MOU) or other working agreement with Environmental Protection Agency (EPA) for HUD projects impacting a sole source aquifer?

✓ Yes

Document and upload MOU or Agreement below.

No

4. For the project to be brought into compliance with this section, all adverse impacts must be mitigated. Explain in detail the exact measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation. This information will be automatically included in the Mitigation summary for the environmental review. If negative effects cannot be mitigated, cancel the project using the button at the bottom of this screen

✓ Yes

Document and upload where your project fits within the MOU or working agreement below. Based on the response, the review is in compliance with this section.

No

Screen Summary

Compliance Determination

The project is located on a sole source aquifer. The region has an MOU or other working agreement with EPA for HUD projects impacting a sole source aquifer, and the MOU or working agreement excludes the project from further review. Terracon contacted the Environmental Protection Agency (EPA) and the EPA replied stating the the proposed project will not adversely effect the sole source aquifer.The project is in compliance with Sole Source Aquifer requirements.

Supporting documentation

Rio Mercado sole source memo 1-29-20.pdf
Sole Source Aquifer Template 5-11-18.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Wetlands Protection

General requirements	Legislation	Regulation
Executive Order 11990 discourages direct or indirect support of new construction impacting wetlands wherever there is a practicable alternative. The Fish and Wildlife Service's National Wetlands Inventory can be used as a primary screening tool, but observed or known wetlands not indicated on NWI maps must also be processed Off-site impacts that result in draining, impounding, or destroying wetlands must also be processed.	Executive Order 11990	24 CFR 55.20 can be used for general guidance regarding the 8 Step Process.

1. Does this project involve new construction as defined in Executive Order 11990, expansion of a building's footprint, or ground disturbance? The term "new construction" shall include draining, dredging, channelizing, filling, diking, impounding, and related activities and any structures or facilities begun or authorized after the effective date of the Order

✓ No

Based on the response, the review is in compliance with this section.

Yes

Screen Summary

Compliance Determination

Based on the project description this project includes no activities that would require further evaluation under this section. The project sites are not located within or adjacent to wetlands, marshes, wet meadows, mud flats or natural ponds.The project is in compliance with Executive Order 11990.

Supporting documentation

Rio Mercado wetlands map 1-29-20.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Wild and Scenic Rivers Act

General requirements	Legislation	Regulation
The Wild and Scenic Rivers Act provides federal protection for certain free-flowing, wild, scenic and recreational rivers designated as components or potential components of the National Wild and Scenic Rivers System (NWSRS) from the effects of construction or development.	The Wild and Scenic Rivers Act (16 U.S.C. 1271-1287), particularly section 7(b) and (c) (16 U.S.C. 1278(b) and (c))	36 CFR Part 297

1. Is your project within proximity of a NWSRS river?

✓ No

Yes, the project is in proximity of a Designated Wild and Scenic River or Study Wild and Scenic River.
Yes, the project is in proximity of a Nationwide Rivers Inventory (NRI) River.

Screen Summary
Compliance Determination
This project is not within proximity of a NWSRS river. Tucson and southern Arizona have no NWSRS rivers. The project is in compliance with the Wild and Scenic Rivers Act.

Supporting documentation

Wild-Scenic Rivers TEMPLATE 11-1-19.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Environmental Justice

General requirements	Legislation	Regulation
Determine if the project creates adverse environmental impacts upon a low-income or minority community. If it does, engage the community in meaningful participation about mitigating the impacts or move the project.	Executive Order 12898	

HUD strongly encourages starting the Environmental Justice analysis only after all other laws and authorities, including Environmental Assessment factors if necessary, have been completed.

1. Were any adverse environmental impacts identified in any other compliance review portion of this project's total environmental review?

Yes

✓ No

Based on the response, the review is in compliance with this section.

Screen Summary

Compliance Determination

No adverse environmental impacts were identified in the project's total environmental review. The project is in compliance with Executive Order 12898.

Supporting documentation

Rio Mercado EJ 1-29-20.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Terracon

RECORD OF COMMUNICATION

PROJECT NAME: Rio Sites
TERRACON PROJECT NO.: 63187186

Name: Camilla Martins Bekat
Company: Tucson Electric Power
Phone: 520-237-8943

Call Attempt	*Date*	*Time*
	3/19/2019	1:45 pm

Ms. Martins Bekat stated the existing infrastructure for Tucson Electric Power has the capacity to support the increase in energy consumption for the development. She does not know if upgrades to the existing infrastructure in the area will be needed for the proposed projects, but if so, additional costs may apply depending on project design.

Emily Trimpe
Assistant Scientist

Terracon

RECORD OF COMMUNICATION

PROJECT NAME: Rio Sites
TERRACON PROJECT NO.: 63187186

Name: Rick Bright, Project Architect
Company: Bright Design Associates
Phone: 520-529-1878

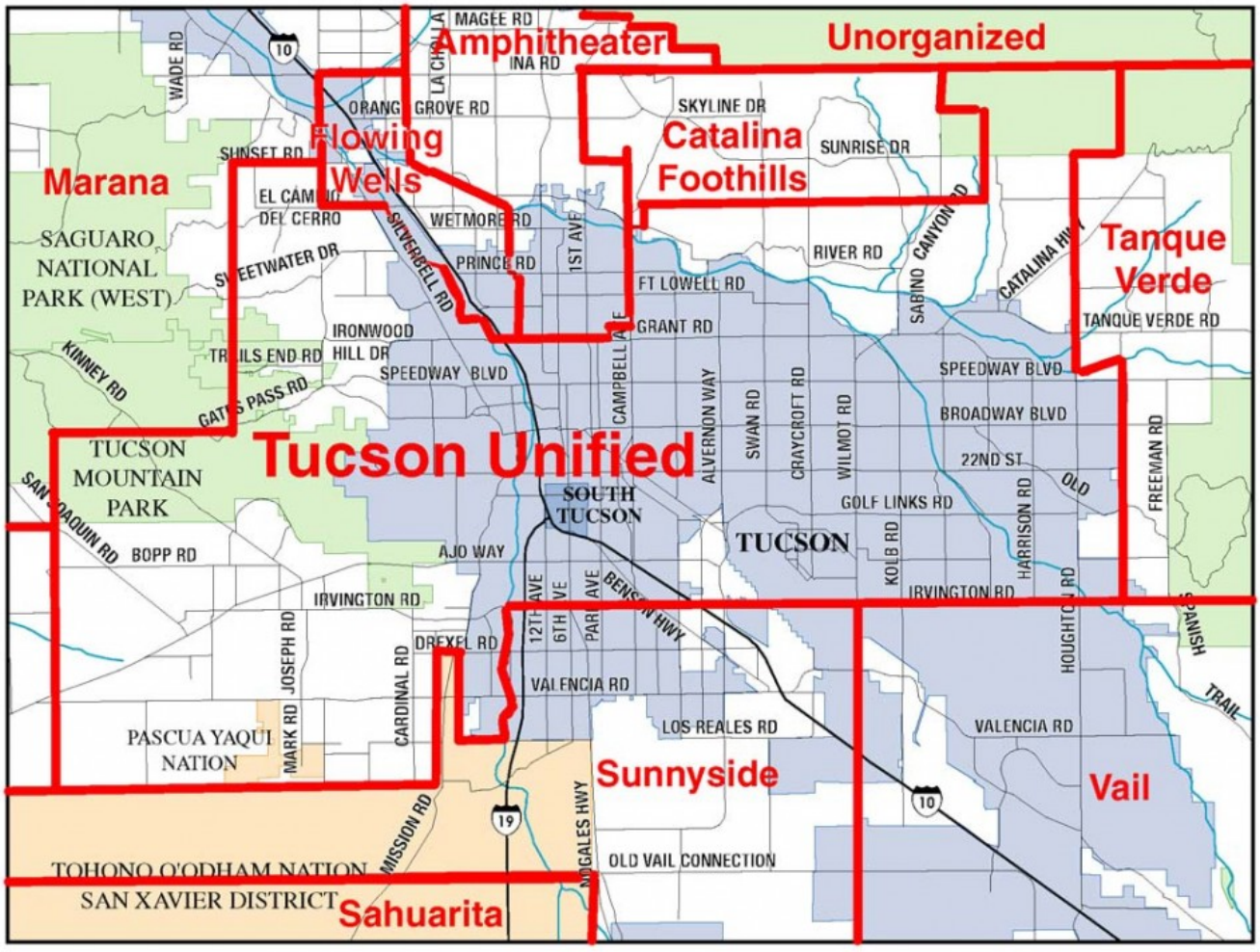
Call Attempt	*Date*	*Time*
	3/18/2019	12:40 pm

Mr. Bright stated the project is not expected to alter established views, obscure landmarks, or impair existing trails or bikeways.

Emily Trimpe
Assistant Scientist

APPENDIX I

Map of Tucson School Districts



Arizona Department of Education

Tucson Area Homes for Sale – Newly Listed

(within the last 5 days)

Schools

Academies

SHS Freshman Academy

SHS College & Career Academy

DVHS Freshman Academy

DVHS College & Career Academy

High Schools

Sunnyside High School

Desert View High School

Star Academic High School

Middle Schools

Apollo Middle School

Lauffer Middle School

Challenger Middle School

Sierra 2-8 School

Gallego Intermediate School

Elementary Schools

Craycroft Elementary School

Drexel Elementary School

Elvira Elementary School

Esperanza Elementary School

Liberty Elementary School

Los Amigos Elementary School

Summit View Elementary School

Los Niños Elementary School

Mission Manor Elementary School

Gallego Primary School

Rivera Elementary School

Santa Clara Elementary School

Ocotillo Learning Center

Terracon

RECORD OF COMMUNICATION

PROJECT NAME: Rio Sites
TERRACON PROJECT NO.: 63187186

Name: Tom Scott
Company: City of Tucson Environmental Services Department
Phone: 520-837-3799

Call Attempt	*Date*	*Time*
	3/15/2019	2:45 pm

Mr. Scott stated the local disposal system can adequately service the proposed multi-family residential developments. Recycling is available.

Emily Trimpe
Assistant Scientist

OVERVIEW

PCRWRD provides 97% of the total wastewater treatment capacity for Pima County. As a result of the Regional Optimization Master Plan (ROMP), Pima County is now an industry leader in using state-of-the-art technology to produce high-quality reclaimed water and other treatment byproducts that can be beneficially used. PCRWRD is now poised to not only meet future capacity demand of the growing population and regulatory requirements, but also to produce a growing renewable water resource. PCRWRD is poised to contribute to community-wide water resource sustainability by offsetting the demand for limited potable water resources through the production of high-quality reclaimed water.

TREATMENT GOAL

Provide clean and safe water for beneficial use in the reclaimed water cycle, generate biosolids products that can be beneficially utilized, and beneficially use a renewable gas product, while protecting the public health, safety and the environment, while also meeting all regulatory requirements mandated by state and federal agencies.

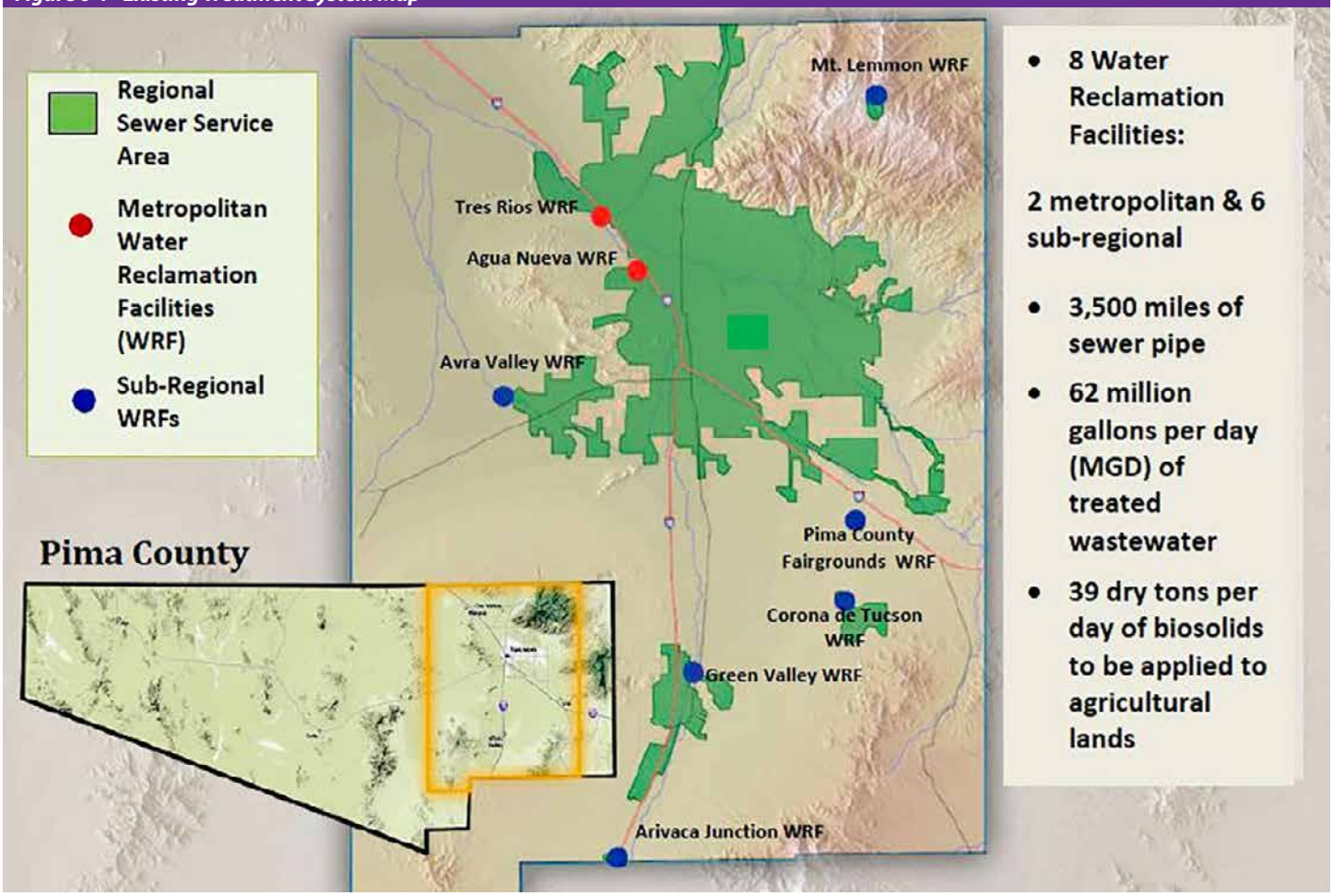
In addition, PCRWRD is focusing on optimizing its ability to recover byproducts from its treatment operations. There is an enormous opportunity to contribute to a cleaner environment through recovery and reuse of treatment byproducts in a cost-effective manner. Biosolids, biogas and nutrients are all byproducts of the wastewater treatment process. Biosolids will continue to be beneficially used in land applications across the community. Biogas will be captured and sold to regional and national markets for beneficial reuse. Also on the horizon are a side stream treatment program (to recover nutrients and use them for agricultural purposes), and an Energy Management Program (to address the rise in energy usage associated with the new innovative treatment technologies).

Over the next years, CIP treatment projects will include proactive equipment replacement to prevent equipment failures and maintain compliance. Over the next five years, the department will invest approximately $5 million in small projects and equipment purchases. These investments will address regulatory compliance commitments and safety improvements. Key projects include sludge screening, ARC Flash Study/Compliance, lighting protection, process piping improvements, replacement of aging electrical equipment and improvements to process water.

6.1 EXISTING TREATMENT SYSTEM

Treatment of wastewater in Pima County is achieved through large publicly-owned treatment (water reclamation) facilities, pri-

Figure 6-1 Existing Treatment System Map



and significant expansions must meet Best Available Demonstrated Control Technology regulation requirements. The department will determine design and constructions schedules based on actual increases in facility influent flows and loads. When PCRWRD increases capacity at its existing facilities, it also retrofits and updates older equipment and plant elements.

With the completion of the ROMP, the department has met ADEQ's regulatory requirements at the Agua Nueva and Tres Rios WRFs. However, there are some projects in the CIP Program that must still be completed. Continuing projects include:

- Side Stream Treatment of Digested Centrate (potential nutrient recovery and reuse)
- Carbon Dioxide Separation and Reuse (study by U of A is currently underway. A pilot demonstration project at the Tres Rios WRF is scheduled for the Summer 2016.)
- Fats, Oil and Grease (FOG)/Food Waste Co-digestion Study (scope of study under preparation)
- Biosolids Land Application Property Purchase (evaluation underway for purchase of approximately 1,200 acres of State-owned land within economical hauling distance from the Tres Rios WRF).

Green Valley and Sahuarita Long-Term Treatment System Needs

The long-term planning goals of the Town of Sahuarita to eventually develop the majority of agricultural land east of I-19 into master-planned communities, will result in a significant increase in the demand for sewer services over time. The Town Sahuarita owns and operates a 3.0 MGD treatment facility located downstream from the Green Valley WRF. Over the long run, the existing Sahuarita and Green Valley treatment facilities will not be able to handle projected flows generated by the increased population from projected growth. Both parties will require new and/or expanded wastewater treatment facilities or other viable economic solutions for handling future wastewater flows.

PCRWRD requested that the University o of Arizona to conduct a study to evaluate different sewer service options. That study suggests a new regional water reclamation facility may be the most viable solution for the treatment of flows from Sahuarita, Green Valley and future master planned developments. This option could require shutting down the existing Sahuarita, Green Valley and Arivaca Junction facilities.

6.4 CONCLUSIONS

Based on the existing conditions and future anticipated needs discussed in this chapter, the following are conclusions about PCRWRD's treatment system:

- With the recent treatment system upgrades and capacity expansions at the Tres Rios and Agua Nueva WRFs, the regional wastewater treatment system is equipped to adequately serve existing users and meet growing community needs well into the future. The existing capacity is sufficient for at least the next ten to fifteen years.
- The Corona de Tucson WRF facility currently does not have sufficient capacity to handle additional flow from new developments. The remaining unused capacity (1.0 MGD) is allocated to developments that paid for capacity expansion in 2007. Expansion of treatment capacity is required to support future growth in adjacent areas.
- The department will move forward with a BNROD capacity expansion at the Green Valley WRF. A recommended option is to optimize the existing 2.0 MGD BNROD to operate at least 2.5 to 2.8 MGD.
- The department has laid the foundation for a new water reclamation facility to serve anticipated growth in the Southlands, should the need arise. The timing of facility construction depends on the progress of development activities in the area. If a facility is constructed, it is imperative that the reclaimed water produced there remain in the upper basin for reuse or recharge.
- The department's goal is to eventually remove the Fairgrounds stabilization ponds from service and re-route the existing flows to the Southeast Interceptor. This decision is being driven by steadily-increasing influent flows.
- The department is presently evaluating options to replace the aging Mt. Lemmon facility, and weighing the options of rehabilitating the existing facility or replacing it with a modern facility.

6.5 OUTLOOK

Based on the near-term treatment system needs discussed in this chapter, PCRWRD will continue to:

- Monitor population growth and wastewater flows in its service areas, especially in the Green Valley, Avra Valley, and Corona de Tucson service areas where the department has allocated existing capacity. Expansion in these areas will soon be necessary.
- Implement the System-Wide Odor Control Plan at the sub-regional facilities. In addition to odor control, the department will seek to be a good neighbor to surrounding neighborhoods by instituting noise abatement and creating pleasant aesthetics at the facilities.
- Implement security improvements at the sub-regional facilities.
- Improve the ability to identify critical assets, prioritize repairs and manage equipment maintenance program more efficiently.
- Optimize technology to advance Reliability Centered Maintenance (RCM). The RCM ensures the replacement of equipment and parts before they fail, by ensuring they are available in advance.

Tucson Water Service Area

TUCSON WATER
A proud part of the City of Tucson

Date: 3/7/2019

R 10 E | R 11 E | R 12 E | R 13 E | R 14 E | R 15 E | R 16 E

T 11 S | T 12 S | T 13 S | T 14 S | T 15 S | T 16 S | T 17 S

PINAL COUNTY

ISOLATED SYSTEM

ISOLATED SYSTEM

ISOLATED SYSTEM

MARANA

ORO VALLEY

SANTA CATALINA MOUNTAINS

TUCSON MOUNTAINS

RINCON MOUNTAINS

Sites

TOHONO O'ODHAM NATION

PASCUA YAQUI NATION

TOHONO O'ODHAM NATION
SAN XAVIER DISTRICT

ISOLATED SYSTEM

ISOLATED SYSTEM

ISOLATED SYSTEM

ISOLATED SYSTEM

ISOLATED SYSTEM

SAHUARITA

Existing Obligated Service Area

- Current Service Area
- Obligated Area Currently Not Served

Expansion Areas

- Proposed Service Area - Annexation Required
- Proposed Service Area - Annexation May Be Required

Non-Expansion Areas

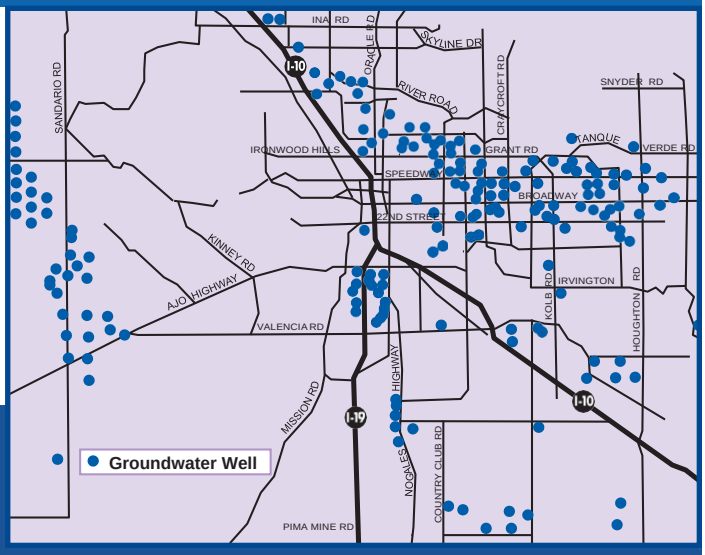
- Unincorporated Pima County
- Other Water Provider
- Other Jurisdiction
- Reservation
- Major Park

0 1 2 4 6
Miles

2017 Annual Water Quality Report

Water Quality & Operations Division •Main System 10-112

This Annual Water Quality Report provides information on your drinking water. The United States Environmental Protection Agency (EPA) requires that all drinking water suppliers provide a water quality report to their customers on an annual basis. This report also contains important information on the quality of your water and contact information you may wish to use.



