Douglas Wastewater Treatment Plant Upgrade and Bay Acres Colonia Wastewater Collection System Expansion For the City of Douglas, Arizona

Environmental Assessment

January 7, 2014

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1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) administers the Border Environment Infrastructure Fund (BEIF), which provides grant funding for water and wastewater infrastructure projects located along the international boundary between the United States (U.S.) and Mexico. EPA policy for use of border funds requires evaluation and certification of projects by the Border Environment Cooperation Commission (BECC) as a condition for grant award. As part of the BECC certification process, the proposed project must comply with (1) Mexican environmental regulations and (2) the National Environmental Policy Act (NEPA). The EPA requires compliance with NEPA before BEIF funds can be authorized. Projects within 62 miles (mi) (100 kilometers [km]) of the U.S./Mexico border are eligible for BEIF assistance.

In accordance with the U.S. Council of Environmental Quality (CEQ) regulations, 40 CFR Parts 1500-1508, and EPA regulations (40 CFR Part 6) as guidance, this EA documents the environmental consequences in the US of the proposed federal action. The purpose of this document is to comply with NEPA documentation requirements for the proposed federal action under consideration, which consists of the City of Douglas Wastewater Treatment Plant Upgrade and Bay Acres Colonia Wastewater Collection System Expansion.

1.1 STUDY LOCATION

The City of Douglas is located in the southeastern corner of Arizona in Cochise County (see **Figure 1.1**). Douglas is on the US-Mexico International Border adjacent to the City of Agua Prieta, Mexico, approximately 119 miles southeast of Tucson, Arizona. Douglas is located at latitude 31°20’38.65”N, and longitude of 109°32’42.79”W. State Highway 80 (Pan American Avenue) runs north-south through the community and is the main access to Douglas. The San Bernardino and Leslie Canyon National Wildlife Preserves are located 16 miles from Douglas. The Chiricahua Mountains are approximately 40 miles northwest of Bay Acres Colonia.

The community consists of residential housing, small commercial districts, a 2,000 inmate prison, hospital, fire station, post office, police department, recreation center, and an aquatic center. The Bay Acres Colonia is located in the northeastern part of Douglas, outside of the City limits and south of Highway 80. The City of Douglas is currently serving the residents of Bay Acres with drinking water service; all of the residences have decentralized onsite sewage treatment systems, many of them inadequate and non-functioning.

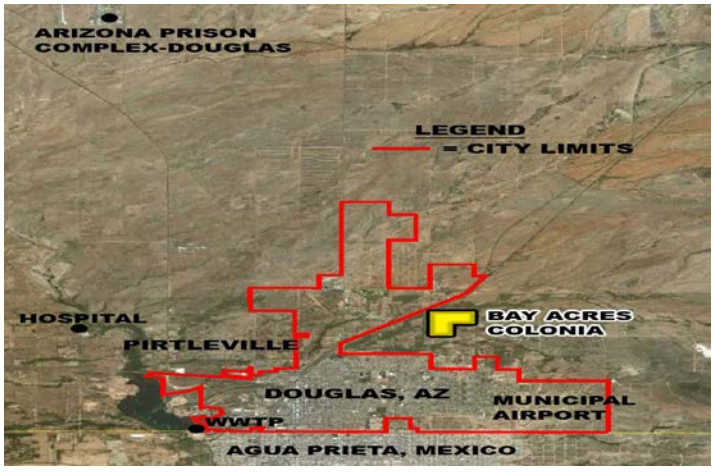

Figure 1.1: Project Location Map

1.2 PURPOSE AND NEED

The expansion of the wastewater collection system to the Bay Acres Colonia and upgrade of the Douglas Wastewater Treatment Plant addressed in this EA are intended to provide improved health, sanitation, and security to the residents of the Bay Acres Colonia and the City of Douglas.

The Bay Acres Colonia is currently serviced by inadequate, failing onsite wastewater collection systems (septic tanks with leach fields). These onsite treatment systems are problematic in Bay Acres because the residential lots are small and the systems are either failing or near the end of their useful life. As a result, the small lots do not provide an adequate area for a new or replacement leach field. In addition, the economic downturn has resulted in many families moving in with each other and these large households are contributing to system failure. When the septic systems fail, the lots typically have no room for expansion. To help prevent system failure, at least 25% of the Bay Acre residences appear to be discharging gray water in their yards to minimize the amount of water into the onsite systems. Improper gray water techniques and onsite treatment system failure are resulting in the discharge of inadequately treated sewage, black water, and gray water to streets, backyards, and alley ways. In some instances, there has been evidence of small children playing in the ponding from these discharges. The failing on-site wastewater collection systems are a public health concern due to various pathogenic microorganisms, ammonia and nitrate that may produce a health risk to humans and degrade the environment.

Currently the Douglas WWTP has flows that are averaging 2.3 MGD and is over the current permitted capacity of 2.0 MGD. With the connection from the Bay Acres Colonia and other existing homes along Washington Ave. and 24th Street along, the service flow will be about 2.5 MGD. Therefore, an expansion of 0.6 MGD will be required to accommodate the flows from full build out of the Bay Acres Colonia. ADEQ requires that a WWTP operate at 85% of its permitted capacity; thus, with Douglas WWTP operating at approximately 2.5 MGD, the minimum capacity that the WWTP would be allowed is 3.1 MGD and still comply with Arizona's regulations.

In addition, this project will increase the capacity of the wastewater treatment plant from 2.0 MGD under Aquifer Protection Permit (#APP-100831) to 3.1 MGD in order to accept and treat flows from the wastewater collection system expansion and allow for limited and controlled build out of the City and adjacent areas. The need for increased capacity at the WWTP facility to serve Bay Acres Colonia triggers a new Aquifer Protection Permit with stricter effluent requirements. These new requirements necessitate the inclusion of process units for the reduction of effluent nitrogen concentration as part of the expansion/upgrade. The upgraded treatment process will help meet the Douglas Aquifer Protection Permit requirements and minimum Class B+ effluent standards to enable the reuse of the effluent on open access landscape areas in the project.

1.3 SCOPE OF ANALYSIS

The scope of this EA includes the evaluation of the impact to the relevant environmental resources within the defined area of concern in the U.S. As defined in the CEQ regulations (§1508.25), the scope consists of the range of actions, alternatives, and impacts to be considered in a NEPA-compliant document.

2.0 PROJECT DESCRIPTION AND ALTERNATIVES

In accordance with Council on Environmental Quality (CEQ) regulations (§1502.14), this section of the EA: 1) presents and objectively evaluates three alternatives, including the No Action alternative; 2) devotes substantial treatment to each alternative considered in detail so the reviewers may evaluate comparative merits; and 3) includes appropriate mitigation measures. Based on the information and analysis presented in Section 3.0 (Affected Environment) and Section 4.0 Environmental Consequences), this section also presents the potential environmental impacts of the alternatives in comparative form, which defines the issues and provides a clear basis for choice among options by decision makers and the public.

2.1 PROPOSED ACTION

The Proposed Action involves the construction of a wastewater collection system for the Bay Acres Colonia and expansion and upgrade of the existing Douglas WWTP from 2.0 MGD to 3.1 MGD with treatment to reduce effluent nitrogen concentrations. The proposed upgrade of the Douglas WWTP would consist of the construction of two oxidation ditches, a secondary clarifier, lift station, aerobic digester, and an operations and maintenance building. The WWTP expansion/upgrade will be accompanied by decommissioning of existing components that will no longer be in use. The proposed expansion/upgrade will fit within the confines of the existing WWTP footprint. The City of Douglas will seek funding from agencies including the US EPA through BECC and NADBank, and USDA-RD. This EA will analyze three alternatives, including the No Action alternative for the Douglas wastewater treatment plant.

The proposed wastewater collection system improvements will be installed to provide wastewater collection service to the Bay Acres Colonia and immediate surrounding area, which currently rely on septic tank systems for sewage treatment. Many of the septic systems fail to provide adequate treatment and need to be replaced. Approximately 370 total units will receive service from the collection system expansion. Several action alternatives were developed for the wastewater collection system improvements. This EA will analyze three alternatives, including the No Action alternative.