If you are a non-English speaking resident, we recommend that you obtain a copy in Spanish by calling (520) 791-4331 or speak with someone about this report.

Para nuestros clients de habla español: Éste informe contiene información muy importante sobre la calidad de su agua beber. Traduscalo o hable con alguien que lo entienda bien. Para obtener una copia de este reporte en Espanol, llame al (520) 791-4331.

WHERE DOES MY WATER COME FROM?

Tucson Water serves about 725,000 people in the Tucson area. The water supply comes from approximately 200 groundwater wells located in and around the Tucson metropolitan area (see map). A number of these wells are within the area of the Avra Valley facilities designated as the Clearwater Recharge & Recovery Facilities. At the Clearwater facilities, Tucson Water is recharging the Colorado River water into the aquifer, where it blends with local groundwater. As water is recovered from the aquifer there through well pumpage, the blend that gets delivered to customers will contain higher levels of Colorado River water.

Tucson Water's system contains 37 water service areas that are located in and around the Tucson metropolitan area, 4,500 miles of pipes and 145 booster stations that are dedicated to pumping drinking water.

WERE THERE ANY CONTAMINANTS DETECTED IN MY DRINKING WATER?

Tucson Water regularly monitors the drinking water that is delivered to you to comply with regulations set by the EPA. In addition to this required monitoring, Tucson Water performs a great deal of discretionary monitoring in order to provide both staff and customers with additional water quality information. We are pleased to report that the results from the monitoring conducted in 2017 met all standards for safe drinking water.

In most cases, the minimum detection level of a contaminant is well below the EPA regulatory limit for that contaminant. The table on pages 2 and 3 lists the contaminants that were detected in the required drinking water monitoring. To compare the detected amount with the highest level allowed by the EPA, refer to the Maximum Contaminant Level (MCL) column in the table. The vast majority of regulated contaminants were not detected in the drinking water delivered by Tucson Water and those non-detected results were not included in the table. For a complete list of all EPA regulated contaminants, contact the EPA at 1-800-426-4791 or visit the EPA website at **www.epa.gov/safewater/mcl.html#mcls.**

For accommodations, materials in accessible formats, foreign language interpreters, and/or materials in a language other than English, please contact Tucson Water at (520) 791-4331 or (520) 791-2639 for TDD.

WHY ARE THERE CONTAMINANTS IN MY DRINKING WATER?

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants.

Tucson's groundwater contains dissolved minerals and organic compounds, which have been leached from the rock, sediments, and plant materials through which the water travels. One would expect to find beneficial minerals such as calcium and magnesium, harmless minerals such as chloride, bicarbonate, and sulfate, and metals such as iron, copper, arsenic, and lead, which may be either beneficial or harmless at low concentrations, but harmful at high concentrations. In addition to these naturally occurring contaminants, our groundwater may contain contaminants resulting from industrial or domestic activities. For this reason, water utilities must currently monitor for approximately 90 regulated and 31 unregulated contaminants.

The following language is required by the EPA to appear in this report, some of which may not be applicable to deep groundwater wells, the primary source of the Tucson Water supply:

Contaminants that may be present in source water can include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage, septic systems, agricultural livestock, and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.
- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA regulations limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water that must provide the same protection for public health. Bottled water may come from either a surface water source or groundwater source, and may be treated minimally or extensively. For information on the quality of your bottled water, contact the water bottling company.

Detected Contaminants Table

Contaminant	Sample Year	Maximum Result	Range	MCL	MCLG	Major Sources of Contaminant
Disinfection By-Products						
Haloacetic Acids (HAA5)						
HAA5 Locational Running Annual Average (LRAA)	17	1.5 ppb	NA	60 ppb	None	By-product of Chlorination
Total Trihalomethanes (TTHM)						
TTHM Locational Running Annual Average (LRAA)	17	17 ppb	NA	80 ppb	None	By-product of Chlorination
Inorganics						
Arsenic	12 - 17	7.0 ppb	< 2.0 – 7.0 ppb	10 ppb	0 ppb	Natural deposits, runoffs
Barium	12 - 17	0.16 ppm	< 0.02 – 0.16 ppm	2 ppm	2 ppm	Natural deposits, Industrial. Use
Fluoride	17	1.09 ppm	< 0.1 – 1.09 ppm	4 ppm	4 ppm	Natural deposits
Nitrate (as N)	17	6.58 ppm	< 0.25 – 6.58 ppm	10 ppm	10 ppm	Natural deposits, septic tanks, agriculture, sewage
Selenium	17 - 17	6.2 ppb	< 1.0 – 6.2 ppb	50 ppb	50 ppb	Discharge from petroleum, metal refineries, mines, erosion of natural deposits
Sodium	12 - 17	116 ppm	13 – 116 ppm	None	None	Natural deposits

Detected Contaminants Table *continued*

Contaminant	Sample Year	Maximum Result	Range	MCL	MCLG	Major Sources of Contaminant
Synthetic Organics						
Atrazine	12 - 17	0.08 ppb	<0.05 – 0.08 ppb	3 ppb	3 ppb	Herbicide runoffs
Simazine	12 - 17	0.08 ppb	< 0.05 – 0.08 ppb	4 ppb	4 ppb	Herbicide runoffs
Volatile Organics						
Trichloroethene (TCE)	12 - 17	0.7 ppb	<0.5 – 0.7 ppb	5.0 ppb	0 ppb	Metal degreasing sites
Radioactive Chemicals						
Alpha Emitters	12 - 17	6.0 pCi/l	< 1.0 – 6.0 pCi/l	15 pCi/l	0 pCi/l	Natural deposits
Combined Radium	12 - 17	1.3 pCi/l	< 0.3 – 1.3 pCi/l	5.0 pCi/l	0 pCi/l	Natural deposits
Uranium	12 - 17	19 ppb	< 0.6 – 19 ppb	30 ppb	0 ppb	Natural deposits

Contaminant	Year Sampled	No. of Samples above Action Level	90th Percentile Value	Action Level	Action Level Goal	Major Sources of Contaminant
Lead	2017	None	1.07 ppb	15 ppb	0 ppb	Corrosion of household plumbing systems, erosion of natural deposits
Copper	2017	None	0.127 ppm	1.3 ppm	1.3 ppm	Corrosion of household plumbing systems, erosion of natural deposits

Disinfectant	Year Sampled	Annual Average	Monthly Average Range	MRDL	MRDLG	Source
Chlorine	2017	0.87 ppm	0.81 – 0.94 ppm	4 ppm	4 ppm	Disinfection additive used to control microbes

Contaminant	Month Detected	Positive Samples for the Month	Total Samples for the Month	MCL	MCLG	Source
Total Coliform	Nov. & Dec 2017	0.8% or 2 samples	270	< 5% of Samples	0	Naturally present in the Environment

EXPLANATION OF THE DATA PRESENTED IN THE DETECTED CONTAMINANTS TABLE:

Tucson Water routinely monitors for contaminants in your drinking water as specified in the national Primary Drinking Water Standards. Monitoring results for the period of January 1 to December 31, 2017, or from the most recent period, are included in the table. Certain contaminants are monitored less than once a year because the concentrations of these contaminants are not expected to vary significantly from year to year, or the system is not considered vulnerable to this type of contamination.

DO I NEED TO TAKE SPECIAL PRECAUTIONS?

While the Safe Drinking Water Act regulations are intended to protect consumers throughout their lifetime, some people may be more vulnerable to infections from drinking water than the general population. These "at-risk" populations include: immuno-compromised persons such as persons with cancer undergoing chemotherapy, people who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, and in some cases, elderly people and infants. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the EPA's Safe Drinking Water hotline.

DETAILED INFORMATION ON DETECTED CONTAMINANTS

Haloacetic Acids (HAA5) are a group of chemicals that are formed along with other disinfection by-products when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water. The regulated haloacetic acid compounds, known as HAA5, are monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid. EPA has established an MCL of 60 parts per billion for HAA5. Compliance with the HAA5 standard is based on the Locational Running Annual Average (LRAA) concentration. The maximum LRAA for HAA5 in 2017 was 1.5 ppb.

Total Trihalomethanes (TTHMs) are formed when chlorine combines with naturally occurring organic material in water. Since the level of organic matter in our groundwater is extremely low, these compounds are found at very low concentrations. The compounds which make up the TTHMs include bromodichloromethane, bromoform, chlorodibromomethane, and chloroform. Compliance with the TTHM standard is based on the Locational Running Annual Average (LRAA) concentration. The maximum LRAA for TTHMs in 2017 was 17 ppb (the MCL is 80 ppb).

Arsenic is a naturally occurring substance commonly found in groundwater in the southwestern United States. While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the cost of removing arsenic from drinking water. EPA continues to research the health effect of low levels of arsenic which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems. The highest arsenic concentration detected during 2012 – 2017 was 7.0 ppb (the MCL is 10 ppb).

Barium occurs naturally at very low concentrations in our groundwater. The highest barium value during 2011 – 2017 was 0.16 ppm (the MCL is 2 ppm).

Fluoride is an important naturally occurring mineral that helps to form healthy teeth and bones. A concentration of 1 ppm is considered optimum. At concentrations above 2 ppm, fluoride can cause mild discoloration of teeth, and exposure at above the MCL of 4 ppm can cause both severe discolorations of teeth and over many years of exposure, bone disease. The highest level of fluoride detected during 2017 was 1.09 ppm (the MCL is 4 ppm).

Nitrate is a form of nitrogen and an important plant nutrient. Tucson Water performs more frequent monitoring of wells high in nitrate for extra assurance that action can be taken when approaching the MCL. Nitrate in drinking water at levels above 10 ppm is a health risk for infants less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant, ask advice from your health care provider. The highest level for nitrate during 2017 was 6.58 ppm (the MCL is 10 ppm).

Selenium is an important nutrient. However, some people who drink water containing selenium in excess of MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation. The highest selenium level in 2012 – 2017 was 6.2 ppb (the MCL is 50 ppb).

DRINKING WATER TERMS AND DEFINITIONS:

Action Level. The concentration of a contaminant, which, if exceeded, triggers a treatment or other requirement which a water system must follow.

Entry Point to the Distribution System (EPDS). All water sources are monitored at the entry point to the distribution system before the first customer but after any required treatment.

Maximum Contaminant Level (MCL). The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology. If a contaminant is believed to cause health concerns in humans, then the MCL is set as close as practical to zero and at an acceptable level of risk. Generally, the maximum acceptable risk of cancer is 1 in 10,000 with 70 years of exposure.

Maximum Contaminant Level Goal (MCLG). The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL). The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG). The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Parts Per Billion (ppb). Some constituents in water are measured in very small units. One ppb equals one microgram per liter. For example, one part per billion equals: 2 drops of water in a 15,000 gallon backyard swimming pool, one second of time in 31.7 years, or the first 16 inches of a trip to the moon.

Parts Per Million (ppm). One ppm equals one milligram per liter or 1,000 times more than a ppb. One part per million equals: 1/4 cup of water in a typical 15,000 gallon backyard swimming pool; or one second of time in 11.6 days.

Picocurie Per Liter (pCi/l). It is defined as the quantity of radioactive material in one liter which produces 2.22 nuclear disintegrations per minute.

Sodium is the sixth most abundant element on Earth and is widely distributed in soils, plants, water, and food. A goal of 2300 mg/day dietary sodium has been proposed by several government and health agencies. Drinking water containing between 30 and 60 ppm would contribute only 2.5% to 5% of the dietary goal if tap water consumption is 2 liters per day. Currently, there is no MCL for sodium in drinking water. The recommended EPA guidance level for individuals on a very low sodium diet (500 mg/day) is 20 ppm in drinking water. The highest sodium value in Tucson water during 2012 – 2017 was 116 ppm. Drinking water does not play a significant role in sodium exposure for most individuals. Those who are under treatment for sodium-sensitive hypertension should consult with their health care provider regarding sodium levels in their drinking water supply and the advisability of using an alternative water source or point-of-use treatment to reduce the sodium.

Synthetic Organics are generally not mobile. Atrazine, an herbicide, was detected at concentration of 0.08 ppb in 2012 – 2017 (MCL is 3 ppb). Simazine, also an herbicide, was detected at concentration of 0.08 ppb in 2012 – 2017 (the MCL is 4 ppb).

Volatile Organics(VOC) include such compounds as TCE. VOCs are volatile, like alcohol or gasoline, made up of small molecules, and migrate through soils readily.

Alpha emitters are a measure of radioactivity due to naturally occurring minerals in groundwater. This excludes the radioactivity contributed by either radon or uranium. The highest level for alpha emitters during 2012 – 2017 was 6.0 picocuries per liter or pCi/L (the MCL is 15 pCi/L).

Radium 226 and 228 are two of the most common radium isotopes. Radium is a naturally occurring radionuclide, formed by the decay of uranium or thorium in the environment. It occurs at low concentrations in virtually all rock, soil, water, plants, and animals. The highest concentration for combined radium 226 and 228 during 2012 – 2017 was 1.3 pCi/l (the MCL is 5.0 pCi/l).

Uranium is a metallic element which is highly toxic and radioactive. The highest level for uranium during 2012 – 2017 was 19 ppb (the MCL is 30 ppb).

Coliform Bacteria are common in the environment. While rarely harmful, they indicate that the water may also contain harmful microorganisms. There were only three positive total coliforms for the entire 2017. The recollect samples were all negative. (The MCL is less than 5% per month or 12 samples.)

Lead and Copper are naturally occurring metals which are generally found at very low levels in source waters. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Tucson Water is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at **www.epa.gov/safewater/lead**. The required lead and copper monitoring was performed during 2017. The 90th percentile value was
1.07 ppb for lead (Action Level is 15 ppb) and 0.127 ppm for copper (Action Level is 1.3 ppm). No sample was above the action level for lead. There were no samples above the action level for copper either.

Chlorine Residual Disinfection is maintained throughout the distribution system. Approximately 1 ppm of chlorine is added to the drinking water supply at well sites, reservoirs and other facilities to provide assurance that water delivered to customers will remain free of microbiological contamination. This also ensures that the water meets microbiological drinking water standards from the time it is pumped from the ground until it reaches the customer's tap. Chlorine Residual Disinfectant is measured from 247 sample stations where the bacteriological samples are collected monthly. The annual chlorine residual disinfectant is calculated using the monthly chlorine averages for the past 12 months. The annual average for twelve months of 2017 was 0.87 ppm. The maximum monthly average was 0.94 ppm. (The Maximum Residual Disinfectant Limit or MRDL is 4 ppm.)

Unregulated Contaminant Monitoring Regulation (UCMR) and Data Availability: Unregulated contaminants are those for which EPA has not established drinking water standards. The purpose of monitoring for these contaminants is to help EPA decide whether the contaminants should have a standard or warrant future regulation. The presence of a compound does not necessarily equate to a health risk; the concentration of a compound is a far more important factor in determining whether there are health implications. We will closely monitor both the concentrations of these compounds and the EPA's health studies and will keep you informed of any development. UCMR sampling was conducted by Tucson Water in two rounds during 2013. The following UCMRs were detected in 2013.

Unregulated Contaminants Table

UCMR Contaminant	Average	Range	Explanation
1,1-Dichloroethane	0.021 ppb	<0.03 – 0.042 ppb	Used as an intermediate in chemical synthesis to manufacture rubber, plastic, and oils
1,4-Dioxane	3.33 ppb	<0.07 – 6.66 ppb	Used as a stabilizer in chlorinated solvents
Chlorate	0.55 ppm	<0.02 – 1.1 ppm	Used in making herbicides, explosives, dyes, cosmetics, and paper
Chlorodifluoromethane	0.045 ppb	<0.08 – 0.09 ppb	A colorless gas used as a propellant and refrigerant
Chromium hexavalent	4.72 ppb	0.045 – 9.4 ppb	Discharge from steel and pulp mills, corrosion of natural deposits
Molybdenum	7.5 ppb	<1.0 – 15 ppb	Recovered from naturally occurring low grade deposits, mined either from a primary deposit or by-product of copper processing
Strontium	0.94 ppm	0.18 – 1.7 ppm	A silvery soft metal, by product of the fission of uranium and plutonium in nuclear reactors
Vanadium	6.65 ppb	2.3 – 11 ppb	Occurs as a metal compound in nature
Perfluoro octanesulfoonic Acid (PFOS)	0.028 ppb	<0.04 – 0.056 ppb	Used as a key ingredient in Scotchgard, as a fabric protector, and stain repellents
Perfluoro-1-hexanesulfonic Acid (PFHxS)	0.21 ppb	<0.03 – 0.42 ppb	Used in manufacturing of stain, oil, and water resistant products

As a Tucson Water customer, you have the right to know that this data is available. If you are interested in examining the results, please contact the Water Quality and Operations Division at (520) 791-2544.

SOURCE WATER ASSESSMENT PROGRAM (SWAP)

The Arizona Department of Environmental Quality (ADEQ) has completed a source water assessment for Tucson Water drinking water wells. This assessment reviewed the adjacent land uses that may pose a potential risk to the water sources. These risks include, but are not limited to, gas stations, landfills, dry cleaning, agricultural fields, wastewater treatment plants, and mining activities. The assessment has classified approximately 1/3 of our wells as high risks.

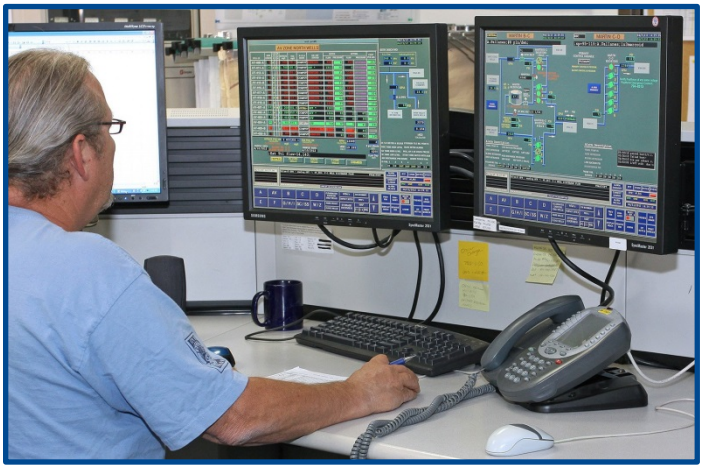
Tucson Water ensures the safety of our drinking water by conducting regular monitoring of all sources. If any contamination approaches the drinking water MCL, the source is removed from service.

Residents can help protect our water sources by practicing good septic system maintenance, limiting pesticide and fertilizer use, and by taking hazardous household chemicals to the Household Hazardous Waste Program locations (visit **www.tucsonaz.gov/hhw** or call (520) 791-3171).

Source Water Assessments on file with the ADEQ are available for public review. You may obtain a copy by contacting the Arizona Source Water Coordinator at (602) 771-4597.

PERFLUORINATED COMPOUNDS (PFOA & PFOS)

In May 2016, the EPA issued a revised Health Advisory for the perfluorinated compounds perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). The lifetime health advisory for each compound is 0.07 ug/L, which is applicable to each compound individually or in combination. The EPA Health Advisory is based on a developmental toxicity study in mice; consequently, the sensitive sub-populations of concern are pregnant and nursing mothers. Tucson Water, based on historical PFOA/PFOS observations and per EPA recommendation, took additional samples to assess the level, scope and source of contamination in order to determine next steps. This additional sampling for PFOA/PFOS identified five wells that were above the new health advisory and thus were promptly taken out of service while Tucson water evaluates its treatment options. Tucson Water continues to investigate its system for PFOA/PFOS detections and is committed to ensuring compliance with all drinking water regulations. More information can be found at **https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos**



MONITORING WAIVERS

The Arizona Department of Environmental Quality (ADEQ), the regulatory agency for all public water suppliers in Arizona, grants waivers for certain monitoring requirements. Tucson Water participates in IOC, SOC, and VOC waiver programs offered to public water systems by the ADEQ. Waivers save money by reducing the monitoring frequencies for these contaminants without affecting public safety.

To determine a system's eligibility for an SOC susceptibility waiver, ADEQ's evaluation includes the following:

- Previous analytical results
- Previous vulnerability assessments
- Proximity of the system to adjacent land uses
- Mobility of the compound
- Methods in place to control contaminant sources
- Releases of worst case contaminant in the study area
- Source construction including depth to groundwater, soil type, and hydrogeological setting.
- Source Water Assessment Plan
- Historical information related to current waivers and historical full and partial waivers.

In 2017, Tucson Water utilized IOC, SOC, and VOC Waivers in its main system. Most of Tucson Water's sources (wells) were eligible for waivers.

WERE THERE ANY MONITORING FAILURES OR VIOLATIONS?

At the end of each quarter, Tucson Water conducts an internal audit of compliance monitoring records to verify that all required monitoring has been completed and reported to the State. During 2017, there was no monitoring violation or failure.

WHAT ABOUT COLORADO RIVER WATER?

The City of Tucson has rights to approximately 144,000 acre-feet of Colorado River water per year, delivered through the Central Arizona Project (CAP). At the Clearwater Renewable Resource Facility located in Avra Valley, Tucson Water is recharging the City's available CAP supply by delivering the river water to shallow basins and allowing the water to percolate (or recharge) naturally through the earth to reach and blend with the groundwater below. Tucson Water began delivery of this blend of recharged Colorado River water and groundwater in 2001. At the end of 2017, the blend was about 29% native groundwater and 71% recharged Colorado River water. Over time, it will contain an increasing percentage of recharged Colorado River water; the percentage will also vary according to which Clearwater production wells are pumped.

HOW IS OUR DRINKING WATER TREATED?

The groundwater delivered by Tucson Water meets all drinking water standards without treatment, with the exception of the water supplied from the Tucson Airport Area Remediation Project or TARP (see below). However, approximately 1 ppm of chlorine is added to the drinking water supply at well sites, reservoirs and other facilities to provide assurance that water delivered to customers will remain free of microbiological contamination. This also ensures that the water meets microbiological drinking water standards from the time it is pumped from the ground until it reaches the customer's tap.

MORE ABOUT TARP

TARP was developed in order to clean and make beneficial use of water contaminated with the industrial solvent trichloroethylene (TCE). Tucson Water operates TARP under an agreement with the USEPA and other industrial and governmental agencies. All costs associated with operating and maintaining the TARP facility are fully reimbursed to Tucson Water.