Douglas Wastewater Treatment Plant

The existing wastewater treatment plant consists of an activated sludge process with headworks, two aeration basins, two clarifiers, a belt filter press, chlorination contact chamber, dechlorination, and concrete sludge drying beds. The existing WWTP currently has a capacity of 2.0 MGD. According to ADEQ's reclaimed water rating system, the WWTP currently produces an effluent classified as Class C. The effluent from the WWTP is discharged directly across the border to Agua Prieta via a 24-inch PVC pipe. The effluent is used primarily for crop irrigation in Mexico.

The upgrades to the wastewater treatment plant will be located in the same location as the existing facility. The site is located in the southwest portion of the City of Douglas. The facility is bounded to the north and east by private land that was previously used as a smelter facility; to the south by the US-Mexico border; and to the west by City land.

The proposed WWTP will increase capacity from 2.0 MGD to 3.1 MGD. The proposed WWTP upgrades will provide treatment for all residents of Bay Acres Colonia, and existing homes along

Washington Avenue and 24th Street, and will meet the existing needs of the City of Douglas plus consideration for reasonable planned and controlled growth. The need for increased capacity at the WWTP facility to serve Bay Acres triggers a new Aquifer Protection Permit with stricter effluent requirements. These new requirements necessitate the inclusion of process units for the reduction of effluent nitrogen concentration as part of the expansion/upgrade.

It is intended that the treated effluent from the WWTP will continue to be discharged for use in Agua Prieta, Mexico. The proposed WWTP will be capable of producing a Class B+ effluent. The Proposed Action includes a lift station, oxidation ditches, clarifier, and an aerobic digester. Piping modifications to the existing headworks, disinfection contact chamber, Recycle and Waste Activated Sludge (RAS and WAS) systems, and the belt filter press will also be incorporated into the proposed improvements. The proposed improvements will be constructed within the existing facility's footprint. An operation and maintenance building and perimeter security are also being considered for the proposed improvements.

Bay Acres Wastewater Collection System
The Bay Acres community is located to the northeast of the City of Douglas, just outside of the City limits and south of Highway 80. The City of Douglas currently provides the residents of Bay Acres with drinking water service. None of the residents are receiving centralized wastewater services.

The proposed collection system is expected to connect 318 dwellings within the Bay Acres Colonia, 32 units along 24th Street, and 20 units in the surrounding area adjacent to Bay Acres, to the City's centralized wastewater collection system. This amounts to 370 existing sewer services, producing approximately 103,780 gallons per day (gpd) of wastewater flow. An additional 148 future connections for a total of 508 connections may produce up to 142,764 gpd of sewage within Bay Acres, and along Washington Avenue and 24th Street, if and when full build-out occurs.

The Proposed Action will require approximately 25,840 linear feet of 8-inch PVC (SDR 35) gravity sewer pipe, 370 sewer service connections (4-inch lines for laterals) for existing residences, and 59 sewer manholes. Due to its natural slope in the south-west direction, the proposed alternative is a gravity sewer system that will not require a lift station. The proposed collection system would be routed along 24th Street and tie into an existing 8-inch gravity sewer line at Eddie Avenue and 23rd Street. Septic systems for households connecting to the new centralized collection system will be properly closed according Arizona Administrative Code (AAC), Title 18, Chapter 9, Section D.

2.2 ALTERNATIVES CONSIDERED - DOUGLAS WASTEWATER TREATMENT PLANT

Alternative 1—No Action
The No Action alternative is intended to be used as the baseline alternative for all the other alternatives to be compared. No action would result in repeated non-compliance with ADEQ permit requirements since the WWTP is currently exceeding its plant capacity. The No Action alternative would most likely result in a compliance action that prevents Douglas from adding

connections to the wastewater collection system. Bay Acres and other customers that have been issued capacity assurances would need to look at other alternatives to repair failing onsite treatment systems or provide new services. These compliance actions do not remedy the public health and environmental threats and are not the preferred alternative for ADEQ, the EPA, the City of Douglas, or other governmental agencies. The residents of Bay Acres do not have the area on their properties for new leach fields. Many of the homes take up most of the lot, indicating that the leach field was installed before the home was built or a leach field was never properly installed.

The No Action alternative does not protect public health or water quality in the Douglas city limits and surrounding areas. If no action was taken, it would most likely result in significant violations of the Douglas WWTP's APP permit and potentially an administrative order issued by ADEQ. In addition to having to pay fines, Douglas would likely also have to pay attorney fees to deal with the legal ramifications of non-compliance. When the possible violations and monetary fines are taken into account, the operation cost of non-compliance can exceed the cost of building a new plant and, in the end, the City would be required to upgrade the WWTP to meet the capacity limits.

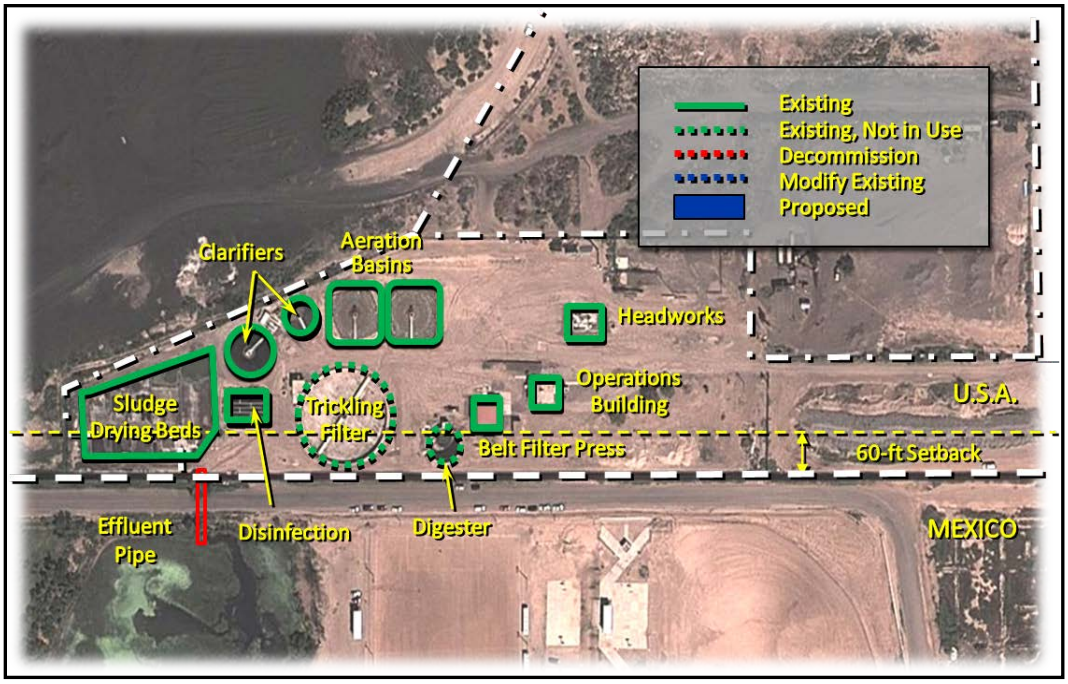

Figure 2.1: Existing Wastewater Treatment Plant Site Layout (No Action Alternative)

Alternative 2—Aeration Basin

This alternative includes constructing a new larger aeration basin and retrofitting one of the existing aeration basins to get the needed 3.1 MGD plant capacity. In addition to the aeration basin, the other existing aeration basin may be retrofitted to function as an anoxic basin for nitrification/de-nitrification process, the smaller clarifier will be decommissioned and a new clarifier the same size as the existing larger clarifier will be constructed, and a new aerobic digester should be constructed for biosolids stabilization.

The existing aeration basins are over 30 years old and were constructed of a four-inch wire mesh with two inches of pneumatically placed concrete. Due to the age and construction method of the aeration basins, it is unlikely that the basins are watertight. The existing aeration basins may be lined to mitigate any leakage that occurs. Replacement and/or modifications of the existing basins will allow the use of more efficient aeration, having a lower O&M cost.

The existing secondary clarifiers appear to be in good condition; however, they are shallower when compared to today's standards. This alternative will replace the 50-foot clarifier with a new 77-foot secondary clarifier that is equal to the size of the larger existing clarifier. Modification can also be considered for the existing clarifier to improve the efficiency. The smaller secondary clarifier can then be decommissioned.

All components proposed in Alternative 2 (shown in **Figure 2.2**) would be compatible should the plant's capacity be expanded in the future.

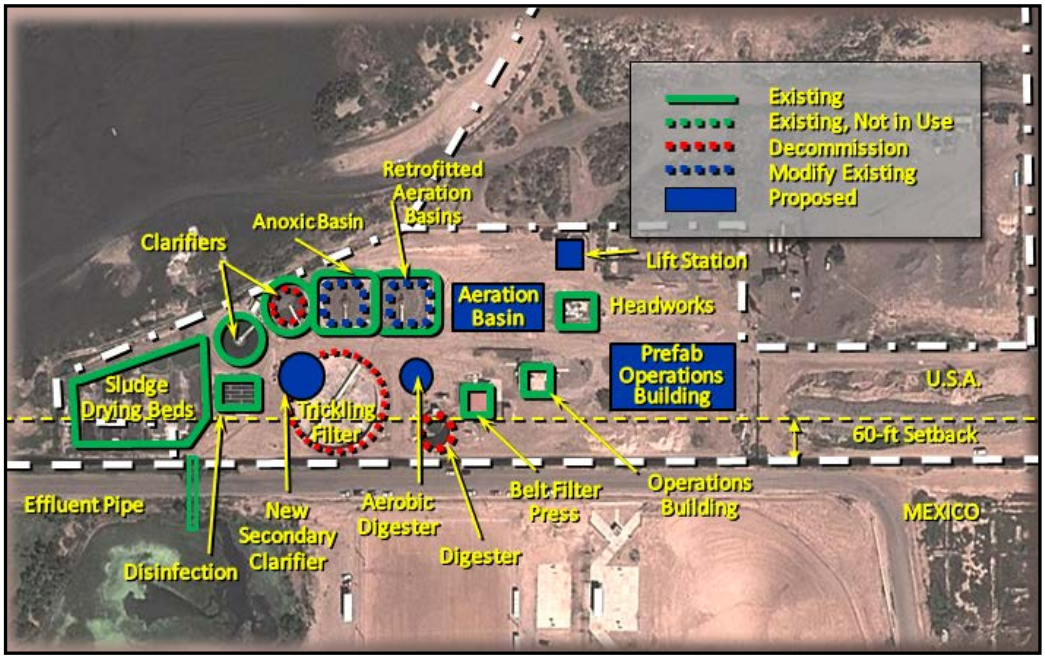

Figure 2.2: Aeration Basin Site Layout (Alternative 2)

Alternative 3—Oxidation Ditch

The oxidation ditch is an activated sludge process. The oxidation ditch will be capable of producing high quality effluent because of the detention time and recirculation of the mixed liquor suspended solids (MLSS) which gives it the capability of removing more nitrogen than other activated sludge processes. The higher quality effluent should have total nitrogen concentrations within the WWTP's anticipated APP limits. An oxidation ditch is an oval-shaped basin where MLSS continuously flow around the oval at a speed of approximately 0.8 to 1.2 ft/s to keep the solids suspended, as

Figure 2.3: Oxidation Ditch

shown in **Figure 2.3.**

The oxidation ditch is a looped system where water travels around the ditch several times before it is discharged, creating a large internal recycle volume. The high internal recycle can lead to nearly complete de-nitrification, resulting in low effluent nitrogen concentrations.

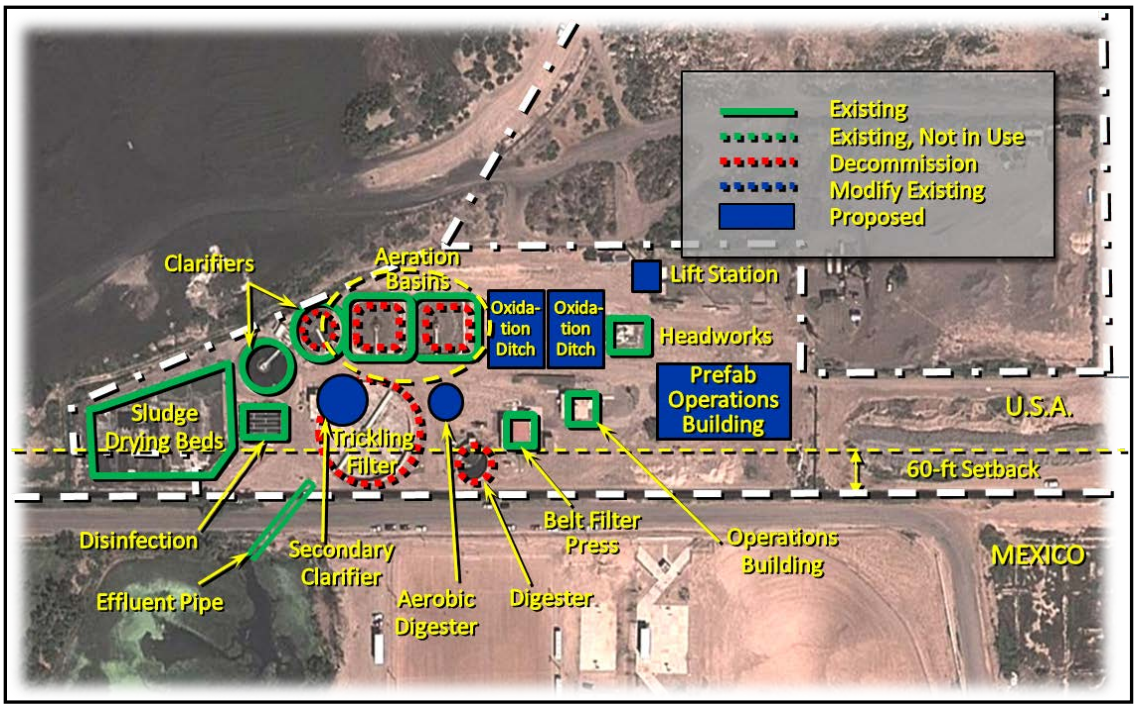

Figure 2.4: Oxidation Ditch Treatment Plant Site Layout (Alternative 3)

Alternative 4—Sequencing Batch Reactor

The Sequencing Batch Reactor (SBR) is an activated sludge process that operates in a batch mode. If the SBR is chosen, it would include concrete reactor basins, mixers, waste pumps, and a control area. The process utilizes a fill and draw reactor with complete mixing during the batch reaction step; subsequent aeration and clarification steps occur in the same tank. As with other activated sludge processes, BOD removal, and nitrification and de-nitrification processes are performed in an SBR system. The SBR process does not require a RAS system like other activated sludge processes since both aeration and settling occur in the same basin. Treated flow from the basin is fed to the disinfection system prior to discharge. WAS from the SBR system is fed to digesters and the belt filter press for solids management. **Figure 2.5** depicts the sequencing batch reactor treatment plant layout.

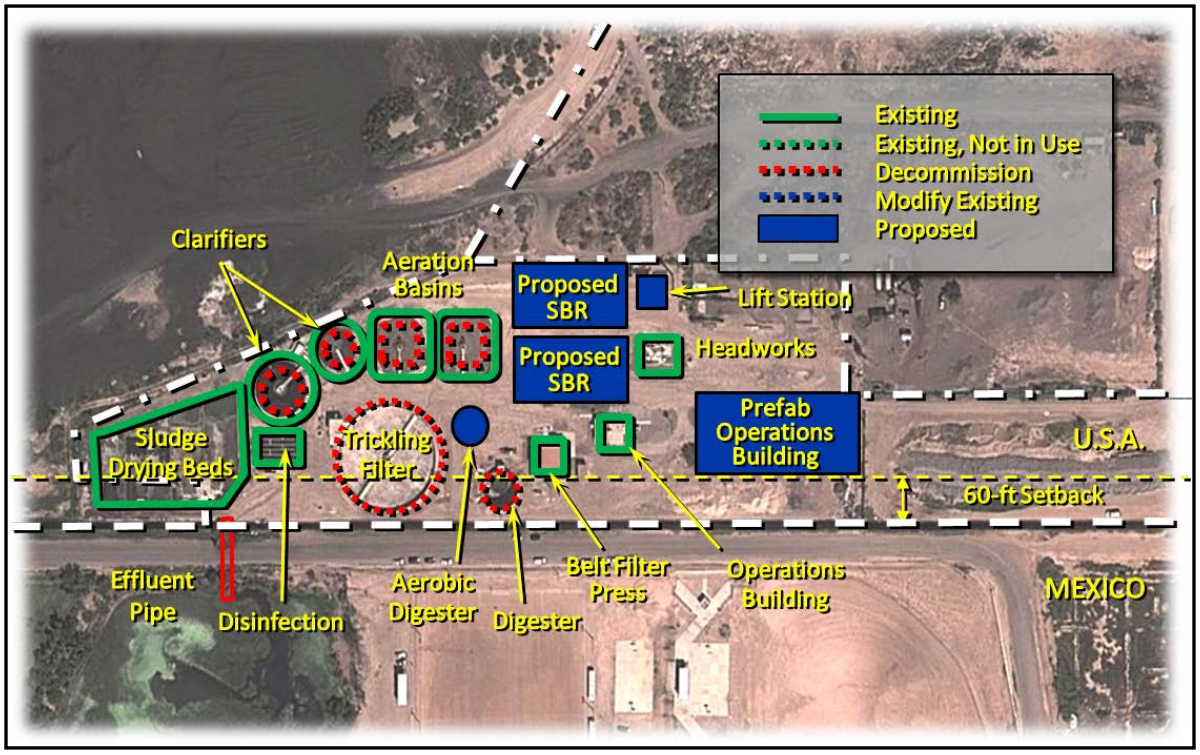

Figure 2.5: Sequencing Batch Reactor System Site Layout (Alternative 4)