Nine wells designed to extract contaminated water and deliver it through a pipeline to the Advanced Oxidation Process (AOP) facility at TARP, where both TCE and 1,4-dioxane are removed from the water to below detection limit. Per Federal Consent Decree that specifies the procedures of TARP, the water still passes through the original "air-stripping" towers before being chlorinated and sent into the distribution system.

The TARP Facilities are designed to treat approximately 8.4 million gallons of water per day or 5,800 gallons per minute.

During 2017, this plant treated a total of approximately 1.76 billion gallons of water. The treatment system removed 154 pounds of combined volatile organics from the groundwater.

In February 2014, Tucson Water proactively put into operation the above –mentioned AOP Facility at TARP to additionally treat for contaminant 1,4-dioxane from the nine groundwater extraction wells that feed the TARP Plant. The AOP Facility is now removing 1,4-dioxane to below detection limits.

WHOM DO I CONTACT FOR MORE INFORMATION?

For more information, questions, or comments on this Tucson Water report, contact Mohsen Belyani, Water Quality & Operations Division, at (520) 791-2544 or **Mohsen.belyani@tucsonaz.gov**

Tucson's Mayor and Council set policy and direction for Tucson Water, including those policies that may impact water quality. Mayor and Council meetings are normally held every other Tuesday and are open to the public. Mayor and Council meeting agendas and other opportunities for public comments are published at **www.tucsonaz.gov/mcc**. Tucson Water customers may leave a message for the Mayor and Council at (520) 791-4201.

Tucson Water's Water Quality Information Net program provides timely information about the quality of tap water in your neighborhood at **tucsonaz.gov/water/water-quality**. For questions, comments, or reports on water quality topics in your neighborhood, contact our water quality concerns team at (520) 791-5945 or email CustomerSupportUnit@tucsonaz.gov.

To schedule a tour of Tucson Water's Water Quality Laboratory or a speaker for your organization, contact the Public Information Office at (520) 791-4331 or email **pico@tucsonaz.gov**

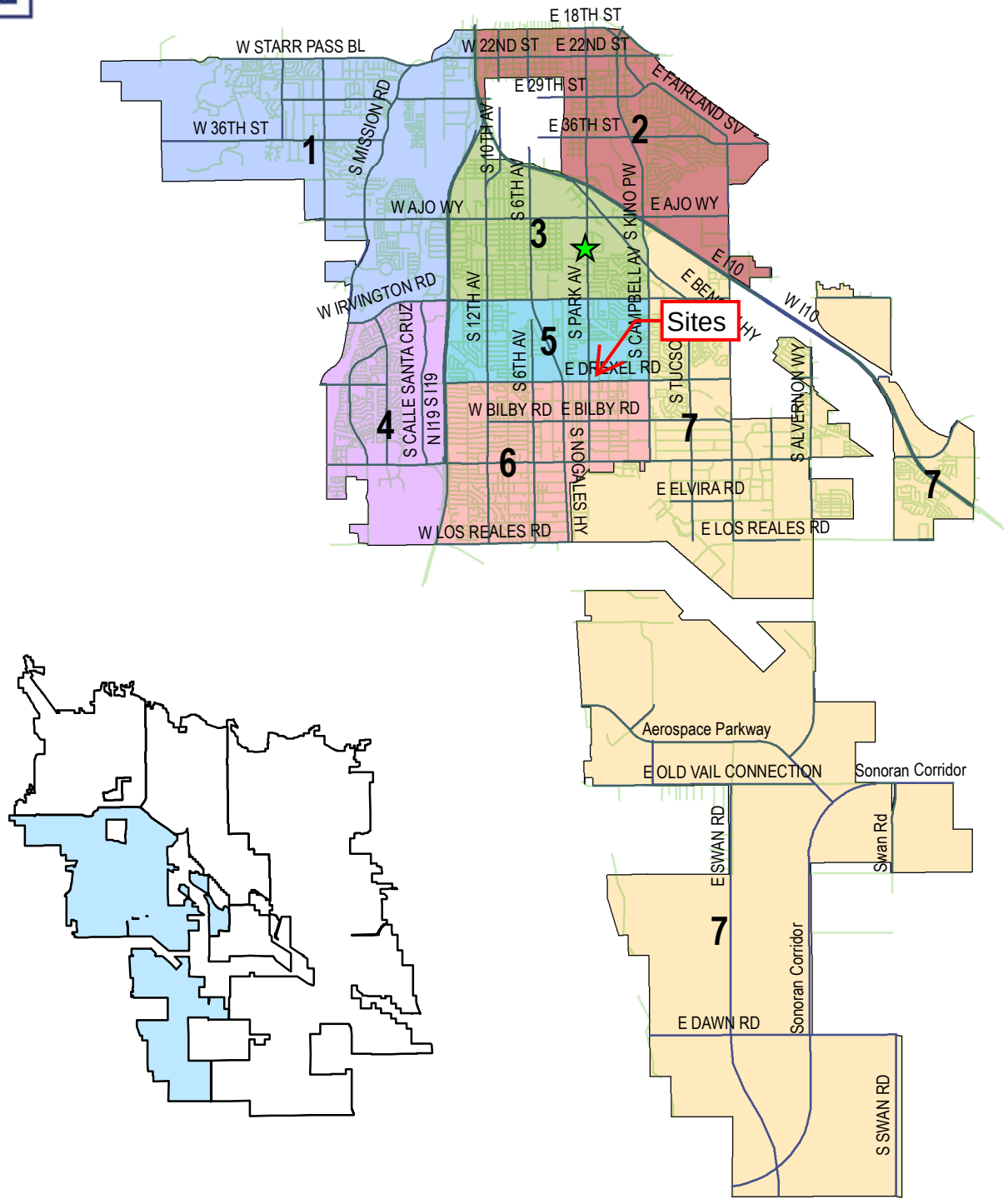
CONTACT INFORMATION:

Tucson Water Public Information Office	(520) 791-4331
Tucson Water Quality & Operations Division	(520) 791-2544
Tucson Water Customer Service/Billing	(520) 791-3242
Tucson Water 24-hour Emergency	(520) 791-4133
USEPA Safe Drinking Water Hotline	1-800-426-4791
USEPA Website	**epa.gov/safewater**
Si usted desea este documento escrito en español, por favor, llame al	(520) 791-4331
City of Tucson TTY#	(520) 791-2639

Para nuestros clients de habla español: Éste informe contiene información muy importante sobre la calidad de su agua beber. Traduscalo o hable con alguien que lo entienda bien. Para obtener una copia de este reporte en español, llame al (520) 791-4331.

CLICK	WATCH	CALL	TDD	SOCIAL
tucsonaz.gov/water	YouTube tucsonwater	English/Spanish: (520) 791-4331	(520) 791-2639	

Tucson Police Department



Legend

- Santa Cruz Substation
- MajorStreet_T1
- All_Streets

Sectors

1 3 5 7
2 4 6

Operations Division South (ODS) Sector Boundaries

N

1 Miles

Research and Analysis, February 20, 2019

e/fire-stations

CITY OF TUCSON

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Donate

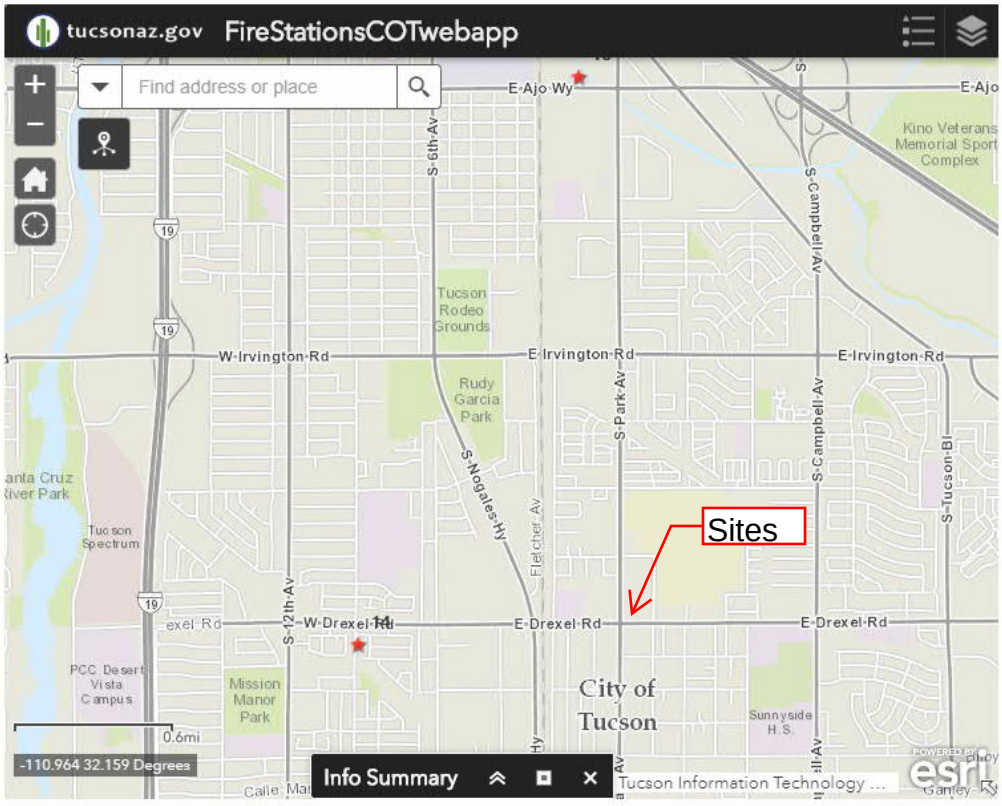
Government | Neighborhoods | Business | City Info | Departments | I Want To...

Select Language

Fire Department

- Mission and Overview
  - Organization Chart
  - > Fire Stations
  - History
- Fire & Emergency Medical Services
- Permits & Resources
- Fire Prevention
- Public Education and Community Safety
- Training
- Medical Privacy/HIPAA
- Contact Us

Fire Stations



ArcGIS Tucson Parks and Recreation Recreation Centers Modify Map

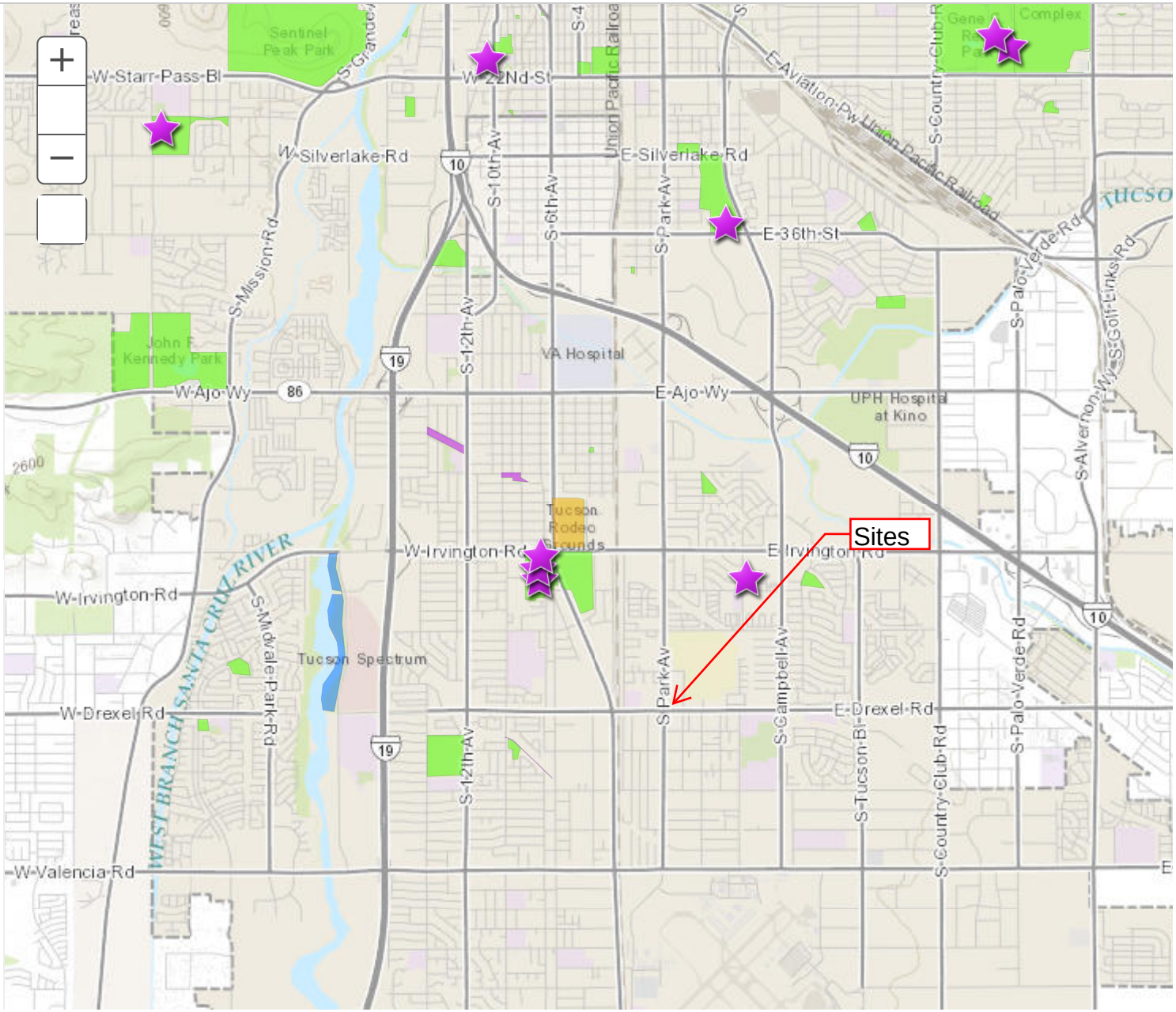
Details | Basemap | Share Print | Measure Find address or place

Legend

Parks - Recreation Centers - TPRD_RECREATION_CENTERS

Parks - Park Boundaries - TPRD_PARKS

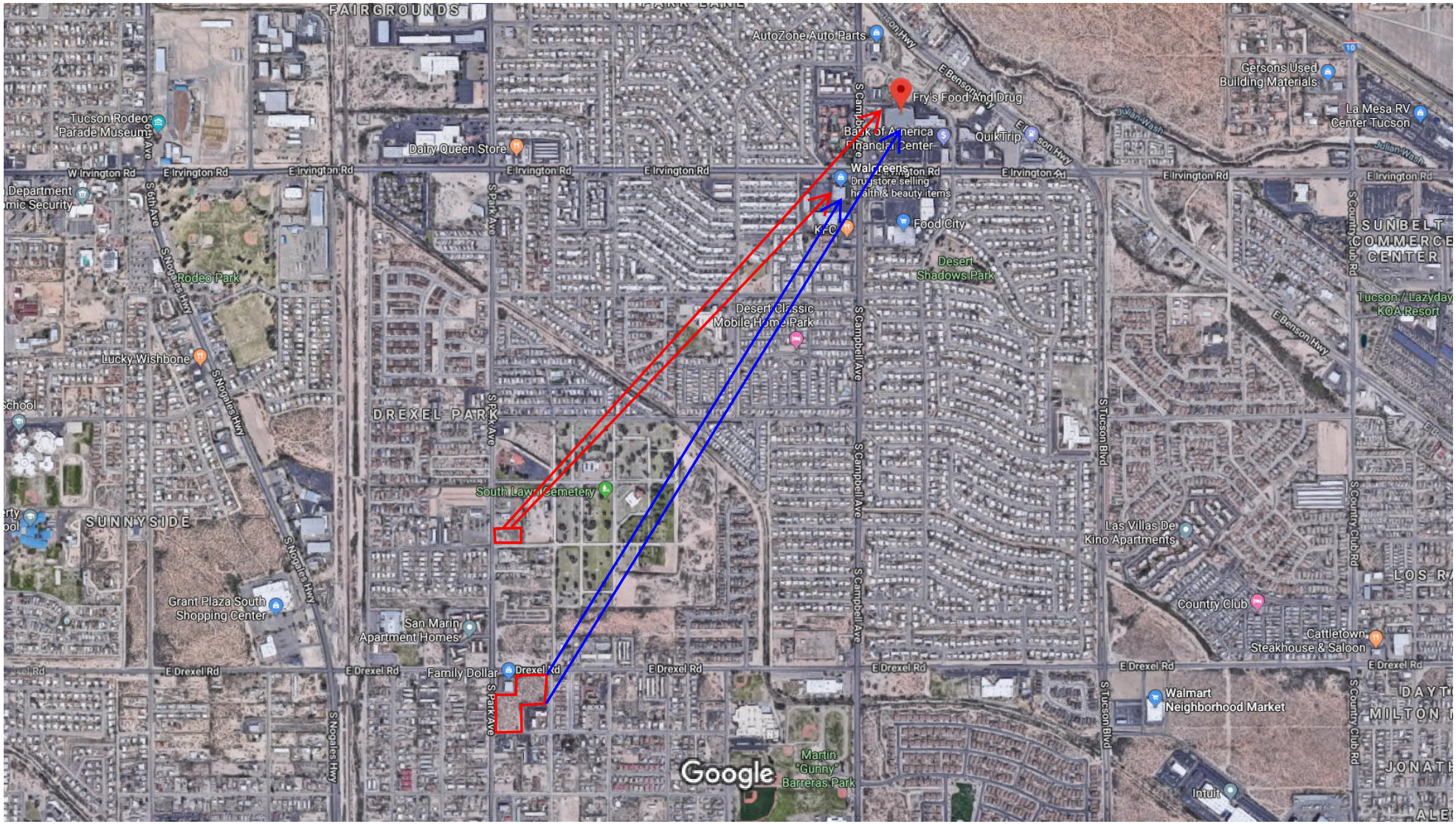
- NEIGHBORHOOD PARK
- MINI PARK
- COMMUNITY PARK
- METRO PARK
- REGIONAL PARK
- GREENWAY
- RIVER PARK
- PLAZA
- RODEO GROUNDS



Google Maps

Fry's Food And Drug, Bank of America, AutoZone Auto Parts, Walgreens

Distance from Sites to Commercial Facilities



Imagery ©2019 Google, Map data ©2019 Google 1000 ft

Google Maps

Banner - University Medical Center South and Pima County Health Department

Distance from Sites to Health and Emergency Medical Facilities

Imagery ©2019 Google, Map data ©2019 Google 1000 ft

Google Maps

Dept of Health & Human Services

Distance from Sites to Social Service Facility

Imagery ©2019 Google, Map data ©2019 Google 2000 ft

https://www.visittucson.org/things-to-do/day-trips/heritage-culture-shapes-tucson

Heritage & Culture Events

Live Demonstration: Agave Roasting & Fiber Crafts **April 25, 2019**
Watch firing the roasting pit and preparation of agave hearts. Agave... Read More

Spring Enchanted Evenings **April 26, 2019 - April 28, 2019**
Stroll the serene gardens after dusk in a beguiling fairy-tale... Read More

Ignite Agave **April 26, 2019**
An engaging presentation about food, agriculture, beverage, and... Read More

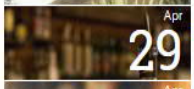
El Tambo Fest **April 26, 2019 to April 27, 2019**
El Tambó Fest 2019 brings together legendary cumbia bands from across... Read More

Family Adventure Hour **April 27, 2019**
"Family Adventure Hour" at Presidio San Agustin del Tucson Museum is... Read More

Agave Roasting Live Demonstration **April 27, 2019**
Taste fresh roasted agave and agave spirits and enjoy an agave home-... Read More

Agave Fiesta **April 27, 2019**
(21+) This annual signature event showcases all things agave,... Read More

Ancient Agave Garden Tour **April 28, 2019**
Learn about an ancient ecological site and the impact it has made in... Read More



Bacanora: Spirit of the Sonoran Desert, Part 1 **April 29, 2019**
Learn about the sustainability and the future of agave plant while... Read More

Bacanora: Spirit of the Sonoran Desert, Part 2 **April 30, 2019**
Learn about the sustainability and the future of agave plant while... Read More

FEATURED

You Might Also Like

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Transit Services Division

The Transit Services Division provides administrative services and coordination for the activities of the public transportation system, which includes fixed-route bus service, Sun Tran, paratransit service for persons with disabilities, Sun Van, and streetcar service, Sun Link. Private sector management companies operate the transit, and paratransit systems, with all operating equipment and vehicles being owned by the City. Transit Services coordinates its management oversight with the transit contractors and acts as a liaison with City Departments, other governmental entities, and citizen groups for transit service delivery in the Tucson Metropolitan Area.

Transit Services


Sun Link


Sun Tran


Sun Van

SunGo

Go Tucson

Reports

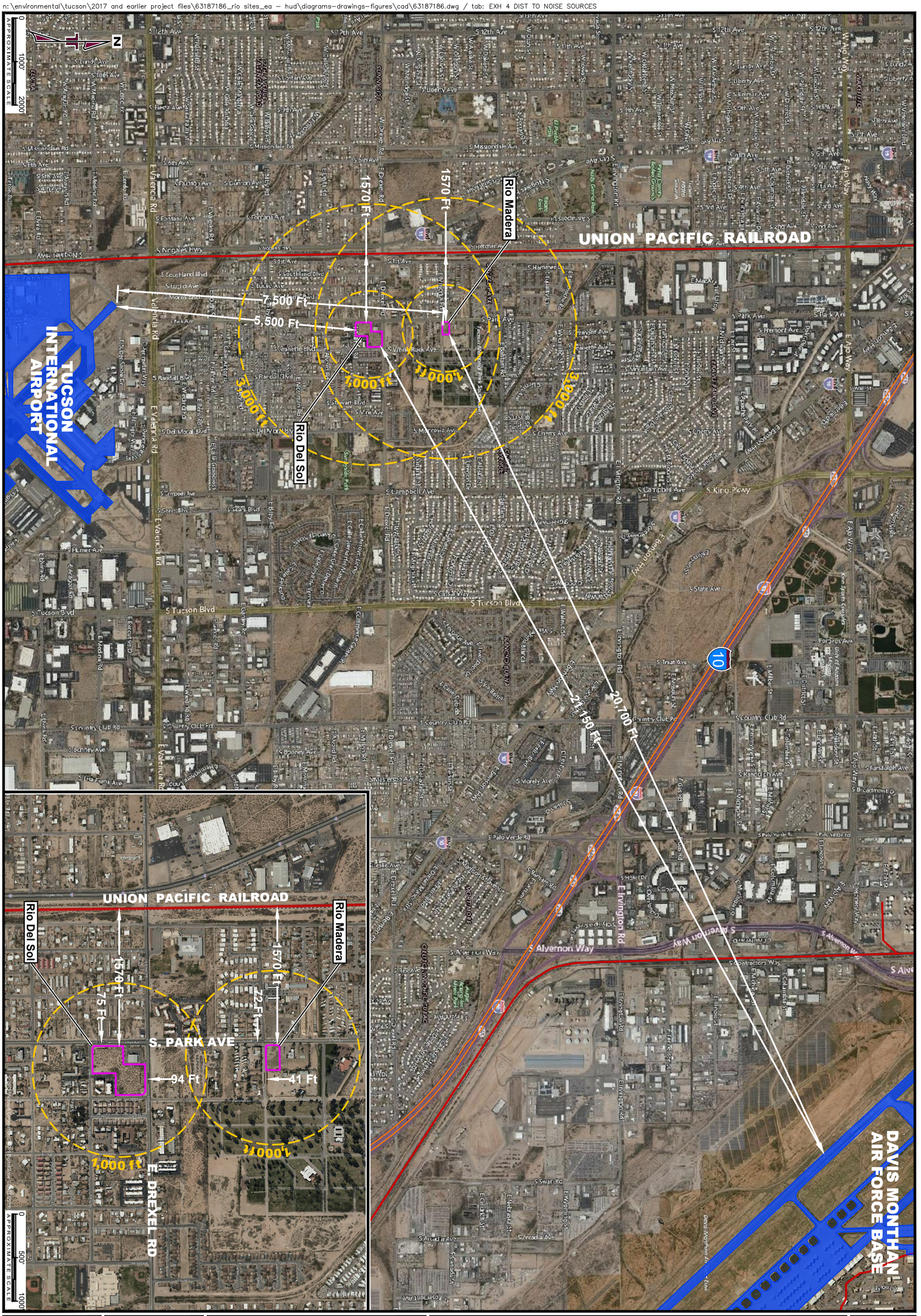
August 2016 - City of Tucson: On-Board Survey
February 2016 - Pima Association of Governements: Alternative Models for Transit Service
February 2014 - City of Tucson: Target Budget Service Review
January 2014 - City of Tucson: Bus/Rail Interface Report
January 2014 - City of Tucson and Regional Transportation Authority: Comprehensive Operational Analysis (Full Report with Appendices)
December 2013 - City of Tucson: Peer Review
January 2013 - Transit Task Force: Five-Year Strategic Transit Plan

Contact Information

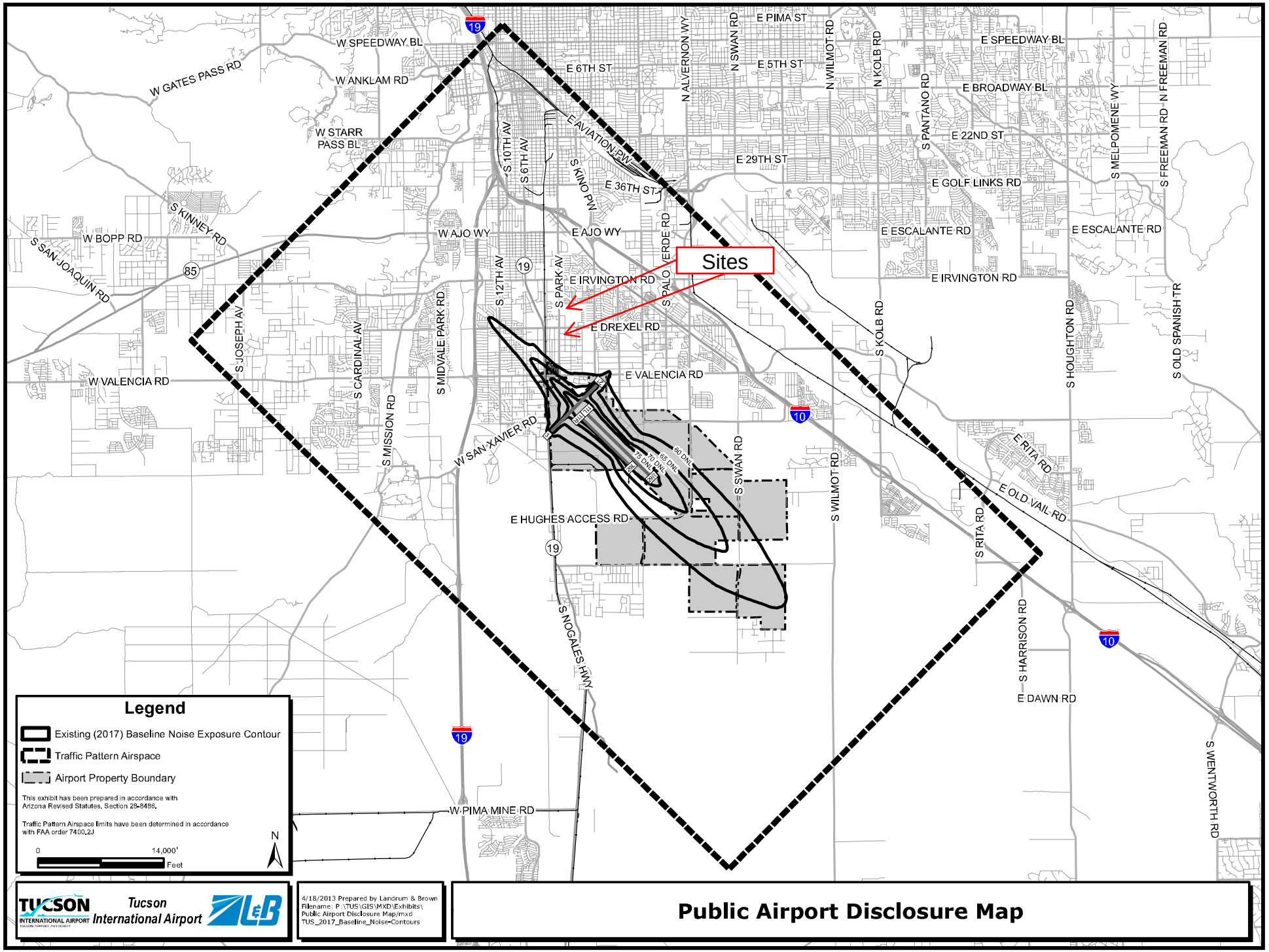
The Transit Services and Special Services Office is located downtown at 35 West Alameda Street. Offices are open from 8:00 am to 4:00 pm Monday thru Friday (closed all official city holidays). If you have any questions please refer to the frequently asked questions or contact us at SpecialServices@tucsonaz.gov.

APPENDIX G

n:\environmental\tucson\2017 and earlier project files\63187186_rio sites_ea – hud\diagrams-drawings-figures\cad\63187186.dwg / tab: EXH 4 DIST TO NOISE SOURCES



Project Mngr: MKZ	Project No. 63187186	Terracon Consulting Engineers and Scientists	DISTANCE TO NOISE SOURCES
Drawn By: KLJ	Scale: AS SHOWN	4685 South Ash Avenue, Suite H-4 Tempe, AZ 85282	Rio Sites
Checked By: MKZ	File No. 63187186.DWG	PH. (480) 897-8200 FAX. (480) 897-1133	Rio Del Sol: 5761 South Park Avenue Rio Madera: 5489 South Park Avenue Tucson, Pima County, Arizona
Approved By: MKZ	Date: 04/05/2019		EXHIBIT 1


Sites
W SPEEDWAY BL
W GATES PASS RD
W ANKLAM RD
W STARR PASS BL
E 6TH ST
E PIMA ST
E 5TH ST
E SPEEDWAY BL
E BROADWAY BL
E 22ND ST
E 29TH ST
E 36TH ST
E GOLF LINKS RD
E ESCALANTE RD
E IRVINGTON RD
E DREXEL RD
E VALENCIA RD
E AJO WY
W AJO WY
W BOPP RD
W VALENCIA RD
E AVIATION PW
S KINNEY RD
S SAN JOAQUIN RD
S JOSEPH AV
S CARDINAL AV
S MIDVALE PARK RD
S MISSION RD
S 10TH AV
S 6TH AV
S KINO PW
S 12TH AV
S PARK AV
S CALLE VERDE RD
N ALVERNON WY
N SWAN RD
N WILMOT RD
N KOLB RD
S PANTANO RD
S MELPOMENE WY
S FREEMAN RD
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S KOLB RD
S HOUGHTON RD
S OLD SPANISH TR
W SAN XAVIER RD
S SWAN RD
S WILMOT RD
E RITA RD
S RITA RD
E OLD VAIL RD
E HUGHES ACCESS RD
S NOGALES HWY
S HARRISON RD
E DAWN RD
S WENTWORTH RD
W PIMA MINE RD
85
60 DNL
65 DNL
70 DNL
75 DNL
Legend
Existing (2017) Baseline Noise Exposure Contour
Traffic Pattern Airspace
Airport Property Boundary
This exhibit has been prepared in accordance with Arizona Revised Statutes, Section 28-8486.
Traffic Pattern Airspace limits have been determined in accordance with FAA order 7400.2J
0
14,000'
Feet
N
TUCSON INTERNATIONAL AIRPORT
Tucson International Airport
4/18/2013 Prepared by Landrum & Brown
Filename: P:\TUS\GIS\MXD\Exhibits\Public Airport Disclosure Map/mxd
TUS_2017_Baseline_Noise-Contours
Public Airport Disclosure Map

Trimpe, Emily A

From:	Scott Robidoux <srobidoux@flytucson.com>
Sent:	Wednesday, March 20, 2019 2:54 PM
To:	Trimpe, Emily A
Subject:	Request for TAA Noise Contour Information
Attachments:	2 Part One Noise Exposure Maps.pdf; 4 Chapter Two Noise Exposure.pdf; x2-NEMPLOT_Future (2017) Noise Exposure Map reduced.pdf; x1-NEMPLOT_Existing (2012) Noise Exposure Map reduced.pdf

Hi Emily,

As requested, I have attached copies of TAA documents regarding noise contours for Tucson International Airport (TUS) and Ryan Airfield. Based on the project location information you provided I have determined that your proposed project is located outside of the 65 DNL that is illustrated in these TAA documents. Please note that your project site is in close proximity to TAA and would likely be subject to overflight by aircraft operating at TUS. It is very likely Air National Guard military F-16 aircraft will be flying overhead or close proximity to your project site since these aircraft will circle around TUS to train and to provide safe separation between other F-16 aircraft when they are landing at TUS.

Thank you,

Scott Robidoux
Senior Airport Planner

TUCSON AIRPORT AUTHORITY
TUCSON INTERNATIONAL AIRPORT • RYAN AIRFIELD

TUCSON AIRPORT AUTHORITY
7250 South Tucson Boulevard
Suite 300
Tucson, AZ 85756
Phone 520-573-8100
Direct 520-573-4811
www.flytucson.com

HUD Airport Noise Worksheet

Use this worksheet to identify information needed to evaluate a site's exposure to aircraft noise.

Name and Location of Project: Rio Sites Rio Del Sol: 5761 South Park Avenue Rio Madera: 5489 South Park Avenue	Date: 3/14/2019
Name of Airport: Davis-Monthan Air Force Base	Person completing worksheet: Emily Trimpe

1. Determine if the proposed site/project is within 15 miles of a civil or military airport.

   ☐ No. Attach a map identifying the location of the proposed project site and the location of any airports. This worksheet is not required.
   ☒ Yes. Attach a map identifying the location of the proposed project site and the location of any airports. Continue.

2. Determine the number of operations at the airport by going to: http://www.gcr1.com/5010web/
3. Determine if the annual number of operations for air carriers #100, air taxis #102, military #105, and general aviation #103 plus #104 exceeds thresholds.

		Yes	No
Annual air carrier operations	Is this 9,000 or more	☐	☒
Annual air taxi operations	Is this 18,000 or more	☐	☒
Annual military operations	Is this 18,000 or more	☐	☒
Annual general aviation operations	Is this 72,000 or more	☐	☒

4. If you answer "No" on each of the questions above, it is assumed that the noise attributed to the airplanes will not extend beyond the boundaries of the airport. Maintain the documentation in your Environmental Review Record. You are finished with the evaluation of airport noise for this airport. If you have marked any question in #3 with "Yes" continue to 5.

5. Contact the airport manager and ask them if the airport has noise contour maps. Are contour maps available?

☐ Yes. Locate your project on the noise contour map. If there are no roads or railroads that are being considered for noise, utilize the information from the contour map to determine if the site is acceptable. If roads or railroads are being considered, input the information obtained from the airport noise contours, along with the road and

railroad information in the HUD Noise Assessment Guidelines (NAG) or the online took at https://www.hudexchange.info/environmental-review/dnl-calculator/

☐ No. Construct the approximate DNL contours by using the guidance on page 52 and 53 of the NAG. You will need to obtain the following information from the airport: 1) The number of nighttime jet operations (10 pm to 7 am) 2) The number of daytime jet operations (7 am to 10 pm) 3) The flight paths of the major runways 4) Any available information about expected changes in airport traffic (e.g. will the number of operations increase or decrease in the next 10 to 15 years)

89MP02-94NEM-8/21/99

1994 AIRCRAFT NOISE EXPOSURE MAP - NOISE COMPATIBILITY PROGRAM

LEGEND

- Airport Property Line
- Potential Residential
- Existing Residential
- Existing Resort, Public Assembly
- S — Future School Site
- Flight Track
- —65— Ldn Noise Contour

AIRCRAFT OPERATIONS - 1994

	1994
General Aviation	
Local	97,290
Itinerant	54,310
Military	
Local	4,500
Itinerant	500
Total	156,600

NORTH

0 3000 6000

SCALE IN FEET

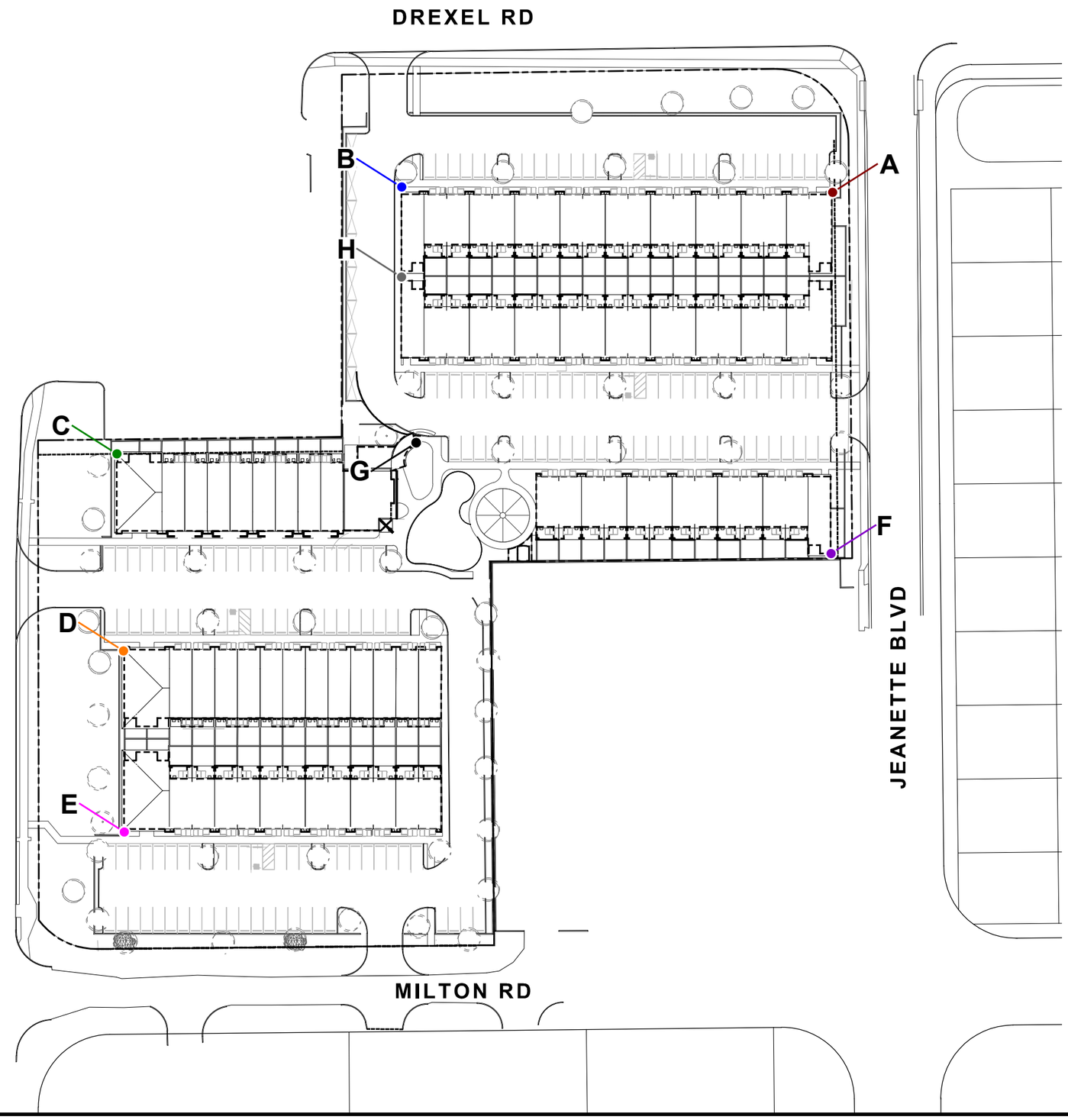
SPONSOR'S CERTIFICATION

The Noise Exposure Maps and accompanying documentation for Ryan Airfield, including the description of consultation and opportunity for public involvement, submitted in accordance with F.A.R. Part 150, are hereby certified as true and complete to the best of my knowledge and belief. It is hereby certified that adequate opportunity has been afforded interested persons to submit views, data, and comments on the Noise Exposure Maps and forecasts.

Date of Signature

Walter A. Burg
General Manager
Tucson Airport Authority

RYAN AIRFIELD



Point **A** Distances
123' to Drexel Rd
590' to Park Ave
41' to Jeanette Blvd
2129' to Rail Road

TOTAL DNL: 65.997

Point **B** Distances
123' to Drexel Rd
292' to Park Ave
1831' to Rail Road

TOTAL DNL: 66.7894

Point **C** Distances
306' to Drexel Rd
94' to Park Ave
1631' to Rail Road

TOTAL DNL: 68.5599

Point **D** Distances
436' to Drexel Rd
94' to Park Ave
1631' to Rail Road

TOTAL DNL: 68.3763

Point **E** Distances
561' to Drexel Rd
94' to Park Ave
111' to Milton Rd
1631' to Rail Road

TOTAL DNL: 68.2983

Point **F** Distances
376' to Drexel Rd
588' to Park Ave
299' to Milton Rd
41' to Jeanette Blvd
2124' to Rail Road

TOTAL DNL: 61.0588

Point **G** Distances
295' to Drexel Rd
301' to Park Ave
1838' to Rail Road

TOTAL DNL: 63.4852

Point **H** Distances
180' to Drexel Rd
292' to Park Ave
1830' to Rail Road

TOTAL DNL: 65.1604

EXHIBIT 2

NOISE LEVEL CALCULATION POINTS AND DISTANCES

Rio Del Sol: 5761 South Park Avenue

Tucson, Pima County, Arizona

Terracon
Consulting Engineers and Scientists
4685 South Ash Avenue, Suite H-4 Tempe, AZ 85282
PH. (480) 897-9200 FAX. (480) 897-1133

Project No.	63187186 SITE REF
Scale:	AS SHOWN
File No.	187186 SITE REF.DWG
Date:	04/01/2019

Project Mngr:	MKZ
Drawn By:	KLJ
Checked By:	MKZ
Approved By:	MKZ

n:\environmental\tucson\2017 and earlier project files\63187186_rio sites_ea - hud\diagrams-drawings-figures\cad\63187186 site ref.dwg / tab: NOISE LEVEL CALC

DNL Calculator

WARNING: HUD recommends the use of Microsoft Internet Explorer for performing noise calculations. The HUD Noise Calculator has an error when using Google Chrome unless the cache is cleared before each use of the calculator. HUD is aware of the problem and working to fix it in the programming of the calculator.