2.3 ALTERNATIVES CONSIDERED—BAY ACRES COLONIA

Alternative 1 – No Action
The No Action alternative is intended to be used as the baseline alternative to compare all viable options. The current situation with the failing septic tanks presents an acute risk to human health and safety. The City of Douglas has been trying for years to alleviate the wastewater issues currently facing the Bay Acres Colonia, and adjacent areas.

The No Action alternative does not protect public health or water quality. The No Action alternative would result in the potential for continued leakage of untreated or partially treated wastewater, exposure of the residents to this public health threat, and possible contamination of the surrounding area and soil, nearby water wells, and ground water.

Alternative 2 – Gravity Wastewater Collection System

This alternative involves discharging the sewage from the Bay Acres Colonia and the adjacent areas into an existing 8-inch gravity sewer line on 24th Street and Eddie Street. Although the closest discharge point is actually at a sewer manhole on 23rd Street and Washington Avenue, the tie-in point on 24th Street and Eddie Street was selected since 24th Street (between Washington Avenue and Eddie Street) also contains residents with failing septic tank systems. The tie-in will be to the wastewater collection system within the jurisdiction of the City of Douglas. Initially, the Bay Acres Colonia is expected to produce approximately 103,780 gpd of sewage with 370 sewer connections to existing residents. The projected amount of sewage may increase to as much as 142,764 gpd with 508 sewer connections at total build-out.

Figure 2.6: System Layout, Gravity Sewer System (Alternative 2)

Alternative 3 –Vacuum Collection System

The use of a vacuum collection system is typical in areas where the transport of sewage becomes a challenge via gravity due to challenges with ground conditions (hard rock, calcareous material, mountainous terrain, etc.) and in areas where sloping conditions do not lend themselves to a gravity system. Moreover, in situations where a narrow and shallow trench is needed, vacuum lines are employed and the installation is simplified since there are no strict gradient and alignment requirements. Initially, the total wastewater flow for residents with septic tank systems (370 sewer connections) is expected to produce 103,780 gpd. The projected amount of sewage may increase to as much as 142,764 gpd with 508 sewer connections projected as in-fill in the Colonia occurs. The vacuum collection system is shown in **Figure 2.7**.

The system includes 24,600 linear feet of 4-inch and 2,600 linear of 6-inch PVC pipe. The best location for the vacuum station was selected to be in the northeast corner of the intersection of

24th Street and Washington Avenue. A 6-inch PVC C-900 pressure line will be needed to eventually discharge to the City of Douglas 8-inch gravity sewer line system. Flows from the project area will then flow via gravity to the Douglas WWTP.

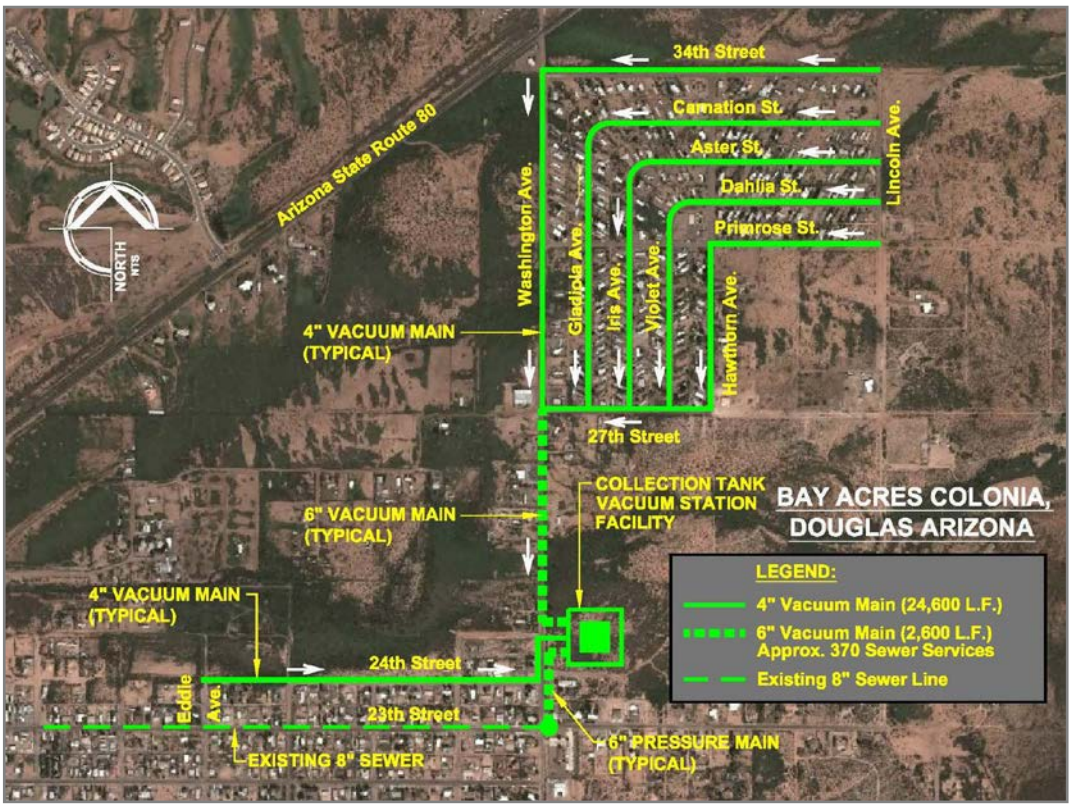

Figure 2.7: Vacuum Collection System

Alternative 4 – Aerated Treatment Pond System. This alternative will involve the use of an aerated treatment pond system. Although the ADEQ may ultimately not approve the use of aerated ponds, it is presented herein for a streamlined comparison.

Aerated treatment system-type ponds use mechanical or a diffused air system (artificial aeration). The system of this particular type offers a high efficiency level of oxygen in a one basin module which is separated in several single treatment steps, such as the BIOWORKS-process. Consequently the clarifier is embedded as well into this module. The main advantages of this embedded design are: 1) reduced footprint because of compact construction; 2) waste water is flowing by gravity through the single process steps and 3) there is no need for interconnecting pipe or pumps.

This system is not a fixed grid aeration system, but instead provides a lateral oscillating motion of floating air header pipes combined with the suspended OXIWORKS® diffuser allowing free movement within the bioreactor. While the system provides aeration to zones with lower dissolved oxygen content, it also makes treatment more efficient. The development of the cleaning system OXIRISE® made the system easier for maintenance. By inserting pressurized air over a special air distribution system into the diffuser body, each individual diffuser can

independently float to the surface. From there, it can be directly inspected in the boat or removed for other purposes. Aerated lagoons require less land area and shorter detention times for wastewater than other lagoons; which is why they are very common in small communities. The aerated treatment pond system layout is shown in **Figure 2.8**.

Figure 2.8: Aerated Treatment Pond System

Based on design parameters and specifications from BIOWORKS, a treatment plant of approximately 1,799 people (build-out amount) requires at least two lagoons in series, with the first being complete mix and the other being a partial mix. The second lagoon will achieve the 30 mg/l BOD in the effluent. Each lagoon will have side slopes of 2:1 and about 2 feet of freeboard. Details of the lagoon size and aeration requirements are listed in Table 2-1.

Table 2-1. Lagoon Details and Aeration Requirements

	Lagoon 1*	Lagoon 2*
Volume, MGD	0.2	0.2
Length x width (at grade), ft	295 X207	294 X 207
SWD, ft	12	12
No. aeration headers	10	4
No. OXIWORKS/header	7	4
SCFM req'd	1,700	400

*BOD and TSS limits of 30 mg/L

Each OXIWORKS assembly will have four tube diffusers for a combined total of approximately 284 tubes. Only one 100 HP blower out of two will be utilized to feed Lagoon 1 with one blower as a spare. For Lagoon 2, two 25 HP blowers are needed, but one will act as a spare, for a total of 4 blowers. Lagoon 2 could be partitioned off for settling to achieve desired TSS levels. Sludge production will be assumed at 0.5 pounds per pound of BOD removal.

3.0 AFFECTED ENVIRONMENT

The purpose of this section is to describe the environmental resources that could potentially be impacted by the project alternatives described in Section 2.0. The descriptions of the affected environment focus on environmental resources located within the proposed project sites and near the US-Mexican border. Figure 1.2 depicts the areas of interest for the upgrades to the Douglas WWTP and the Bay Acres wastewater collection system expansion.

The environment setting in the vicinity of the project area consists of a small to medium size community with a population of approximately 20,000. Douglas is located in the southeastern corner of Arizona in Cochise County. Douglas is on the US-Mexico International Border adjacent to the City of Agua Prieta, Mexico. The Project Site is located approximately 119 miles southeast of Tucson, Arizona in the southern Sulphur Springs Valley of Cochise County.

The Douglas area has a semi-arid climate with hot summer days, moderate winter days, and low humidity. Average monthly high temperatures range from 62.3° Fahrenheit (F) in January to 95.3° F in June. Average monthly low temperatures range from 28.9° F in January to 64.2° F in June. The prevailing wind direction in the Douglas area is from the southeast with mean wind speeds from 7 to 9 miles per hour. Almost all of the precipitation occurs as rainfall. Precipitation ranges from 10 to 20 inches per year with an average 14.60 inches per year. Almost half of the rainfall occurs during the "monsoon" season between June and August. The nearest National Weather Service (NWS) station is located in Tucson, Arizona.

3.1 LAND USE

Land use within the project site falls into one of six categories: low density residential, medium-high density residential, commercial, golf course/schools/parks/ irrigation, Douglas Municipal Airport, and undeveloped.

Infrastructure potentially affected by the project is the existing wastewater collection system and the wastewater treatment plant. Land planned for the expansion of the wastewater collection system and the wastewater treatment plant is in already developed and disturbed areas that need to be connected to City infrastructure.

3.2 SOILS

Cochise County is located entirely within the Basin and Range Province and is characterized by gently sloping plains broken by rugged mountain ranges. The mountain ranges in southeastern Cochise County are generally aligned in a north-south direction, and define the boundaries of the Douglas Basin (Mule Mountains to the southwest, Perilla and Swisshelm Mountains to the east, and the southern end of the Dragoon Mountains to the north).

Soils within the City of Douglas and other developed areas within the project site are primarily classified as Libby Gulch complex with inclusions of Ubik and Riveroad soils along drainageways (NRCS 2012). Other soil types found within the Project Site are Blackeney-Luckyhills and Forrest-Bonita complexes (NRCS 2012), consistent with local geology. Project area soils tend to be well-drained with slow to moderately slow permeability rates with the exception of Ubik, Blackeney, and Luckyhills soils which have moderately rapid permeability

rates (NRCS 1999). The project site does not contain any farmlands designated Prime and Unique by the USDA-Natural Resources Conservation Service (USDA-NCRS) (NCRS 1999).

3.3 WATER RESOURCES

Surface Water

The Douglas Basin lies within the Chihuahuan Desert interface with the Sonoran Desert at an elevation averaging 4,100 to 6,966 feet amsl, and is located between mountain ranges reaching up to 6966 feet amsl. The basin occupies approximately 949 square miles and is characterized as a valley flanked by two mountain ranges. It is located in the southeastern corner of Cochise County and extends from the US-Mexico border northward to the southern end of the Dragoon Mountains northwest of Elfrida (Arizona Department of Water Resources, 2012).

There is one intermittent stream, Whitewater Draw, located within the basin and near the project sites. The Whitewater Draw is the primary surface water drainage in the project area. Small ephemeral washes are also present (AZDWR 2012). Whitewater Draw drains the 949 square mile Douglas basin in a southerly direction, continuing across the US-Mexico border (AZDWR 2012). The City of Douglas does not withdraw water from or discharge water to Whitewater Draw.

The two-mile reach of the Whitewater Draw through the project area was perennial until 1976 when it became intermittent after widespread groundwater pumping lowered the regional water table. Since 1976, Whitewater Draw only flows during summer monsoon season and winter snowmelt. The annual flow of Whitewater Draw averages 6,730 acre-feet, as measured at US Geological Survey (USGS) stream gauging station 9537500 “Whitewater Draw near Douglas” (AZWDR 1997).

Hydrology and Hydraulics

Average annual runoff varies within the basin from 0.2 inches per year in the middle portion of the basin to 2 inches per year at the northern boundary of the basin (AZDWR 2012).

Wetlands and Waters of the United States

No wetlands or waters of the United States are located within the project area. However, small palustrine and riverine type wetland habitat may be associated with the Whitewater Draw. Wetlands are associated with aquatic habitat approximately 25 miles from the project area near the border with Mexico on the San Bernardino Natural Wildlife Refuge. The Whitewater Draw flows and is renamed Rio Agua Prieta after crossing the US-Mexico border as part of the Yaqui River. The Yaqui River eventually drains into the Gulf of California near Guaymas. No construction would occur within the Whitewater Draw (an intermittent stream) with the proposed project. Whitewater Draw has designated uses established by the State of Arizona’s Water Quality Standards as aquatic and wildlife (warm water), full body contact, fish consumption, and agricultural livestock watering (ACC, Title 18, Ch.*11*). Portions at the headwaters of the confluence are designated as partial body contact.

Groundwater

The City of Douglas pumps groundwater from the Douglas basin-fill aquifer. The project area is included within the boundaries of the Douglas Irrigated Non-Expansion Area (INA). Within the

Douglas basin, irrigation is only allowed on land that was irrigated from 1975 through 1980. Domestic and municipal water uses are subject to restrictions imposed by the INA classification.

The City of Douglas groundwater records show that the average pumping rate between 2000 and 2011 was 3.86 MGD (4,289 ac-ft/yr). Although, current pumping rates are not readily available, pumping rates to serve current demand in the project area can be estimated as 4.4 MGD, assuming a 15 percent loss factor.

According to data from the AZDWR, the measured water levels in the basin-fill aquifer range between 8 and 402 feet below ground surface. Recorded water levels for Douglas' twenty wells range from 32 to 283 feet below ground surface.

Total groundwater recharge in the Douglas basin is estimated to be 22,000 ac-ft per year. Mountain-front precipitation is the main source of groundwater recharge in the Douglas basin at 20,000 ac-ft per year. A small amount of recharge may result from streambed infiltration from the Whitewater Draw and other ephemeral washes in the basin. Direct recharge from valley floor precipitation is negligible because high evaporation rates and clay and caliche layers impede percolation of water.

Floodplains
The majority of the project area is not located within a Federal Emergency Management Agency (FEMA) Flood Hazard Zone. However, a small portion of the Douglas Wastewater Treatment Plant and Bay Acres Colonia are located in a Flood Zone A. The Bay Acres collection system will be constructed underground and will not impact the existing floodplains. For the wastewater treatment plant, the floodplain is located where existing sludge drying beds are located, thus not producing additional impacts on floodplains.

3.4 VEGETATIVE HABITAT

The project area is located in the semidesert grassland biotic community, which transitions into the Chihuahuan Desert scrub community east of Douglas. Vegetation encountered is typical of the semidesert grasslands consisting of short grasses intermingled with a variety of large, well-spaced scrub-shrub perennials. Perennial grasses commonly found include black grama (*Bouteloua eriopoda*) and other grama species (*Bouteloua* spp.). Sotols (*Dasylirion* spp.), agaves (*Agave* spp.), yuccas (*Yucca* spp.), and beargrasses (*Nolina* spp.) may also be found. Dominant scrub-shrub species can include mesquite (*Prosopis* spp.), one seed juniper (*Juniperus monosperma*), grayhorn (*Zizyphus obtusifolia*, *Condalia spathulata*), and Mormon or Mexican tea (*Ephedra trifurca*, *E. Antisyphilitica*). Various cactus species are common. Important species include barrel cactus (Ferocacutus wislizenii), cane cholla and prickly pears (*Opuntia* spp.), and pincushions (*Mammillaria* spp.).