The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Rio Del Sol Point A
Record Date	03/29/2019
User's Name	Emily Trimpe

Road # 1 Name:	**East Drexel Road**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	123	123	123
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	10229	409	409
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	58.5418	54.5607	63.5793
Calculate Road #1 DNL	65.2198	Reset	

Road # 2 Name:	South Jeanette Boulevard

Road #2

Vehicle Type	Cars ☑	Medium Trucks ☐	Heavy Trucks ☐
Effective Distance	41		
Distance to Stop Sign			
Average Speed	25		
Average Daily Trips (ADT)	40		
Night Fraction of ADT	15		
Road Gradient (%)			
Vehicle DNL	38.6983		
Calculate Road #2 DNL	38.6983	Reset	

Road # 3 Name:	South Park Avenue

Road # 3 Name:	South Park Avenue

Road #3

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	590	590	590
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	49.8906	45.9116	53.7704
Calculate Road #3 DNL	55.7584	Reset	

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. Dot Crossing Number 742114L)

Rail # 1

Train Type	Electric ☐	Diesel ☑
Effective Distance		2129
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐

Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☐ No: ☐
Train DNL		54.1414
Calculate Rail #1 DNL	54.1414	Reset
Add Road Source Add Rail Source		
Airport Noise Level		
Loud Impulse Sounds?	◯ **Yes** ◯ **No**	
Combined DNL for all Road and Rail sources	**65.997**	
Combined DNL including Airport	**N/A**	
Site DNL with Loud Impulse Sound		
Calculate		

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)

Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)

DNL Calculator

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Guidelines

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- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
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DNL Calculator

Site ID	Rio Del Sol Point B
Record Date	03/29/2019
User's Name	Emily Trimpe

Road # 1 Name:	**East Drexel Road**

Road #1

Vehicle Type	Cars	Medium Trucks	Heavy Trucks
Effective Distance	123	123	123
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	10229	409	409
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	58.5418	54.5607	63.5793
Calculate Road #1 DNL	65.2198	Reset	

Road # 2 Name: **South Park Avenue**

Road #2

Vehicle Type	Cars	Medium Trucks	Heavy Trucks
Effective Distance	292	292	292
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	54.4726	50.4936	58.3524
Calculate Road #2 DNL	60.3404	Reset	

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. DOT Crossing Number 742114L)

Rail # 1

Train Type	**Electric** ☐	**Diesel** ☑
Effective Distance		1831
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		55.1237
Calculate Rail #1 DNL	55.1237	Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○ **Yes** ○ **No**
Combined DNL for all Road and Rail sources	**66.7894**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

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Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)

DNL Calculator

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- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Rio Del Sol Point C
Record Date	03/29/2019
User's Name	Emily Trimpe

Road # 1 Name:	**East Drexel Road**

Road #1

Vehicle Type	Cars	Medium Trucks	Heavy Trucks
Effective Distance	306	306	306
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	10229	409	409
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	52.6045	48.6235	57.6421

Calculate Road #1 DNL | 59.2825 | Reset

Road # 2 Name: **South Park Avenue**

Road #2

Vehicle Type	Cars	Medium Trucks	Heavy Trucks
Effective Distance	94	94	94
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	61.8564	57.8774	65.7362

Calculate Road #2 DNL | 67.7242 | Reset

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. DOT Crossing Number 742114L)

Rail # 1

Train Type	**Electric** ☐	**Diesel** ☑
Effective Distance		1631
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		55.8772
Calculate Rail #1 DNL	55.8772	Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○ **Yes** ○ **No**
Combined DNL for all Road and Rail sources	**68.5599**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

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DNL Calculator

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Guidelines

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- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
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- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Rio Del Sol Point D
Record Date	03/29/2019
User's Name	Emily Trimpe

Road # 1 Name:	**East Drexel Road**

Road #1

Vehicle Type	Cars	Medium Trucks	Heavy Trucks
Effective Distance	436	436	436
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	10229	409	409
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	50.2981	46.317	55.3356
Calculate Road #1 DNL	56.9761	Reset	

Road # 2 Name: **South Park Avenue**

Road #2

Vehicle Type	Cars	Medium Trucks	Heavy Trucks
Effective Distance	94	94	94
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	61.8564	57.8774	65.7362
Calculate Road #2 DNL	67.7242	Reset	

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. DOT Crossing Number 742114L)

Rail # 1

Train Type	**Electric** ☐	**Diesel** ☑
Effective Distance		1631
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		55.8772
Calculate Rail #1 DNL	55.8772	Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○ **Yes** ○ **No**
Combined DNL for all Road and Rail sources	**68.3763**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)

Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)

DNL Calculator

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Guidelines

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DNL Calculator

Site ID	Rio Del Sol Point E
Record Date	03/29/2019
User's Name	Emily Trimpe

Road # 1 Name:	**South Park Avenue**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	94	94	94
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	61.8564	57.8774	65.7362
Calculate Road #1 DNL	67.7242	Reset	

Road # 2 Name: **East Milton Road**

Road #2

Vehicle Type	Cars ☑	Medium Trucks ☐	Heavy Trucks ☐
Effective Distance	111		
Distance to Stop Sign			
Average Speed	25		
Average Daily Trips (ADT)	416		
Night Fraction of ADT	15		
Road Gradient (%)			
Vehicle DNL	42.3806		
Calculate Road #2 DNL	42.3806	Reset	

Road # 3 Name: **East Drexel Road**

Road # 3 Name:	East Drexel Road

Road #3

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	561	561	561
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	10229	409	409
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	48.6559	44.6748	53.6935
Calculate Road #3 DNL	55.3339	Reset	

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. Dot Crossing Number 742114L)

Rail # 1

Train Type	Electric ☐	Diesel ☑
Effective Distance		1631
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐

Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☐ No: ☐
Train DNL		55.8772
Calculate Rail #1 DNL	55.8772	Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	◯ **Yes** ◯ **No**
Combined DNL for all Road and Rail sources	**68.2983**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

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Guidelines

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DNL Calculator

Site ID	Rio Del Sol Point F
Record Date	03/29/2019
User's Name	Emily Trimpe

Road # 1 Name:	**South Jeanette Boulevard**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☐	Heavy Trucks ☐
Effective Distance	41		
Distance to Stop Sign			
Average Speed	25		
Average Daily Trips (ADT)	40		
Night Fraction of ADT	15		
Road Gradient (%)			
Vehicle DNL	38.6983		
Calculate Road #1 DNL	38.6983	Reset	

Road # 2 Name: **East Milton Road**

Road #2

Vehicle Type	Cars ☑	Medium Trucks ☐	Heavy Trucks ☐
Effective Distance	299		
Distance to Stop Sign			
Average Speed	25		
Average Daily Trips (ADT)	416		
Night Fraction of ADT	15		
Road Gradient (%)			
Vehicle DNL	35.9253		
Calculate Road #2 DNL	35.9253	Reset	

Road # 3 Name: **South Park Avenue**

Road # 3 Name:	South Park Avenue

Road #3

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	588	588	588
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	49.9127	45.9337	53.7925
Calculate Road #3 DNL	55.7805	Reset	

Road # 4 Name:	East Drexel Road

Road #4

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	376	376	376
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	10229	409	409
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	51.2626	47.2815	56.3001
Calculate Road #4 DNL	57.9406	Reset	

Calculate Road #4 DNL | 57.9406 | Reset

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. Dot Crossing Number 742114L)

Rail # 1

Train Type	Electric ☐	Diesel ☑
Effective Distance		2124
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		54.1567
Calculate Rail #1 DNL	54.1567	Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○ **Yes** ○ **No**
Combined DNL for all Road and Rail sources	**61.0588**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
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Tools and Guidance

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Guidelines

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- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Rio Del Sol Point G
Record Date	04/01/2019
User's Name	Emily Trimpe

Road # 1 Name:	**East Drexel Road**

Road #1

Vehicle Type	Cars	Medium Trucks	Heavy Trucks
Effective Distance	295	295	295
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	10229	409	409
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	52.843	48.8619	57.8806

Calculate Road #1 DNL | 59.521 | Reset

Road # 2 Name: **South Park Avenue**

Road #2

Vehicle Type	Cars	Medium Trucks	Heavy Trucks
Effective Distance	301	301	301
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	54.2749	50.2958	58.1546

Calculate Road #2 DNL | 60.1426 | Reset

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. DOT Crossing Number 742114L)

Rail # 1

Train Type	**Electric** ☐	**Diesel** ☑
Effective Distance		1838
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		55.0988

Calculate Rail #1 DNL | 55.0988 | Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○ **Yes** ○ **No**

Combined DNL for all Road and Rail sources	**63.4852**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)

Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)

DNL Calculator

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- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Rio Del Sol Point H
Record Date	04/01/2019
User's Name	Emily Trimpe

Road # 1 Name:	**East Drexel Road**

Road #1

Vehicle Type	Cars	Medium Trucks	Heavy Trucks
Effective Distance	180	180	180
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	10229	409	409
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	56.0613	52.0802	61.0988
Calculate Road #1 DNL	62.7393	Reset	

Road # 2 Name: **South Park Avenue**

Road #2

Vehicle Type	Cars	Medium Trucks	Heavy Trucks
Effective Distance	292	292	292
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	54.4726	50.4936	58.3524
Calculate Road #2 DNL	60.3404	Reset	

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. DOT Crossing Number 742114L)

Rail # 1

Train Type	**Electric** ☐	**Diesel** ☑
Effective Distance		1830
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		55.1272

Calculate Rail #1 DNL | 55.1272 | Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○ **Yes** ○ **No**
Combined DNL for all Road and Rail sources	**65.1604**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
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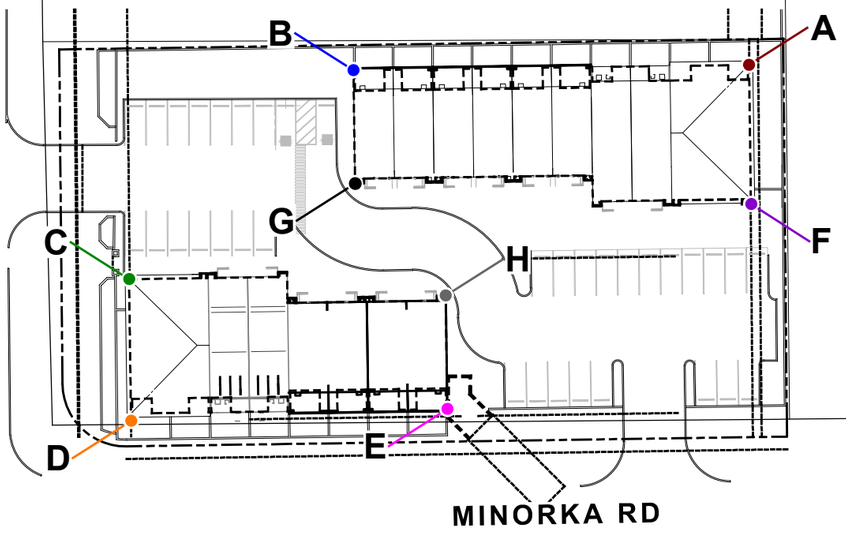

PARK AVE

WHITE ROCK AVE

Point **A** Distances
301' to Park Ave
353' to White Rock Ave
1867' to Rail Road

TOTAL DNL: 61.3134

Point **B** Distances
162' to Park Ave
1710' to Rail Road

TOTAL DNL: 64.7175

Point **C** Distances
72' to Park Ave
1620' to Rail Road

TOTAL DNL: 69.6842

Point **D** Distances
72' to Park Ave
41' to Minorka Rd
1620' to Rail Road

TOTAL DNL: 69.6842

Point **E** Distances
196' to Park Ave
41' to Minorka Rd
1745' to Rail Road

TOTAL DNL: 63.6373

Point **F** Distances
301' to Park Ave
353' to White Rock Ave
1867' to Rail Road

TOTAL DNL: 61.3134

Point **G** Distances
162' to Park Ave
1710' to Rail Road

TOTAL DNL: 64.7175

Point **H** Distances
196' to Park Ave
1745' to Rail Road

TOTAL DNL: 63.6373

N

0 40' 80'
APPROXIMATE SCALE

EXHIBIT 3

NOISE LEVEL CALCULATION POINTS AND DISTANCES

Rio Madera: 5489 South Park Avenue

Tucson, Pima County, Arizona

Terracon
Consulting Engineers and Scientists
4685 South Ash Avenue, Suite H-4 Tempe, AZ 85282
PH. (480) 897-9200 FAX. (480) 897-1133

Project No.	63187186 SITE REF
Scale:	AS SHOWN
File No.	187186 SITE REF.DWG
Date:	04/04/2019
Project Mngr:	MKZ
Drawn By:	KLJ
Checked By:	MKZ
Approved By:	MKZ

n:\environmental\tucson\2017 and earlier project files\63187186_rio sites_ea - hud\diagrams-drawings-figures\cad\63187186 site ref.dwg / tab: Rio Madre Noise Level Calc

DNL Calculator

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DNL Calculator

Site ID	Rio Madera Point A
Record Date	04/04/2019
User's Name	Emily Trimpe

Road # 1 Name:	**South Park Avenue**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	301	301	301
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	54.2749	50.2958	58.1546
Calculate Road #1 DNL	60.1426	Reset	

Road # 2 Name: **South White Rock Avenue**

Road #2

Vehicle Type	Cars ☑	Medium Trucks ☐	Heavy Trucks ☐
Effective Distance	353		
Distance to Stop Sign			
Average Speed	25		
Average Daily Trips (ADT)	20		
Night Fraction of ADT	15		
Road Gradient (%)			
Vehicle DNL	21.6632		
Calculate Road #2 DNL	21.6632	Reset	

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. Dot Crossing Number 742114L)

Rail # 1

Train Type	**Electric** ☐	**Diesel** ☑
Effective Distance		1867
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		54.9968
Calculate Rail #1 DNL	54.9968	Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○ **Yes** ○ **No**
Combined DNL for all Road and Rail sources	**61.3134**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
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Tools and Guidance

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DNL Calculator

Site ID	Rio Madera Point B
Record Date	04/04/2019
User's Name	Emily Trimpe

Road # 1 Name:	**South Park Avenue**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	162	162	162
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	58.3106	54.3316	62.1904
Calculate Road #1 DNL	64.1784	Reset	

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Rail # 1

Train Type	Electric ☐	Diesel ☑
Effective Distance		1710
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		55.5691
Calculate Rail #1 DNL	55.5691	Reset

Calculate Rail #1 DNL | 55.3691 | Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	Yes No
Combined DNL for all Road and Rail sources	**64.7175**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
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Tools and Guidance

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DNL Calculator

Site ID	Rio Madera Point C
Record Date	04/04/2019
User's Name	Emily Trimpe

Road # 1 Name:	**South Park Avenue**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	72	72	72
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	63.5934	59.6144	67.4732
Calculate Road #1 DNL	69.4612	Reset	

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Rail # 1

Train Type	Electric ☐	Diesel ☑
Effective Distance		1620
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		55.9213
Calculate Rail #1 DNL	55.9213	Reset

Calculate Rail #1 DNL | 55.9213 | Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	Yes No
Combined DNL for all Road and Rail sources	**69.6842**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

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- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
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Tools and Guidance

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DNL Calculator

Site ID	Rio Madera Point D
Record Date	04/04/2019
User's Name	Emily Trimpe

Road # 1 Name:	**South Park Avenue**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	72	72	72
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	63.5934	59.6144	67.4732
Calculate Road #1 DNL	69.4612	Reset	

Road # 2 Name:	East Minorka Road

Road #2

Vehicle Type	Cars ☑	Medium Trucks ☐	Heavy Trucks ☐
Effective Distance	41		
Distance to Stop Sign			
Average Speed	25		
Average Daily Trips (ADT)	30		
Night Fraction of ADT	15		
Road Gradient (%)			
Vehicle DNL	37.4489		
Calculate Road #2 DNL	37.4489	Reset	

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. Dot Crossing Number 742114L)

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. DOT Crossing Number 742114L)

Rail # 1

Train Type	**Electric** ☐	**Diesel** ☑
Effective Distance		1620
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		55.9213
Calculate Rail #1 DNL	55.9213	Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○ **Yes** ○ **No**
Combined DNL for all Road and Rail sources	**69.6842**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

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Tools and Guidance

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DNL Calculator

Site ID	Rio Madera Point E
Record Date	04/04/2019
User's Name	Emily Trimpe

Road # 1 Name:	**South Park Avenue**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	196	196	196
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	57.0695	53.0905	60.9493
Calculate Road #1 DNL	62.9373	Reset	

Road # 2 Name: **East Minorka Road**

Road #2

Vehicle Type	Cars ☑	Medium Trucks ☐	Heavy Trucks ☐
Effective Distance	41		
Distance to Stop Sign			
Average Speed	25		
Average Daily Trips (ADT)	30		
Night Fraction of ADT	15		
Road Gradient (%)			
Vehicle DNL	37.4489		
Calculate Road #2 DNL	37.4489	Reset	

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. DOT Crossing Number 742114L)

Rail # 1

Train Type	**Electric** ☐	**Diesel** ☑
Effective Distance		1745
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		55.4371
Calculate Rail #1 DNL	55.4371	Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○ **Yes** ○ **No**
Combined DNL for all Road and Rail sources	**63.6373**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

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- **Other Reasonable Alternatives**: Choose an alternate site
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Tools and Guidance

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DNL Calculator

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The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Rio Madera Point F
Record Date	04/04/2019
User's Name	Emily Trimpe

Road # 1 Name:	**South Park Avenue**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	301	301	301
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	54.2749	50.2958	58.1546
Calculate Road #1 DNL	60.1426	Reset	

Road # 2 Name: **South White Rock Avenue**

Road #2

Vehicle Type	Cars ☑	Medium Trucks ☐	Heavy Trucks ☐
Effective Distance	353		
Distance to Stop Sign			
Average Speed	25		
Average Daily Trips (ADT)	20		
Night Fraction of ADT	15		
Road Gradient (%)			
Vehicle DNL	21.6632		
Calculate Road #2 DNL	21.6632	Reset	

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Railroad #1 Track Identifier:	Union Pacific Railroad (U.S. Dot Crossing Number 742114L)

Rail # 1

Train Type	**Electric** ☐	**Diesel** ☑
Effective Distance		1867
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		54.9968
Calculate Rail #1 DNL	54.9968	Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○ **Yes** ○ **No**
Combined DNL for all Road and Rail sources	**61.3134**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)

Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)

DNL Calculator

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The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Rio Madera Point G
Record Date	04/04/2019
User's Name	Emily Trimpe

Road # 1 Name:	**South Park Avenue**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	162	162	162
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	58.3106	54.3316	62.1904
Calculate Road #1 DNL	64.1784	Reset	

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Rail # 1

Train Type	Electric ☐	Diesel ☑
Effective Distance		1710
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		55.5691
Calculate Rail #1 DNL	55.5691	Reset

Calculate Rail #1 DNL | 55.3691 | Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	Yes No
Combined DNL for all Road and Rail sources	**64.7175**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)

Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-

tool-flowcharts/)

DNL Calculator

WARNING: HUD recommends the use of Microsoft Internet Explorer for performing noise calculations. The HUD Noise Calculator has an error when using Google Chrome unless the cache is cleared before each use of the calculator. HUD is aware of the problem and working to fix it in the programming of the calculator.

The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Rio Madera Point H
Record Date	04/04/2019
User's Name	Emily Trimpe

Road # 1 Name:	**South Park Avenue**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	196	196	196
Distance to Stop Sign			
Average Speed	40	40	40
Average Daily Trips (ADT)	11224	449	449
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	57.0695	53.0905	60.9493
Calculate Road #1 DNL	62.9373	Reset	

Railroad #1 Track Identifier: **Union Pacific Railroad (U.S. Dot Crossing Number 742114L)**

Rail # 1

Train Type	Electric ☐	Diesel ☑
Effective Distance		1745
Average Train Speed		30
Engines per Train		2
Railway cars per Train		50
Average Train Operations (ATO)		4
Night Fraction of ATO		50
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☑ No: ☐
Train DNL		55.4371
Calculate Rail #1 DNL	55.4371	Reset

Calculate Rail #1 DNL | 55.4371 | Reset

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	Yes No
Combined DNL for all Road and Rail sources	**63.6373**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)

Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-

tool-flowcharts/)

Barrier Performance Module **Rio Del Sol Point C - Drexel**

This module provides to the user a measure on the barrier's effectiveness on noise reduction. A list of the input/output variables and their definitions, as well as illustrations of different scenarios are provided.

Calculator

View Day/Night Noise Level Calculator (/programs/environmental-review/dnl-calculator/)

View Descriptions of the Input/Output variables.

Note: Tool tips, containing field specific information, have been added in this tool and may be accessed by hovering over the Input and Output variables with the mouse.

WARNING: If there is direct line-of-sight between the Source and the Observer, the module will report erroneous attenuation. "Direct line-of-sight" means if the 5' tall Observer can see the noise Source (cars, trucks, trains, etc.) over the Barrier (wall, hill/excavation, building, etc.), the current version of Barrier Performance Module will not accurately calculate the attenuation provided. In this instance, there is unlikely to be any appreciable attenuation.

Road/Rail Site DNL:

Note: Barrier height must block the line of sight

Input Data

H	8	**R^1**	290
S	8	**D^1**	6
O	5	**α**	180

Calculate Output

Output Data

h	3	**R**	290
D	6	**FS**	11.3264

New Site DNL:

-11.3264

Refresh

Note: If you have separate Road and Rail DNL values, please enter the values below to calculate the new site DNL:

Road DNL:

Rail DNL:

Calculate

Combined New Site DNL:

Input/Output Variables

Input Variables

The following variables and definitions from the barrier being assessed are the input required for the web-based barrier performance module:

- H = Barrier Height
- S = Noise Source Height
- O = Observer Height (known as the receiver)
- R^1 = Distance from Noise Source to Barrier
- D^1 = Distance from the Observer to the Barrier
- α = Line of sight angle between the Observer and the Noise Source, subtended by the barrier at observer's location

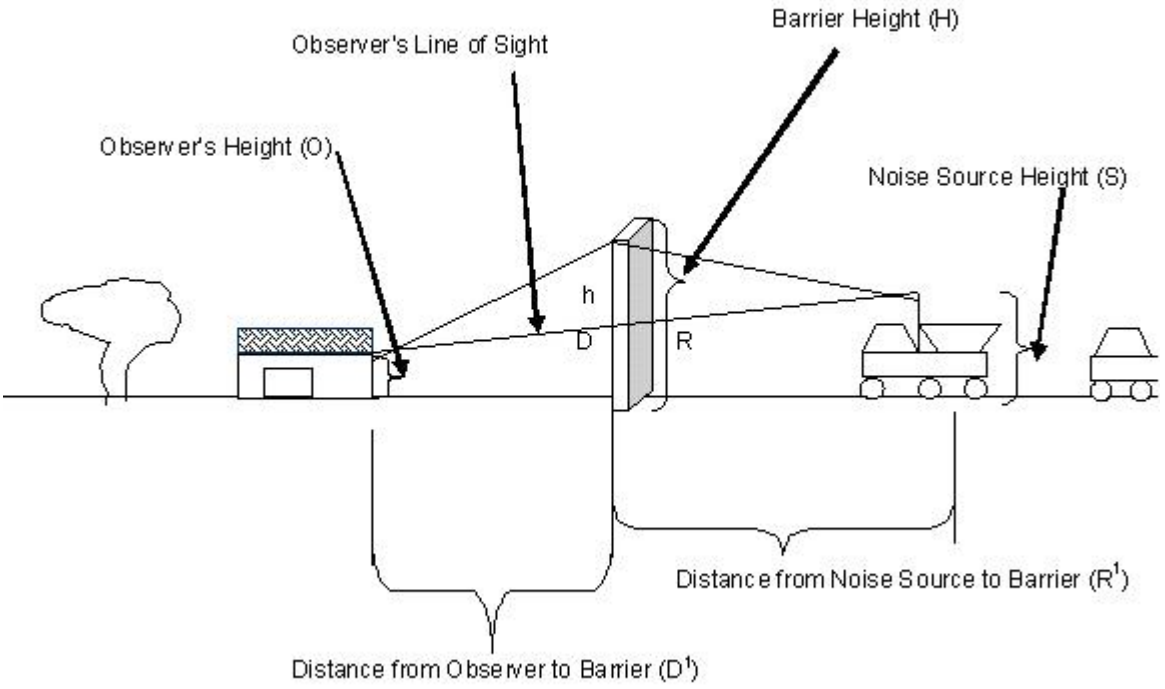
Output Variables

Definitions of the output variables from the mitigation module of the Day/Night Noise Level Assessment Tools as part of the Assessment Tools for Environmental Compliance:

- h = The shortest distance from the barrier top to the line of sight from the Noise source to the Observer.
- R = Slant distance along the line of sight from the Barrier to the Noise Source
- D = Slant distance along the line of sight from the Barrier to the Observer

The “actual barrier performance for barriers of finite length” is noted on the worksheets(in the Guidebook)

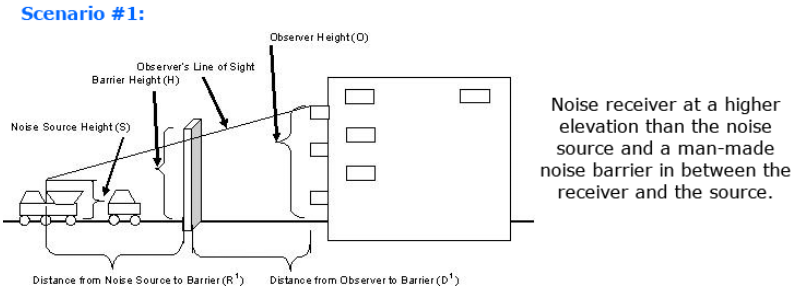
as **FS**.