The Chihuahuan desert scrub community, which borders the semidesert grasslands, is shrub dominated. Creosote bush (Larrea tridentate), tarbush (Flourensia cernua), and whitehorn acacia (Accacia neovernicosa) are common. Yuccas, agaves, sotols, and beargrasses are also found in the Chihuahuan desert community.

3.5 WILDLIFE RESOURCES

Typical wildlife species found in the semidesert grassland include small mammals such as black-tailed jack rabbit (Lepus californicus); spotted ground squirrel (Spermophilus spilosoma); Ords, banner-tailed, and Merriam's kangaroo rats (Dipodomys ordii, D. spectabilis, D. merriami); badger (Taxidea taxus); and coyote (Canis latrans). Common birds of the semidesert grassland include Swainson's hawk (Buteo swainsoni); prairie falcon (Falco mexicanus); mourning dove (Zenaida macroura); scaled quail (Callipepla squamata); road runner (Geococcyx californianus); loggerhead shrike (Lanius ludovicianus); and meadow lark (Sturnella magna).

Herpetofauna are more prevalent than mammals in the Chihuahuan desert scrub community bordering the semidesert grassland. Typical species include the Texas banded gecko (Coleonyx brevis); roundtail horned lizard (Phrynosoma modestum); spiny lizards (Sceloporus sp.); trans-Pecos ratsnake (Elaphe subocularis); western hooknose snake (Ficimia cana); and Mohave rattlesnake (Crotalus scrutulatus).

Protected Species and Critical Habitats

Under the Endangered Species Act of 1973, nine endangered species and six threatened species are found within Cochise County, Arizona (USFWS 1999). In addition, two species proposed for listing and four candidate species were also identified by USFWS as potentially occurring within Cochise County; however, no critical habitat for any listed, proposed, or candidate species was identified within the project area. Threatened, endangered, proposed, and candidate species identified by the USFWS for Cochise County are as follows:

<u>Endangered Species</u>
Madrean ladies' tresses (*Spiranthes delitescens*)
Huachuca water umbel (Lilaeopsis schaffneriana ssp. recurva)
Jaguar, United States Population (*Panthera onca*)
Lesser long-nosed bat (Leptonycteris curasoae yerbabuenae)
Gila chub (Gila intermedia)
Yaqui chub (*Gila purpurea*)
Yaqui topminnow (Poeciliopsis occidentalis sonoriensis)
Southwestern willow flycatcher (*Empidonax traillii extimus*)
Sonora tiger salamander (Ambystoma tigrinum stebbinsi)

<u>Threatened Species</u>
Cochise pincushion cactus (*Coryphantha robbinsorum*)
New Mexican ridge-nosed rattlesnake (*Crotalus willardi obscurus*)
Beautiful shiner (*Cyprinella formosa*)
Yaqui catfish (*Ictalurus pricei*)
Mexican spotted owl (Strix occidentalis lucida)
Chiricahua Leopard Frog (*Rana Chiricahuensis*)

<u>Proposed Species</u>
Lemon fleabane (*Erigeron lemmonii*)
Huachuca springsnail (*Pyrgulopis thompsoni*)

Candidate Species
American peregrine falcon (*Falco peregrinus anatum*)
Bald eagle (Haliaeetus leucocephalus)
Sprague's Pipit (*Anthus spragueii*)
Yellow-billed Cuckoo (*Coccyzus Americana*)
San Bernardino springsnail (*Pyrgulopsis bernardina*)
Northern Mexican Gartersnake (*Thamnophis eques megalops*)

3.6 CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES

Cultural resources are any prehistoric or historic district, site, or building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historical architectural resources, and traditional cultural resources. Only significant cultural resources, as defined in 36 CFR 60.43, are considered for potential adverse impacts from an action. Significant archeological and architectural resources are either eligible for listing, or listed on, the National Register of Historic Places (NRHP).

In accordance with the provisions of the NHPA, EPA consulted with nine Native American governments with cultural affiliation in southern Arizona to determine whether there are Traditional Cultural Places in the vicinity of the proposed project or other issues of concern that need to be addressed. EPA received responses from three tribes. None of these indicated that a tribe was aware of any historic, religious or culturally significant resources that may be affected by the proposed project.

In addition, as required by Section 106 of the National Historic Preservation Act, 16 U.S.C.470, and the Arizona State Historic Preservation Act, A.R.S. §41-861 et seq., a Class III Cultural Resources Survey of the Bay Acres Colonia and Douglas Wastewater Treatment Plant was conducted. The survey concluded that work within the project area would not impact historic properties. (See Appendix A) On December 5, 2013, EPA received concurrence from the Arizona State Historic Preservation Office of the determination of no adverse effect on historic properties from the proposed project.

3.7 AIR QUALITY

The EPA established National Ambient Air Quality Standards (NAAQS) for specific pollutants determined to be of concern with respect to the health and welfare of the general public. Areas that do not meet these NAAQS are called non-attainment areas. The Federal Conformity Final Rule (40 CFR Pars 51 and 93) specifies criteria or requirements for determination of conformity with NAAQS. The Federal Conformity Rule was first promulgated in 1993 by the EPA, following the passage of Amendments to the Clean Air Act (CAA) in 1990. The rule mandates that a conformity analysis must be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more NAAQS.

EPA is currently finalizing a determination that the Paul Spur/Douglas nonattainment area is now attaining the NAAQS for PM_{10}, based on certified, quality-assured ambient air monitoring data for the years 2009-2011. However, pending finalization of EPA's determination, the area in and around Douglas is still considered in nonattainment of the PM_{10} ambient air quality standard.

Studies of the particulate emissions indicate that 60% of the PM_{10} in the Douglas area originates in Mexico. The largest source of PM_{10} was generated from unpaved road dust (81%). The second largest emission source is agricultural activities (12%). In response to the nonattainment status, ADEQ has developed a State Implementation Plan (SIP) to address the airborne dust issue and has submitted this plan to the EPA.

The Paul Spur/Douglas area is also out of attainment for sulfur dioxide ($SO_{2)}$. Historically, emissions of SO_2 in the Douglas area were largely attributed to the Phelps-Dodge Douglas Reduction Works smelter, which was the major source of SO_2 in Douglas until operations closed in 1987. The smelter had the potential to emit 400,000 tons of SO_2 annually, which was over 100 times the total of any current sources combined.

In December, 2005, EPA signed a direct final rule approving Arizona's plan to maintain attainment of the short-term (24-hour) and long-term (annual) primary NAAQS for Sulfur dioxide (SO_2) in the Douglas area, as well as Arizona's request to re-designate this area from nonattainment to attainment for SO_2. As a formally designated maintenance zone for SO_2, Douglas area federal actions must follow the requirements of the Federal Conformity Rule, as described above.

Odor

There are no odor-producing sources near the Douglas wastewater treatment plant other than the wastewater treatment plant and associated sludge drying beds. Due to the remote location of the wastewater treatment plant, no odor problems have been experience in the Douglas area.

3.8 NOISE

Noise is generally described as unwanted sound, which can be based either on objective effects such as hearing loss or damage to structures or subjective judgments such as community annoyance. Sound usually represented on logarithmic scale with a unit called the decibel (dB). Sound on a decibel scale is referred to as sound level. The threshold of human hearing is approximately 3 dB, and the threshold of discomfort or pain is around 120 dB.

Noise levels occurring at night generally produce a greater annoyance than do the same levels occurring during the day. It is generally agreed that people perceive intrusive noise at night as being 10 dBA.

Acceptable noise levels have been established by the U.S. Department of Housing and Urban Development for construction activities in residential areas: 1) **Acceptable** (not exceeding 65 dB); 2) **Normally Unacceptable** (above 65 but not greater than 75 dB); and 3) **Unacceptable** (greater than 75 dB).