Barrier Implementation Scenarios

Locate the cursor on the following thumbnails to enlarge the respective scenario as implementation examples of the barrier performance module.

Scenario #1:

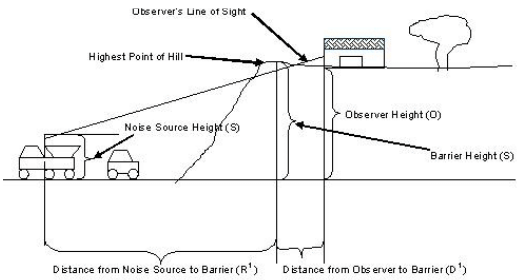


Noise receiver at a higher elevation than the noise source and a man-made noise barrier in between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-1.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #2:



Noise receiver at a higher elevation than the noise source and a natural barrier (hill) between the receiver and the source.

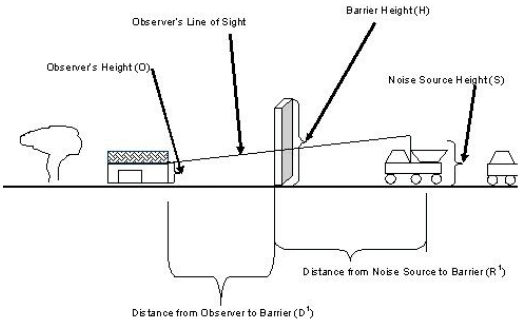
Noise receiver at a higher elevation than the noise source and a natural barrier (hill) between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-2.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #3:

Scenario #3:



Noise receiver at almost the same elevation of the noise source and a man-made noise barrier between the receiver and the source.

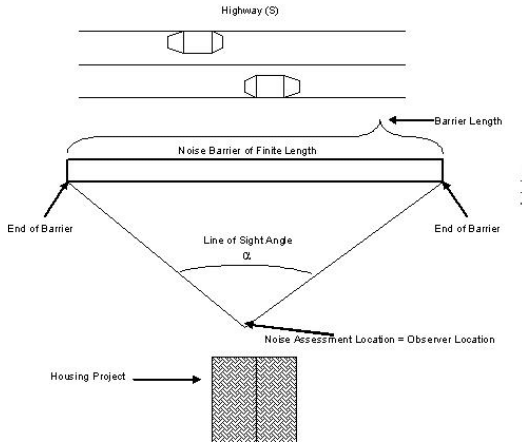
Noise receiver at almost the same elevation of the noise source and a man-made noise barrier between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-3.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #4:

Scenario #4:



A noise barrier of finite length between a noise source and a receiver. This top view illustrates the angle a, subtended by the barrier at the observer's location.

A noise barrier of finite length between a noise source and a receiver. This top view illustrates the angle α, subtended by the barrier at the observer's location.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-4.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

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Barrier Performance Module

Rio Del Sol Point C - Park

This module provides to the user a measure on the barrier's effectiveness on noise reduction. A list of the input/output variables and their definitions, as well as illustrations of different scenarios are provided.

Calculator

View Day/Night Noise Level Calculator (/programs/environmental-review/dnl-calculator/)

View Descriptions of the Input/Output variables.

Note: Tool tips, containing field specific information, have been added in this tool and may be accessed by hovering over the Input and Output variables with the mouse.

WARNING: If there is direct line-of-sight between the Source and the Observer, the module will report erroneous attenuation. "Direct line-of-sight" means if the 5' tall Observer can see the noise Source (cars, trucks, trains, etc.) over the Barrier (wall, hill/excavation, building, etc.), the current version of Barrier Performance Module will not accurately calculate the attenuation provided. In this instance, there is unlikely to be any appreciable attenuation.

Road/Rail Site DNL:

Note: Barrier height must block the line of sight

Input Data

H	8	**R^1**	94
S	8	**D^1**	6
O	5	**α**	180

Calculate Output

Output Data

h	3	**R**	94
D	6	**FS**	11.4336

New Site DNL:

-11.4336

Refresh

Note: If you have separate Road and Rail DNL values, please enter the values below to calculate the new site DNL:

Road DNL:

Rail DNL:

Calculate

Combined New Site DNL:

Input/Output Variables

Input Variables

The following variables and definitions from the barrier being assessed are the input required for the web-based barrier performance module:

- H = Barrier Height
- S = Noise Source Height
- O = Observer Height (known as the receiver)
- R^1 = Distance from Noise Source to Barrier
- D^1 = Distance from the Observer to the Barrier
- α = Line of sight angle between the Observer and the Noise Source, subtended by the barrier at observer's location

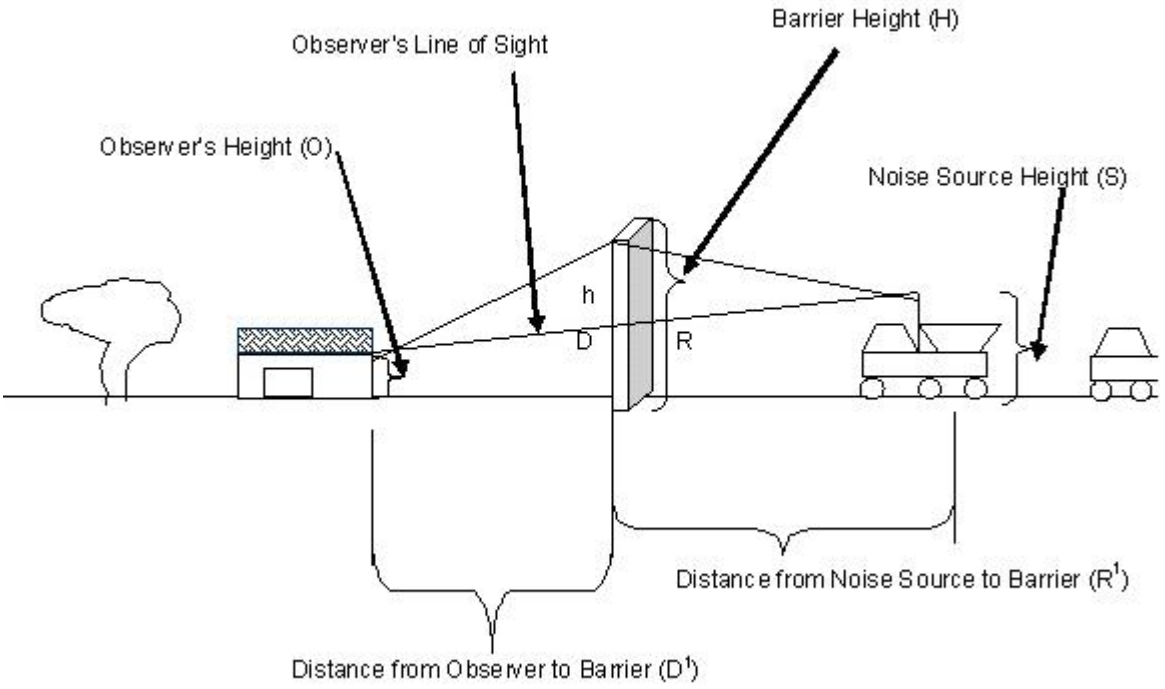
Output Variables

Definitions of the output variables from the mitigation module of the Day/Night Noise Level Assessment Tools as part of the Assessment Tools for Environmental Compliance:

- h = The shortest distance from the barrier top to the line of sight from the Noise source to the Observer.
- R = Slant distance along the line of sight from the Barrier to the Noise Source
- D = Slant distance along the line of sight from the Barrier to the Observer

The “actual barrier performance for barriers of finite length” is noted on the worksheets(in the Guidebook)

as **FS**.



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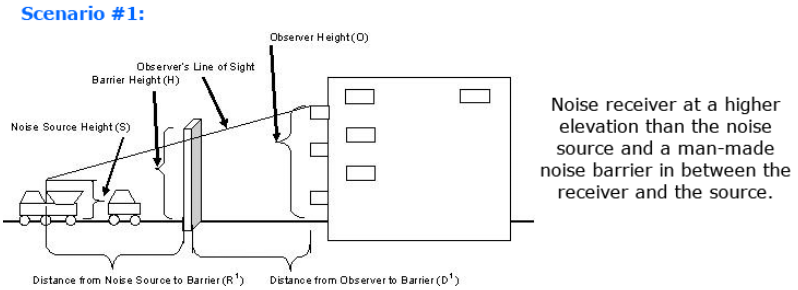
Scenario #1:

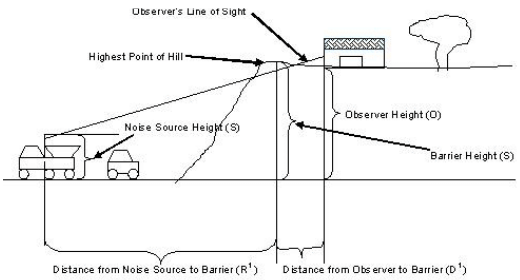


Noise receiver at a higher elevation than the noise source and a man-made noise barrier in between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-1.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #2:



Noise receiver at a higher elevation than the noise source and a natural barrier (hill) between the receiver and the source.

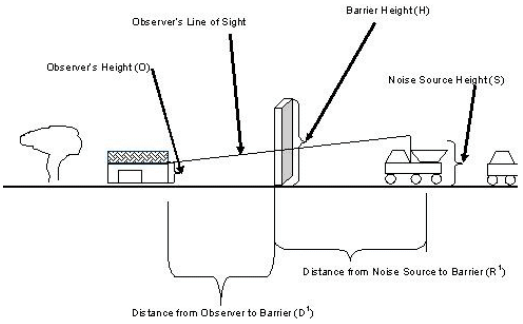
Noise receiver at a higher elevation than the noise source and a natural barrier (hill) between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-2.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #3:

Scenario #3:



Noise receiver at almost the same elevation of the noise source and a man-made noise barrier between the receiver and the source.

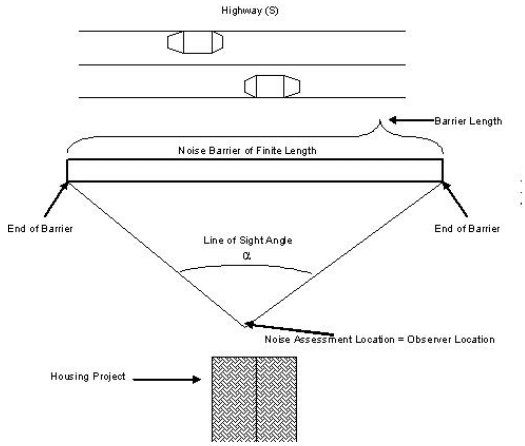
Noise receiver at almost the same elevation of the noise source and a man-made noise barrier between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-3.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #4:

Scenario #4:



A noise barrier of finite length between a noise source and a receiver. This top view illustrates the angle a, subtended by the barrier at the observer's location.

A noise barrier of finite length between a noise source and a receiver. This top view illustrates the angle α, subtended by the barrier at the observer's location.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-4.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

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Barrier Performance Module

Rio Del Sol Points D/E - Park

This module provides to the user a measure on the barrier's effectiveness on noise reduction. A list of the input/output variables and their definitions, as well as illustrations of different scenarios are provided.

Calculator

View Day/Night Noise Level Calculator (/programs/environmental-review/dnl-calculator/)

View Descriptions of the Input/Output variables.

Note: Tool tips, containing field specific information, have been added in this tool and may be accessed by hovering over the Input and Output variables with the mouse.

WARNING: If there is direct line-of-sight between the Source and the Observer, the module will report erroneous attenuation. "Direct line-of-sight" means if the 5' tall Observer can see the noise Source (cars, trucks, trains, etc.) over the Barrier (wall, hill/excavation, building, etc.), the current version of Barrier Performance Module will not accurately calculate the attenuation provided. In this instance, there is unlikely to be any appreciable attenuation.

Road/Rail Site DNL:

Note: Barrier height must block the line of sight

Input Data

H	8	**R^1**	94
S	8	**D^1**	6
O	5	**α**	180

Calculate Output

Output Data

h	3	**R**	94
D	6	**FS**	11.4336

New Site DNL:

-11.4336

Refresh

Note: If you have separate Road and Rail DNL values, please enter the values below to calculate the new site DNL:

Road DNL:

Rail DNL:

Calculate

Combined New Site DNL:

Input/Output Variables

Input Variables

The following variables and definitions from the barrier being assessed are the input required for the web-based barrier performance module:

- H = Barrier Height
- S = Noise Source Height
- O = Observer Height (known as the receiver)
- R^1 = Distance from Noise Source to Barrier
- D^1 = Distance from the Observer to the Barrier
- α = Line of sight angle between the Observer and the Noise Source, subtended by the barrier at observer's location

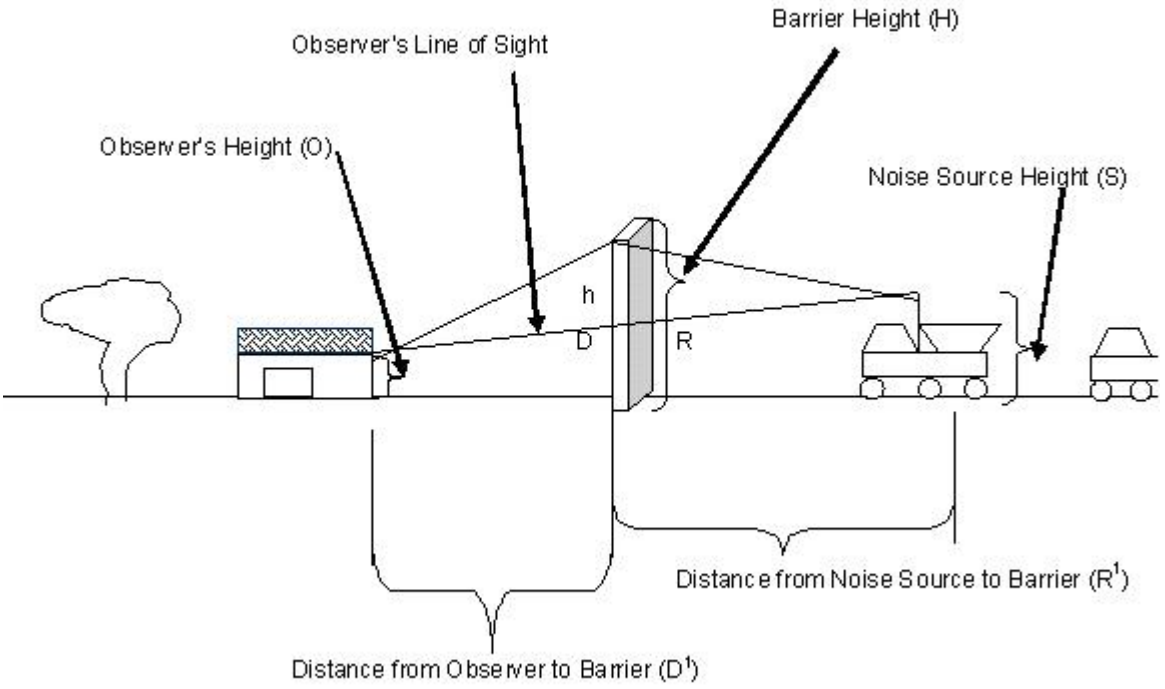
Output Variables

Definitions of the output variables from the mitigation module of the Day/Night Noise Level Assessment Tools as part of the Assessment Tools for Environmental Compliance:

- h = The shortest distance from the barrier top to the line of sight from the Noise source to the Observer.
- R = Slant distance along the line of sight from the Barrier to the Noise Source
- D = Slant distance along the line of sight from the Barrier to the Observer

The “actual barrier performance for barriers of finite length” is noted on the worksheets(in the Guidebook)

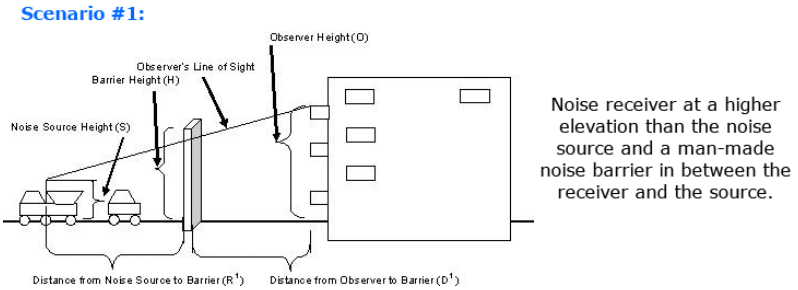
as **FS**.



Barrier Implementation Scenarios

Locate the cursor on the following thumbnails to enlarge the respective scenario as implementation examples of the barrier performance module.

Scenario #1:

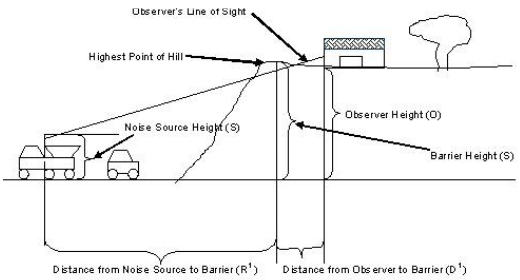


Noise receiver at a higher elevation than the noise source and a man-made noise barrier in between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-1.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #2:



Noise receiver at a higher elevation than the noise source and a natural barrier (hill) between the receiver and the source.

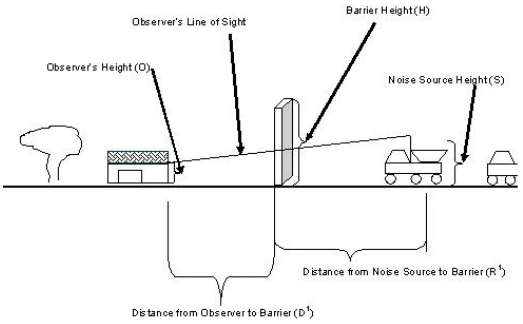
Noise receiver at a higher elevation than the noise source and a natural barrier (hill) between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-2.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #3:

Scenario #3:



Noise receiver at almost the same elevation of the noise source and a man-made noise barrier between the receiver and the source.

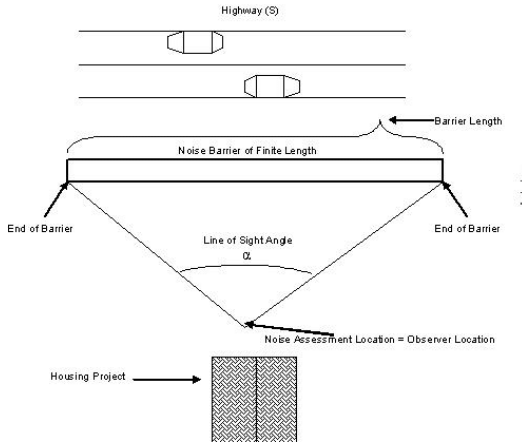
Noise receiver at almost the same elevation of the noise source and a man-made noise barrier between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-3.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #4:

Scenario #4:



A noise barrier of finite length between a noise source and a receiver. This top view illustrates the angle a, subtended by the barrier at the observer's location.

A noise barrier of finite length between a noise source and a receiver. This top view illustrates the angle α, subtended by the barrier at the observer's location.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-4.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Contents

Calculator

Input/Output Variables

Barrier Implementation Scenarios

Point C

	Unshielded DNL	Minimum Barrier Height (ft)	Subtended Angle (degrees)	Barrier Attenuation	Mitigated DNL	BPM File	Intermediate Decibel Summation
Park Ave	67.7	8.0	180.0	11.4	56.3	point_C-park.pdf	426579.519
Drexel Road	59.3	8.0	180.0	11.3	48.0	point_C-drexel.pdf	63095.7344
Union Pacific Railroad	55.8	8.0			55.8		380189.396
Total DNL					**59.4**		**869864.65**

This location requires an eight foot high sound wall on the west and north sides of the backyards to shield from roadway noise.

Barrier Performance Module

Rio Madera Point C/D - Park

This module provides to the user a measure on the barrier's effectiveness on noise reduction. A list of the input/output variables and their definitions, as well as illustrations of different scenarios are provided.

Calculator

View Day/Night Noise Level Calculator (/programs/environmental-review/dnl-calculator/)

View Descriptions of the Input/Output variables.

Note: Tool tips, containing field specific information, have been added in this tool and may be accessed by hovering over the Input and Output variables with the mouse.

WARNING: If there is direct line-of-sight between the Source and the Observer, the module will report erroneous attenuation. "Direct line-of-sight" means if the 5' tall Observer can see the noise Source (cars, trucks, trains, etc.) over the Barrier (wall, hill/excavation, building, etc.), the current version of Barrier Performance Module will not accurately calculate the attenuation provided. In this instance, there is unlikely to be any appreciable attenuation.