3.9 ENERGY AND NATURAL RESOURCES

The City of Douglas purchases electricity from Arizona Public Services. The electricity distribution system appears adequate for the City's current needs as no evidence of brownouts or other forms of power shortages was identified. Southwestern Gas Corporation provides natural gas to the City Douglas.

3.10 ROADWAYS AND TRAFFIC

The wastewater collection system will be installed in public rights-of-way where possible or in easements. The major roadways that will be affected during construction will include:

Washington Avenue
23rd Street
24th Street
27th Street
34th Street
Pan American Avenue
5th Street
Chino Road

These roadways will be most likely be used as haul routes during construction. Roadway impacts will be temporary.

3.11 HAZARDOUS MATERIALS

Hazardous materials and substances are regulated in Arizona by a combination of mandated laws promulgated by the EPA and the ADEQ. A search of Federal and state records for known hazardous waste sites, potential hazardous waste sites, and remedial activities, including sites that are on the National Priorities List or being considered for the list. No evidence of hazardous materials or recognized environmental conditions was detected on-site or near the site during the field surveys conducted on August 13, 2012.

3.12 SOCIOECONMICS

Population and Demographics

According to the US Census Bureau, the City of Douglas had a population of 14,312 persons and 19,772 persons in 2000 and 2010, respectively. The majority of the growth in population occurred in 2001 when the City annexed the Arizona Prison Complex-Douglas. The prison complex increased the City's population by approximately 2,000 residents. In order to accurately model the population growth in Douglas, the prison population was subtracted from the 2010 census population for the annual growth rate calculation. The annual growth rate was determined to be 2.189 percent. To project out the population from 2010 to 2035 for the City of Douglas, the population was projected forward without the prison population. The prison population was then added to the projected Douglas population to determine flow rates. The Douglas area comprises the City of Douglas (including the prison), Pirtleville, and surrounding unincorporated areas.

According to the 2010 U.S. Census Bureau American Community Survey, the racial mix of Douglas consists predominantly of Hispanic. The remainder is divided among African Americans, Native Americans, Asians, Hawaiian or Pacific Islander, and people claiming to be two or more races. A small portion of the population self-identifies as multi-racial.

Housing

The total number of housing units in Douglas was 7,388 in 2010 (**Table 3-3**), of which 87 percent were occupied. The majority of these (55.1 percent) were owner-occupied (U.S. Census Bureau). Comparatively, the owner-occupied housing for the State of Arizona was estimated at 55.2 percent of the total occupied houses (U.S. Census Bureau).

Table 3-3: Housing Units

Geographic Region	Total Housing Units	Status		
		Occupied		Vacant
		Owner	Rented	
Douglas	7,388	6,436	2,362	952
Cochise County	59,041	34,711	16,154	8,176
Arizona	2,844,526	1,571,687	809,303	463,536

Income and Employment

In 2008, Douglas had an average household income of $26,579. This was considerably lower than the countywide median of $43,821 and the statewide income of $51,124. Douglas had an average per capita income of $13,223 in 2008, compared to $22,160 for Cochise County, and $25,639 for the state. Data for the county and state are based on the US Census Bureau's 2006-2008 American Community Survey. Income estimates for Douglas are based on data collected by the US Census Bureau in 1999, adjusted for inflation to 2008 dollars.

3.13 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

The fair treatment of all races has been assuming an increasingly prominent role in environmental legislation and implementation of environmental statues. In February 1994, President Clinton signed Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. The action requires all Federal agencies to identify and address disproportionately high and adverse impacts of its programs, policies, and activities on minority and low-income populations. Cochise County has approximately 31.5 percent of their population claiming Hispanic or Latino origin. Furthermore, Cochise County has a greater percentage of its population in poverty relative to both Arizona and the Nation.

EO 13045 requires each Federal agency "to identify and assess environmental health risks and safety risks that may disproportionately affect children"; and "ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. In Cochise County, about 7 percent of the population is 5 years old or less and approximately 27 percent is younger than 18 years. The potential for impacts on the health and safety of children will be slight with increased dust emissions during construction of the project; however the health benefits of the centralized sanitary sewer collection system will positively impact the health and safety of children in the area.

3.14 SUSTAINABILITY AND GREENING

In accordance with EO 13423 – Strengthening Federal Environmental, Energy, and Transportation Management (72 FR 3919), the City of Douglas would incorporate practices in an environmentally, economically, and fiscally sound, integrated, continuously improving, efficient, and sustainable manner in support of their mission. CBP implements practices throughout the agency to: 1) improve energy efficiency and reduce greenhouse emissions, 2) implement renewable energy projects, 3) reduce water consumption, 4) incorporate sustainable environmental practices such as recycling and the purchase of recycled-content products, and 5) reduce the quantity of toxic and hazardous materials used and disposed of by the agency. Additionally, new facility construction would comply with EO 13514 *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* set forth in the *Federal Leadership in High Performance and Sustainable Memorandum of Understanding*. CBP would also be in compliance with the Energy Act of 2005 and the Energy Independence and Security Act of 2007 and reduce total consumption of petroleum products and use environmentally sound practices with respect to the purchase and disposition of electronic equipment.

3.15 HUMAN HEALTH AND SAFETY

Current health concerns are associated with discharges of raw or inadequately sewage in the neighborhoods, either from failing septic systems or sewer backups.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 LAND USE

Bay Acres
Under the No Action alternative, land use and infrastructure will remain unchanged.

Under the Preferred Alternative and other action alternatives, infrastructure improvements will increase the number of homes connected to the City's centralized wastewater collection and treatment system. The areas that are affected are generally developed with mostly residential lots and a few commercial lots. There are 138 lots that are currently vacant, predominantly within the Bay Acres Colonia, and it is expected that infill may occur at a faster pace once sewer service is available, effectively channeling growth into areas that are already disturbed and reducing pressures to grow the city into areas of open space. These are expected to be the minor long-term impacts to land use. Short-term impacts from construction will also be minor, and located within the existing rights-of-way. It is not expected that the construction will have long-term adverse effect on land use.

Wastewater Treatment Plant
Under the No Action alternative, the Preferred Alternative and the other action alternatives, land use will remain unchanged.

The proposed site for the Preferred Alternative is at the existing wastewater treatment plant site. It is not anticipated that additional land will be required when expanding the wastewater treatment plant; therefore, no adverse direct impacts are expected. Indirect impacts associated with growth resulting from wastewater treatment plant expansion should be limited to in-fill in already developed areas.

4.2 SOILS

Bay Acres
Under the No Action alternative, adverse impacts to the soil from failed septic systems will continue. Furthermore, adverse impacts to soil may increase in the future since new homes in the Bay Acres Colonia will continue to use septic systems and an upgraded wastewater collection system will not be available for connection.

The Preferred Alternative and other action alternatives will minimize impacts to soil from failed septic systems. All current and future residents of Bay Acres and along the gravity collection system alignment will be connected to the existing Douglas wastewater collection system.

Wastewater Treatment Plant
The No Action alternative may pose an adverse impact to soils at the Wastewater Treatment Plant site since the older process may leak untreated wastewater into the soil. Additionally, should the processes fail, there is a potential for a large release of untreated wastewater.

The Preferred Alternative and other action alternatives for the Wastewater Treatment Plant upgrades are not expected to generate impacts to the soil. The Wastewater Treatment Plant will meet water quality standards as directed by the City of Douglas' Aquifer Protection Permit.

4.3 WATER RESOURCES

Surface Water

Bay Acres
The No Action alternative, the Preferred Alternative and other action alternatives are not expected to have any long-term adverse impacts on surface water quality in the US. In the short-term, construction of the wastewater collection lines associated with the Preferred Alternative may result in sediment discharge. Best Management Practices (BMPs) will be used to minimize erosion and sedimentation around construction areas. Sediment impacts, should they occur, will be temporary and are not expected to increase annual total suspended solids (TSS) loads over time.

Wastewater Treatment Plant
The No Action alternative is not expected to have any long term adverse impacts on surface water quality in the US.

The WWTP discharges to community of Agua Preita where it is used for agricultural irrigation. An increase in the discharge volume from 2.0 mgd to 3.1 mgd would increase the availability of irrigation water. The water quality would be improved for all action.