Road/Rail Site DNL:

Note: Barrier height must block the line of sight

Input Data

H	8	**R^1**	72
S	8	**D^1**	6
O	5	**α**	180

Calculate Output

Output Data

h	3	**R**	72
D	6	**FS**	11.4808

New Site DNL:

-11.4808

Refresh

Note: If you have separate Road and Rail DNL values, please enter the values below to calculate the new site DNL:

Road DNL:

Rail DNL:

Calculate

Combined New Site DNL:

Input/Output Variables

Input Variables

The following variables and definitions from the barrier being assessed are the input required for the web-based barrier performance module:

- H = Barrier Height
- S = Noise Source Height
- O = Observer Height (known as the receiver)
- R^1 = Distance from Noise Source to Barrier
- D^1 = Distance from the Observer to the Barrier
- α = Line of sight angle between the Observer and the Noise Source, subtended by the barrier at observer's location

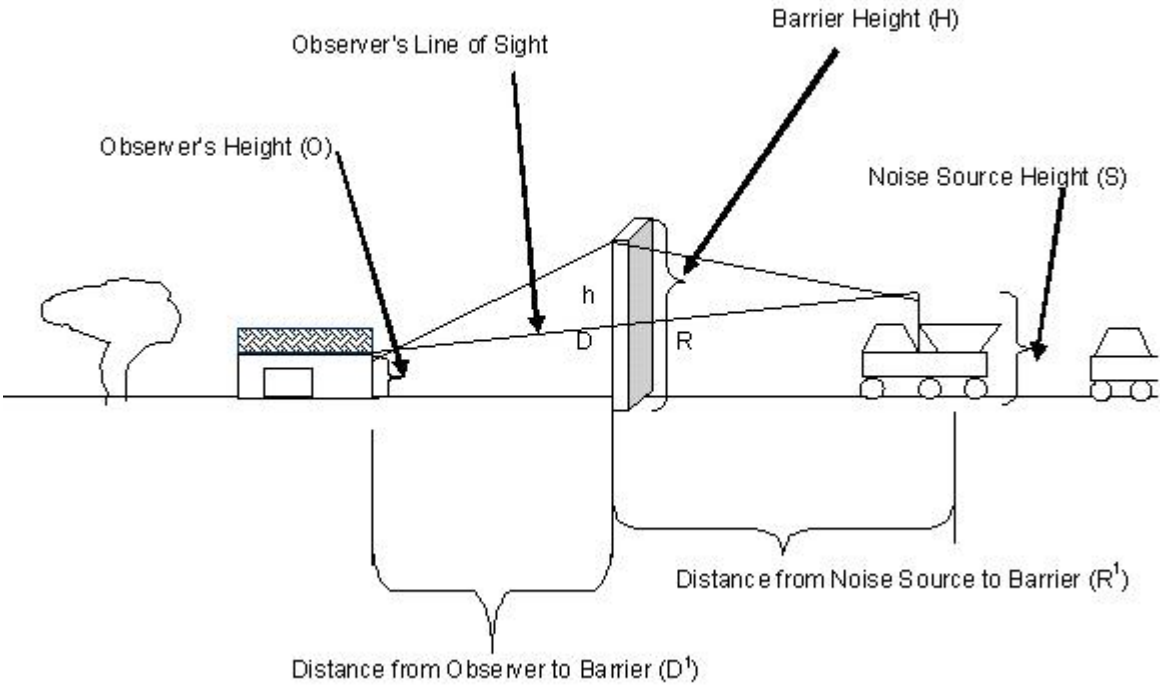
Output Variables

Definitions of the output variables from the mitigation module of the Day/Night Noise Level Assessment Tools as part of the Assessment Tools for Environmental Compliance:

- h = The shortest distance from the barrier top to the line of sight from the Noise source to the Observer.
- R = Slant distance along the line of sight from the Barrier to the Noise Source
- D = Slant distance along the line of sight from the Barrier to the Observer

The “actual barrier performance for barriers of finite length” is noted on the worksheets(in the Guidebook)

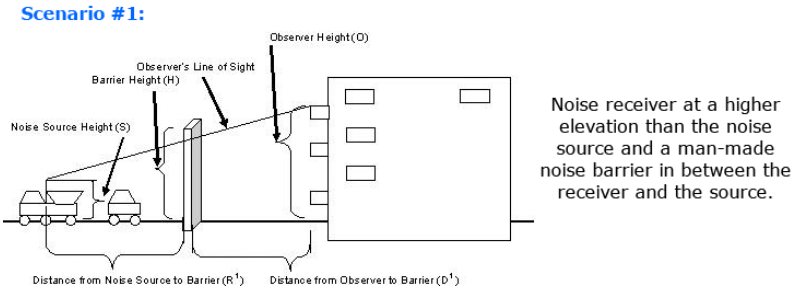
as **FS**.



Barrier Implementation Scenarios

Locate the cursor on the following thumbnails to enlarge the respective scenario as implementation examples of the barrier performance module.

Scenario #1:

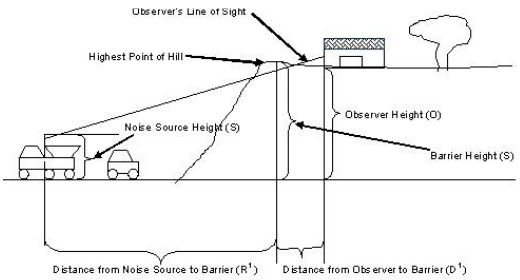


Noise receiver at a higher elevation than the noise source and a man-made noise barrier in between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-1.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #2:



Noise receiver at a higher elevation than the noise source and a natural barrier (hill) between the receiver and the source.

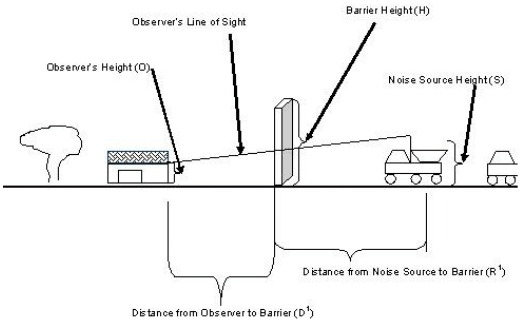
Noise receiver at a higher elevation than the noise source and a natural barrier (hill) between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-2.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #3:

Scenario #3:



Noise receiver at almost the same elevation of the noise source and a man-made noise barrier between the receiver and the source.

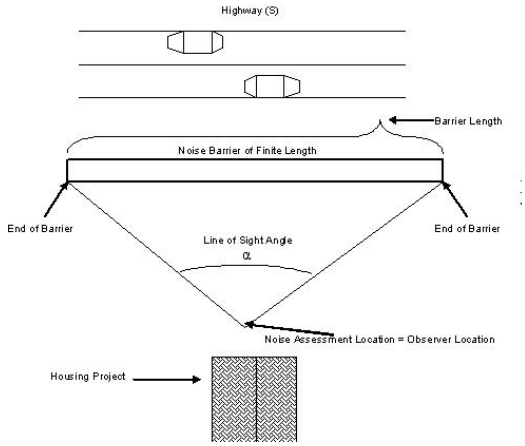
Noise receiver at almost the same elevation of the noise source and a man-made noise barrier between the receiver and the source.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-3.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Scenario #4:

Scenario #4:



A noise barrier of finite length between a noise source and a receiver. This top view illustrates the angle a, subtended by the barrier at the observer's location.

A noise barrier of finite length between a noise source and a receiver. This top view illustrates the angle α, subtended by the barrier at the observer's location.

(https://www.hudexchange.info/resources/documents/Barrier-Performance-Module-Barrier-Implementation-Scenario-4.gif)

view larger version of image (/resource/3841/barrier-performance-module-bpm-barrier-implementation-scenarios/)

Contents

Calculator

Input/Output Variables

Barrier Implementation Scenarios

Point D

	Unshielded DNL	Minimum Barrier Height (ft)	Subtended Angle (degrees)	Barrier Attenuation	Mitigated DNL	BPM File	Intermediate Decibel Summation
Park Ave	69.5	8.0	180.0	11.5	58.0	point_D-park.pdf	630957.344
Minorka Road	37.4	8.0			37.4		5495.40874
Union Pacific Railroad	55.9	8.0			55.9		389045.145
Total DNL					**60.1**		**1025497.9**

This location requires an eight foot high sound wall on the west and south sides of the backyards to shield from roadway noise. The south wall should extend at least half the length of the building on the south side.

Sound Transmission Classification Assessment Tool (STraCAT)

Part I - Description

Project

Rio Del Sol Durango north

Sponsor/Developer

Rio Del Sol Partners LLC

Location

5761 S Park Tucson, Arizona

Prepared by

Rick Bright

Noise Level

71.397

Date

2019-03-28

Primary Source(s)

Traffic

Part II - Wall Components

Wall Construction Detail	Area	STC			
7/8" stucco; #15 building p	157	**57**	7/8	157	57

Select a Diagram | Enter my Own

Add new wall

	157 Sq. Feet	**57**

Window Construction Detail	**Quantity**	**Sq Ft/Unit**	**STC**

Select a Diagram | Enter my Own

Add new window

Door Construction Detail	**Quantity**	**Sq Ft/Unit**	**STC**				
6'x6' slidin	1	**36**	**28**	6'	1	36	28

Select a Diagram | Enter my Own

Add new door

Part III - Results

Wall Statistics

Stat	**Value**
Area:	157 ft²
Wall STC:	57

.

Aperture	Count	Area	% of wall
Windows:	0	**0 ft²**	**0%**
Doors:	1	**36 ft²**	**22.93%**

Evaluation Criteria

Criteria	Value
Noise source sound level(dB):	**71.397**
Combined attenuation for wall component:	**34.38 dB**
Required attenuation:	**29.397000000000005**
Do Wall components meet requirements?	**Yes**

Print

Part 4 - Tips

What do you do if the preferred wall design is not sufficient to achieve the required attenuation? Another wall design with more substantial materials will work, but may not be the most cost-effective solution. Try adding some other elements for just a little more attenuation.

For example:

- Staggering the studs in a wall offers approximately 4dB of additional protection.
- Increasing the stud spacing from 16” on center to 24” can increase the STC from 2-5dB.
- Adding a 2” air space can provide 3dB more attenuation.
- Increasing a wall’s air space from 3” to 6”can reduce noise levels by an additional 5dB.
- Adding a layer of ½” gypsum board on “Z” furring channels adds 2dB of attenuation.
- Using resilient channels and clips between wall panels and studs can improve the STC from 2-5dB.
- Adding a layer of ½” gypsum board on resilient channels adds 5dB of attenuation.
- Adding acoustical or isolation blankets to a wall’s airspace can add 4-10dB of attenuation.
- A 1” rockwool acoustical blanket adds 3dB to the wall’s STC.

insulation adds 2dB to the STC.

Sound Transmission Classification Assessment Tool (STraCAT)

Part I - Description

Project

Rio Del Sol Durango south

Sponsor/Developer

Rio Del Sol Partners LLC

Location

5761 S Park Tucson, Arizona

Prepared by

Rick Bright

Noise Level

71.397

Date

2019-03-28

Primary Source(s)

Traffic

Part II - Wall Components

Wall Construction Detail	Area	STC			
7/8" stucco; #15 building p	157	**57**	7/8	157	57

Select a Diagram | Enter my Own

Add new wall

		157 Sq. Feet	**57**				

Window Construction Detail	**Quantity**	**Sq Ft/Unit**	**STC**				
-- select win	1	**20**	**25**	vi	1	2(	2!

Select a Diagram | Enter my Own

Add new window

Door Construction Detail	**Quantity**	**Sq Ft/Unit**	**STC**				
3'x7' solid-	1	**21**	**27**	3'	1	21	27

Select a Diagram | Enter my Own

Add new door

Part III - Results

Wall Statistics

Stat	**Value**
Area:	157 ft²

Stat	Value
Wall STC:	57

Aperture Statistics

Aperture	Count	Area	% of wall
Windows:	1	**20 ft²**	**12.74%**
Doors:	1	**21 ft²**	**13.38%**

Evaluation Criteria

Criteria	Value
Noise source sound level(dB):	**71.397**
Combined attenuation for wall component:	**31.73 dB**
Required attenuation:	**29.397000000000005**
Do Wall components meet requirements?	**Yes**

Print

Part 4 - Tips

What do you do if the preferred wall design is not sufficient to achieve the required attenuation? Another wall design with more substantial materials will work, but may not be the most cost-effective solution. Try adding some other elements for just a little more attenuation.

For example:

- Staggering the studs in a wall offers approximately 4dB of additional protection.
- Increasing the stud spacing from 16” on center to 24” can increase the STC from 2-5dB.
- Adding a 2” air space can provide 3dB more attenuation.

- Adding a layer of ½" gypsum board on "Z" furring channels adds 2dB of attenuation.
- Using resilient channels and clips between wall panels and studs can improve the STC from 2-5dB.
- Adding a layer of ½" gypsum board on resilient channels adds 5dB of attenuation.
- Adding acoustical or isolation blankets to a wall's airspace can add 4-10dB of attenuation.
- A 1" rockwool acoustical blanket adds 3dB to the wall's STC.
- Filling the cells of lightweight concrete masonry units with expanded mineral loose-fill insulation adds 2dB to the STC.

Sound Transmission Classification Assessment Tool (STraCAT)

Part I - Description

Project

Rio Del Sol Durango west

Sponsor/Developer

Rio Del Sol Partners LLC

Location

5761 S Park Tucson, Arizona

Prepared by

Rick Bright

Noise Level

71.397

Date

2019-03-28

Primary Source(s)

Traffic

Part II - Wall Components

Wall Construction Detail	Area	STC			
7/8" stucco; #15 building p	472	**57**	7/8	472	57

Select a Diagram | Enter my Own

Add new wall

	472 Sq. Feet	**57**

Window Construction Detail	**Quantity**	**Sq Ft/Unit**	**STC**

Select a Diagram | Enter my Own

Add new window

Door Construction Detail	**Quantity**	**Sq Ft/Unit**	**STC**			
-- select doc	0	**0**		0		

Select a Diagram | Enter my Own

Add new door

Part III - Results

Wall Statistics

Stat	**Value**
Area:	472 ft²
Wall STC:	57

.

Aperture	Count	Area	% of wall
Windows:	0	**0 ft²**	**0%**
Doors:	0	**0 ft²**	**0%**

Evaluation Criteria

Criteria	Value
Noise source sound level(dB):	**71.397**
Combined attenuation for wall component:	**57 dB**
Required attenuation:	**29.397000000000005**
Do Wall components meet requirements?	**Yes**

Print

Part 4 - Tips

What do you do if the preferred wall design is not sufficient to achieve the required attenuation? Another wall design with more substantial materials will work, but may not be the most cost-effective solution. Try adding some other elements for just a little more attenuation.

For example:

- Staggering the studs in a wall offers approximately 4dB of additional protection.
- Increasing the stud spacing from 16” on center to 24” can increase the STC from 2-5dB.
- Adding a 2” air space can provide 3dB more attenuation.
- Increasing a wall’s air space from 3” to 6”can reduce noise levels by an additional 5dB.
- Adding a layer of ½” gypsum board on “Z” furring channels adds 2dB of attenuation.
- Using resilient channels and clips between wall panels and studs can improve the STC from 2-5dB.
- Adding a layer of ½” gypsum board on resilient channels adds 5dB of attenuation.
- Adding acoustical or isolation blankets to a wall’s airspace can add 4-10dB of attenuation.
- A 1” rockwool acoustical blanket adds 3dB to the wall’s STC.

insulation adds 2dB to the STC.

Sound Transmission Classification Assessment Tool (STraCAT)

Part I - Description

Project

Rio Del Sol Eldorado north

Sponsor/Developer

Rio Del Sol Partners LLC

Location

5761 S Park Tucson, Arizona

Prepared by

Rick Bright

Noise Level

71.397

Date

2019-03-28

Primary Source(s)

Traffic

Part II - Wall Components

Wall Construction Detail	Area	STC			
7/8" stucco; #15 building p	157	**57**	7/8	157	57

Select a Diagram | Enter my Own

Add new wall

	157 Sq. Feet	**57**	

Window Construction Detail	Quantity	Sq Ft/Unit	STC				
-- select win	1	**9**	**25**	vi	1	9	2

Select a Diagram | Enter my Own

Add new window

Door Construction Detail	Quantity	Sq Ft/Unit	STC				
3'x7' wood	1	**21**	**26**	3'	1	21	26

Select a Diagram | Enter my Own

Add new door

Part III - Results

Wall Statistics

Stat	Value
Area:	157 ft²

Stat	Value
Wall STC:	57

Aperture Statistics

Aperture	Count	Area	% of wall
Windows:	1	**9 ft²**	**5.73%**
Doors:	1	**21 ft²**	**13.38%**

Evaluation Criteria

Criteria	Value
Noise source sound level(dB):	**71.397**
Combined attenuation for wall component:	**32.85 dB**
Required attenuation:	**29.397000000000005**
Do Wall components meet requirements?	**Yes**

Print

Part 4 - Tips

What do you do if the preferred wall design is not sufficient to achieve the required attenuation? Another wall design with more substantial materials will work, but may not be the most cost-effective solution. Try adding some other elements for just a little more attenuation.

For example:

- Staggering the studs in a wall offers approximately 4dB of additional protection.
- Increasing the stud spacing from 16” on center to 24” can increase the STC from 2-5dB.
- Adding a 2” air space can provide 3dB more attenuation.

- Adding a layer of ½" gypsum board on "Z" furring channels adds 2dB of attenuation.
- Using resilient channels and clips between wall panels and studs can improve the STC from 2-5dB.
- Adding a layer of ½" gypsum board on resilient channels adds 5dB of attenuation.
- Adding acoustical or isolation blankets to a wall's airspace can add 4-10dB of attenuation.
- A 1" rockwool acoustical blanket adds 3dB to the wall's STC.
- Filling the cells of lightweight concrete masonry units with expanded mineral loose-fill insulation adds 2dB to the STC.

Sound Transmission Classification Assessment Tool (STraCAT)

Part I - Description

Project

Rio Del Sol Eldorado south

Sponsor/Developer

Rio Del Sol Partners LLC

Location

5761 S Park Tucson, Arizona

Prepared by

Rick Bright

Noise Level

71.397

Date

2019-03-28

Primary Source(s)

Traffic

Part II - Wall Components

Wall Construction Detail	Area	STC			
7/8" stucco; #15 building p	157	**57**	7/8	157	57

Select a Diagram | Enter my Own

Add new wall

		157 Sq. Feet	**57**				

Window Construction Detail	**Quantity**	**Sq Ft/Unit**	**STC**				
-- select win	1	**20**	**25**	vi	1	2(	2!

Select a Diagram | Enter my Own

Add new window

Door Construction Detail	**Quantity**	**Sq Ft/Unit**	**STC**				
3'x7' solid-	1	**21**	**27**	3'	1	21	27

Select a Diagram | Enter my Own

Add new door

Part III - Results

Wall Statistics

Stat	**Value**
Area:	157 ft²

Stat	Value
Wall STC:	57

Aperture Statistics

Aperture	Count	Area	% of wall
Windows:	1	**20 ft²**	**12.74%**
Doors:	1	**21 ft²**	**13.38%**

Evaluation Criteria

Criteria	Value
Noise source sound level(dB):	**71.397**
Combined attenuation for wall component:	**31.73 dB**
Required attenuation:	**29.397000000000005**
Do Wall components meet requirements?	**Yes**

Print

Part 4 - Tips

What do you do if the preferred wall design is not sufficient to achieve the required attenuation? Another wall design with more substantial materials will work, but may not be the most cost-effective solution. Try adding some other elements for just a little more attenuation.

For example:

- Staggering the studs in a wall offers approximately 4dB of additional protection.
- Increasing the stud spacing from 16” on center to 24” can increase the STC from 2-5dB.
- Adding a 2” air space can provide 3dB more attenuation.

- Adding a layer of ½" gypsum board on "Z" furring channels adds 2dB of attenuation.
- Using resilient channels and clips between wall panels and studs can improve the STC from 2-5dB.
- Adding a layer of ½" gypsum board on resilient channels adds 5dB of attenuation.
- Adding acoustical or isolation blankets to a wall's airspace can add 4-10dB of attenuation.
- A 1" rockwool acoustical blanket adds 3dB to the wall's STC.
- Filling the cells of lightweight concrete masonry units with expanded mineral loose-fill insulation adds 2dB to the STC.

Sound Transmission Classification Assessment Tool (STraCAT)

Part I - Description

Project

Rio Del Sol Eldorado west

Sponsor/Developer

Rio Del Sol Partners LLC

Location

5761 S Park Tucson, Arizona

Prepared by

Rick Bright

Noise Level

71.397

Date

2019-03-28

Primary Source(s)

Traffic

Part II - Wall Components

Wall Construction Detail	Area	STC			
7/8" stucco; #15 building p	350	**57**	7/8	350	57

Select a Diagram | Enter my Own

Add new wall

	350 Sq. Feet	**57**	

Window Construction Detail	Quantity	Sq Ft/Unit	STC				
-- select wind	0	**0**	**0**		0	0	0

Select a Diagram | Enter my Own

Add new window

Door Construction Detail	Quantity	Sq Ft/Unit	STC				
-- select doc	0	**0**			0		

Select a Diagram | Enter my Own

Add new door

Part III - Results

Wall Statistics

Stat	Value
Area:	350 ft²

Stat	Value
Wall STC:	57

Aperture Statistics

Aperture	Count	Area	% of wall
Windows:	0	**0 ft²**	**0%**
Doors:	0	**0 ft²**	**0%**

Evaluation Criteria

Criteria	Value
Noise source sound level(dB):	**71.397**
Combined attenuation for wall component:	**57 dB**
Required attenuation:	**29.397000000000005**
Do Wall components meet requirements?	**Yes**

Print

Part 4 - Tips

What do you do if the preferred wall design is not sufficient to achieve the required attenuation? Another wall design with more substantial materials will work, but may not be the most cost-effective solution. Try adding some other elements for just a little more attenuation.

For example:

- Staggering the studs in a wall offers approximately 4dB of additional protection.
- Increasing the stud spacing from 16” on center to 24” can increase the STC from 2-5dB.
- Adding a 2” air space can provide 3dB more attenuation.

- Adding a layer of ½" gypsum board on "Z" furring channels adds 2dB of attenuation.
- Using resilient channels and clips between wall panels and studs can improve the STC from 2-5dB.
- Adding a layer of ½" gypsum board on resilient channels adds 5dB of attenuation.
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- A 1" rockwool acoustical blanket adds 3dB to the wall's STC.
- Filling the cells of lightweight concrete masonry units with expanded mineral loose-fill insulation adds 2dB to the STC.

Routes

- 21 - Congress/Silverbell - South
- 22 - Grande - North
- 22 - Grande - South
- 23 - Mission Road - North
- 23 - Mission Road - South
- 24 - S 12th Ave - North
- 24 - S 12th Ave - South
- [x] **25 - S Park Ave - North**
- 25 - S Park Ave - South
- 26 - Benson Highway - West

Stops

First Intermediate Last

Vehicles

On Time Early Late

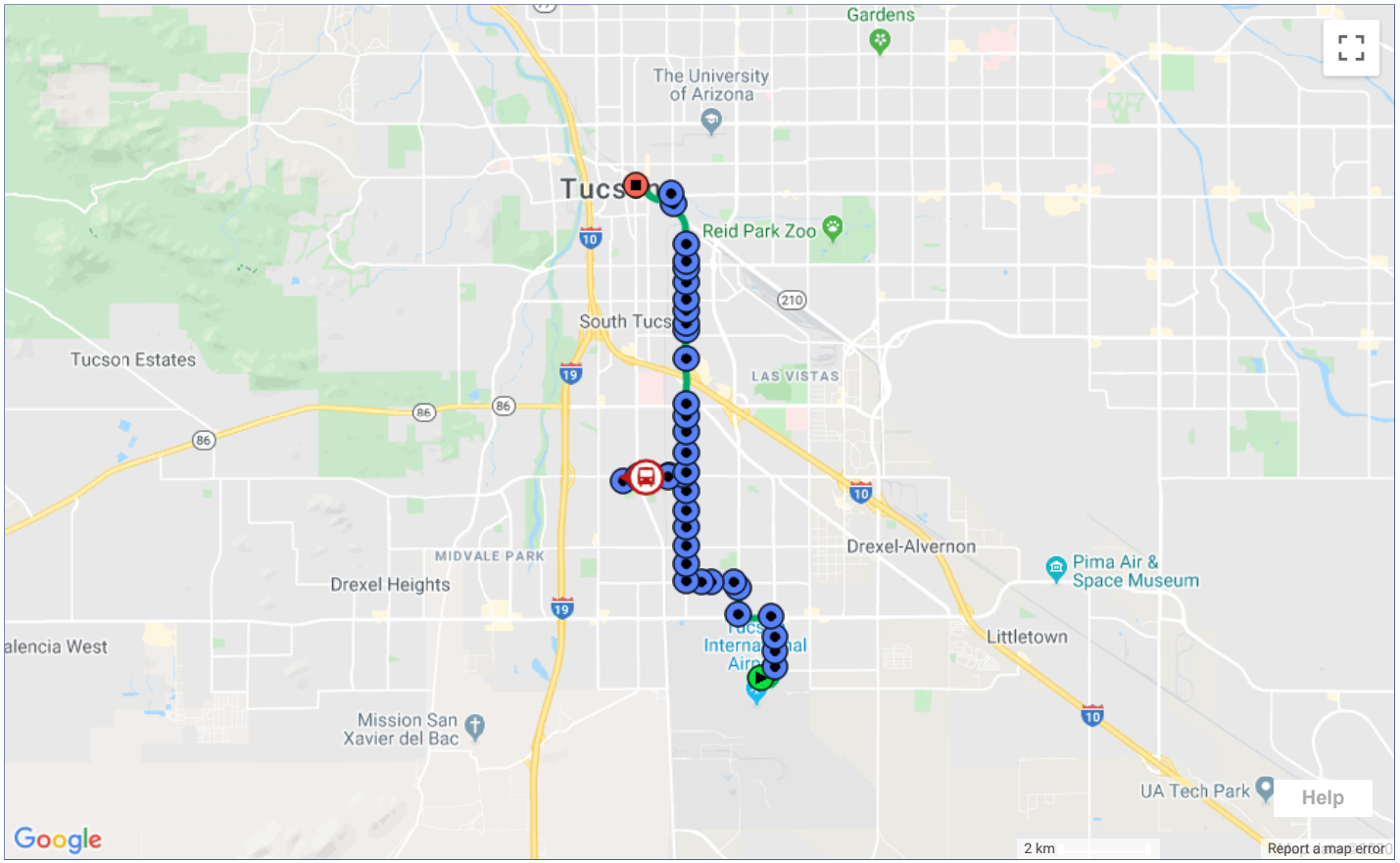
No Info

Trip Planning

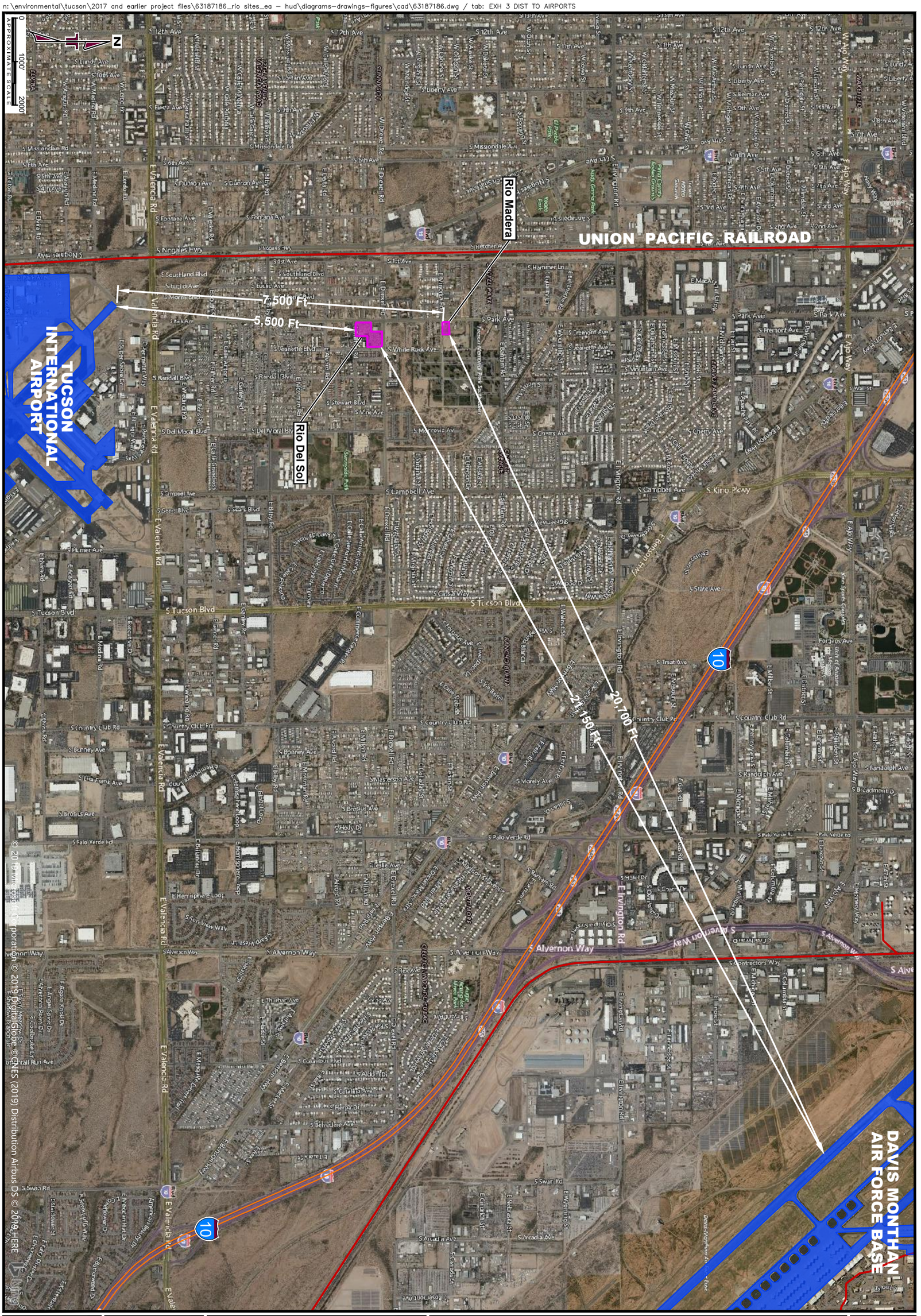
Route Schedules

Next Departures

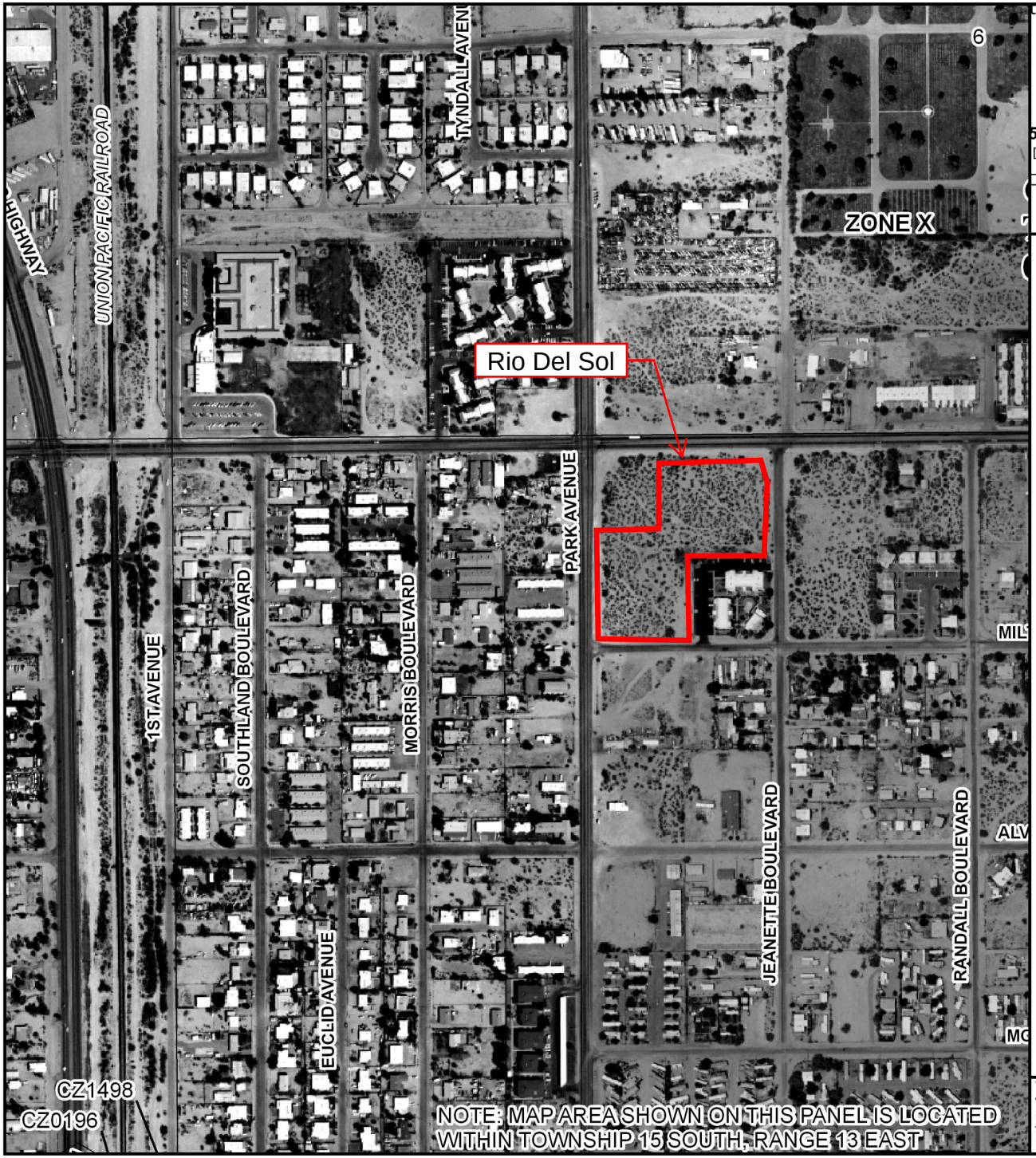
Landmarks



n:\environmental\tucson\2017 and earlier project files\63187186_rio sites_ea – hud\diagrams–drawings–figures\cad\63187186.dwg / tab: EXH 3 DIST TO AIRPORTS



Project Mngr: MKZ	Project No. 63187186	Terracon Consulting Engineers and Scientists	DISTANCE TO AIRPORTS
Drawn By: KLJ	Scale: AS SHOWN	4685 South Ash Avenue, Suite H-4 Tempe, AZ 85282	Rio Sites
Checked By: MKZ	File No. 63187186.DWG	PH. (480) 897-8200 FAX. (480) 897-1133	Rio Del Sol: 5761 South Park Avenue Rio Madera: 5489 South Park Avenue Tucson, Pima County, Arizona
Approved By: MKZ	Date: 04/05/2019		EXHIBIT 3



...ional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2289L

FIRM

FLOOD INSURANCE RATE MAP

PIMA COUNTY, ARIZONA
AND INCORPORATED AREAS

PANEL 2289 OF 4750

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
PIMA COUNTY	040073	2289	L
TUCSON, CITY OF	040076	2289	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04019C2289L

MAP REVISED
JUNE 16, 2011

Federal Emergency Management Agency

...ional Flood Insurance Program at 1-800-638-6620.

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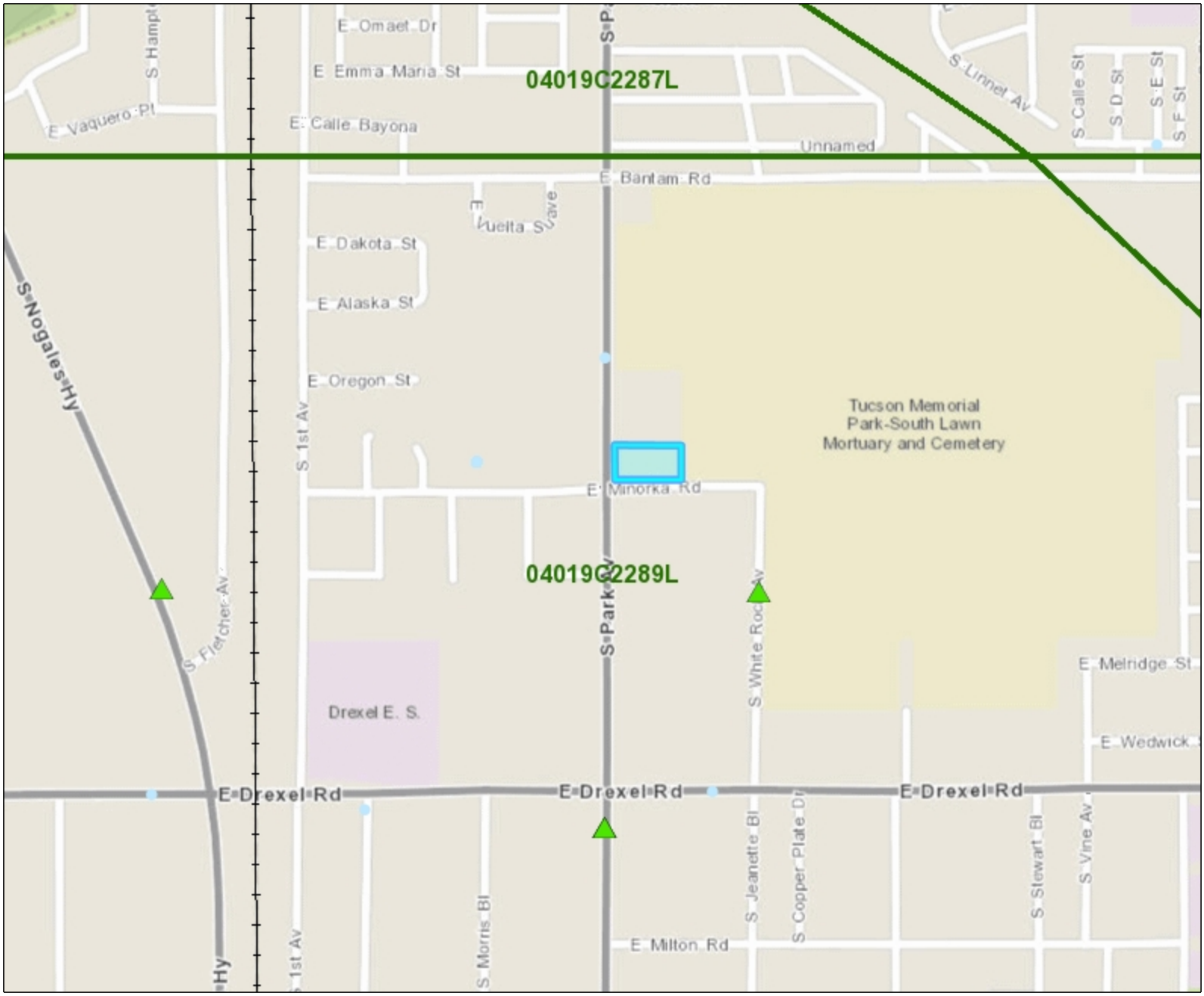
Federal Emergency Management Agency

Rio Mercado Apartments lot 1



Notes

Parcel 140-21-002B

Legend

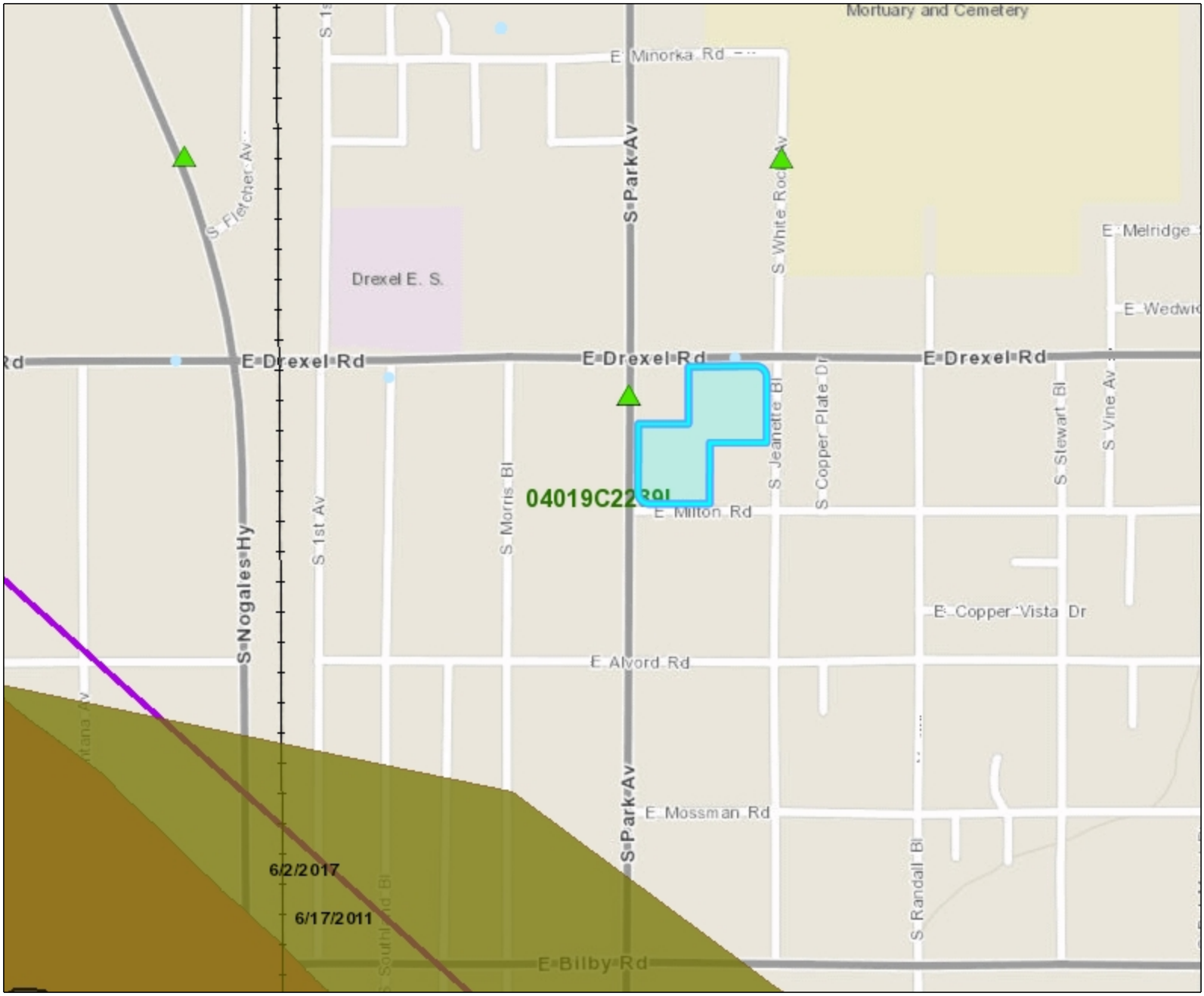
- Land Fills - City/County
- Land Fills - State/Federal
- Leaking Underground Storage Tanks - COT Owned
- Brownfields (ACRES)
- Radiation Info (RADINFO)
- Hazardous Waste (RCRA)
- Toxic Releases (TF
- ZONE AE
- ZONE AH
- ZONE AO
- X Zones
- Areas of 100-year flo
- Areas of 500-year flo
- LOMR
- Excluded Structures/Parcels
- Other
- Floodway
- 1% Chance Flood Contained in Culvert/Channel
- FIRM
- Historic Properties
- Listed
- Listed and Local
- Contributor
- Eligible
- Ineligible
- Non-Contributor
- No Data
- Demolished Contribut
- Demolished
- Demolished
- Vacant
- Outside of HD
- City of Tucson Historic Zones
- H Zones
- N Zones
- City of Tucson National Register Districts
- Current National
- Eligible National
- Railroads
- AEZ_CUZs
- CUZ-1
- CUZ-2
- CUZ-3
- CUZ-4
- AEZ Noise
- 65-70 LDN
- 70-75 LDN
- 70-PLUS LDN
- 75-80 LDN
- 80-PLUS LDN
- DM AFB Approach-Departu Corridors

1: 9,028

0.3 0 0.14 0.3 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

Rio Mercado Apartments lot 1



Notes

Parcel 14025008A

Legend

- Land Fills - City/County
- Land Fills - State/Federal
- Leaking Underground Storage Tanks - COT Owned
- Brownfields (ACRES)
- Radiation Info (RADINFO)
- Hazardous Waste (RCRA)
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WGS_1984_Web_Mercator_Auxiliary_Sphere