Wetlands

Bay Acres
The No Action alternative will not directly or indirectly impact the wetlands or water of the US. The US Army Corps of Engineers (USACE) administers Section 404 of the Clean Water Act, governing the placement of dredged or fill material into wetlands and other Waters of the US. Activities resulting from the project may likely be covered under the Nationwide Permit number 12 with regards to utility line backfilling and bedding. Based on a review of topographic maps, wetlands have not been identified in the project area.

Wastewater Treatment Plant
The No Action alternative, the Preferred Alternative and other action alternatives will not impact wetlands or other Waters of the US from any of the activities that are proposed.

Groundwater

Bay Acres
The No Action alternative may have adverse impacts from untreated or inadequately treated sewage leaking from failed and improperly maintained septic systems that may contaminate the ground water. In addition, due to the lot sizes and soil conditions within the Bay Acres Colonia, sufficient land for proper leach fields is not available. Untreated sewage could potentially reach

the aquifer through the soil or downward movement through poorly cemented groundwater wells drilled for domestic water supply.

Under the Preferred Alternative and other action alternatives, removal of the septic systems will eliminate discharges of untreated and inadequately treated wastewater to the environment, reducing the potential risk to the aquifer from contamination.

Wastewater Treatment Plant
The No Action alternative may have adverse impacts on groundwater from untreated sewage leaking and contaminating groundwater resources.

The Preferred Alternative and other action alternatives will eliminate discharges of untreated wastewater to the environment, reducing the potential risk to the aquifer from contamination. The Preferred Alternative may have positive benefits with the availability of additional treated effluent to use for irrigation in Agua Prieta, Mexico. The additional effluent available will also reduce the impacts to groundwater resources in Mexico.

Floodplains

Bay Acres
Portions of the Bay Acres Colonia are in an area designated as a Zone A floodplain, as shown in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps Nos. 04003C2881F and 04003C2882F, created in August 28, 2008. A Zone A designation indicates that an area has a 1% annual risk of flooding. However, because wastewater collection system is underground, there will be no impacts to flood plains.

The No Action alternative, Preferred Alternative, and other action alternatives will not directly or indirectly impact the floodplains.

Wastewater Treatment Plant
The existing sludge drying beds located within the wastewater treatment plant site are designated to be within FEMA's Zone A floodplain. Since there will be no change to the existing sludge drying beds, this alternative will have no impacts to floodplains.

The No Action alternative, Preferred Alternative, and other action alternatives will not directly or indirectly impact the floodplains.

4.4 VEGETATIVE HABITAT

Bay Acres
The majority of the area affected by the project consists of developed urban or suburban landscapes. Under these conditions, habitat for native species is typically degraded and where vegetation exists it is often dominated by non-native plants, and noxious or other weedy species. These conditions would be expected to continue under the No Action alternative.

For the Preferred Alternative and other action alternatives, impacts would primarily occur within existing rights-of-way in areas that have been developed. Impacts to previously undisturbed native communities would be minimal. Impact to the non-native vegetation within the urban and suburban areas would likely be short-lived, as reseeding and re-vegetation would occur following disturbances. Some type of re-vegetation measure is necessary or, there would be an increased potential for the establishment and proliferation of noxious or other weedy species. If left unchecked, a weed infestation could spread to native communities causing localized areas of habitat degradation.

The Federally listed endangered lesser long-nosed bat is found within the project area. At the recommendation of the U.S. Fish and Wildlife Service, a walk-through was conducted of the project site to identify the presence of agave plants. Only three agaves were identified when the field investigation was performed. All three of the agaves were found inside residential home properties and appear to have been planted by the home owners as an enhancement to their garden. There are no agaves present within the currently vacant lots or in the open space areas that the project may potentially impact.

Wastewater Treatment Plant
The project area for the Wastewater Treatment Plant consists of developed light industrial land. Under these conditions, habitat for native species is degraded and little vegetation exists. Where vegetation does exist, it is often dominated by non-native plants, and noxious or other weedy species. These conditions would be expected to continue under the No Action alternative, the Preferred Alternative and other action alternatives. No agave plants were found within the WWTP site.

4.5 WILDLIFE RESOURCES

Bay Acres
Since the gravity wastewater collection system construction activity would occur primarily within previously disturbed area, the proposed activities would have minimal effect on wildlife. The No Action alternative would maintain the current situation and would thereby not produce any additional effects. The Preferred Alternative and other action alternatives involve construction of a wastewater collection system that could potentially affect some wildlife species primarily through noise and dust. These effects would be limited and short-lived. The impacts would be limited to existing rights-of-way in urban and suburban areas.

Wastewater Treatment Plant
The proposed improvements to the Wastewater Treatment Plant would occur primarily within previously disturbed area and would thereby have minimal effect on wildlife. The No Action alternative would maintain the current situation and would not produce additional effects. The Preferred Alternative and other action alternatives involves construction of new processes and decommissioning of existing processes that are no longer used that could potentially affect some wildlife species, primarily through noise and dust. These effects would be limited and short-lived as well.

Protected Species and Critical Habitat
The No Action alternative would maintain the current situation and would thereby not produce additional effects.

There would not be any adverse effects on threatened or endangered species since these species and critical habitats have not been documented within the project area. In addition, during a walk-through of the project site, no protect species or critical habitat was observed.

4.6 CULTURAL RESOURCES

Under No Action alternative, the current situation would continue.

As required by Section 106 of the National Historic Preservation Act, 16 U.S.C.470, and the Arizona State Historic Preservation Act, A.R.S. §41-861 et seq., a Class III Cultural Resources Survey of the Bay Acres Colonia and Douglas Wastewater Treatment Plant was conducted. The survey concluded that work within the project area would not have adverse effect on historic properties. The Arizona State Historic Preservation Office agreed with the survey's determination.

4.7 AIR QUALITY

PM10 – Under the No Action alternative, no PM10 emissions impacts would be expected. Under the action alternatives for both the expansion of wastewater collection to Bay Acres and the upgrade of the WWTP, temporary fugitive dust emissions could be created during construction.

To determine compliance with the General Conformity Rule for PM10, EPA completed a conformity analysis to estimate the pollutant emission from the proposed action. EPA completed an emission's inventory for the proposed action, and determined that the PM10 impacts to the Paul Spur/Douglas nonattainment area from construction activities will be minimal. The inventory, which was based on conservative estimates of project activity (including but not limited to trenching, grading, demolition and construction) and EPA's Compilation of Emission Factors known as AP-42, determined that project-related fugitive dust emissions would range below the *di minimis* threshold of 100 tons PM10/year.

SO2 -- Under the No Action alternative, no significant SO2 emissions impacts would be anticipated. Under the action alternatives for the expansion of wastewater collection to Bay Acres and the upgrade of the WWTP, temporary but insignificant emissions of SO2 would be generated during construction due to the combustion of sulfur containing diesel fuels in heavy machinery.

As with the PM10 Conformity Analysis, EPA reviewed the project's emission inventory estimation for SO2. EPA determined that the construction activities associated with the proposed action project will be minimal and well below the *di minimis* threshold of 100 tons of S02 per year.

4.8 NOISE

Bay Acres
The No Action alternative would not result in any increase in noise events since this option would result in no construction activities.

The action alternatives would be constructed in rural residential/commercial areas. Installation of the pipeline would require the use of heavy construction equipment. The construction activity has the potential to expose sensitive receptors to noise levels that are not normally unacceptable at urban sites. Table 4-1 describes noise emission levels for construction equipment which range from 70 dBA to 84 dBA (Federal Highway Administration [FHWA] 2007).

Table 4-1: Weighted (dBA) Sound Levels of Construction Equipment and Model Attenuation at Various Distances

Noise Source	50 feet	100 feet	200 feet	500 feet	1000 feet
Backhoe	78	72	68	58	52
Dump Truck	76	70	64	56	50
Excavator	81	75	69	61	55
Front end Loader	79	73	67	59	53
Concrete mixer truck	79	73	67	59	53
Pneumatic Tools	81	75	69	61	55
Bull dozer	82	76	70	62	56
Generator	81	75	69	61	55

Assuming the worst case scenario of 82 dBA, the noise level would have to travel 500 feet before it attenuates to acceptable levels of 65 dBA. Common construction equipment can produce noise levels of 81 dBA, although noise emissions attenuate to normally acceptable levels of 65 dBA, approximately 300 feet away from the noise source.

The construction activities for the Preferred Alternative would be adjacent to residential properties and may experience normally unacceptable noise levels (65 to 75 dBA). However, emissions are expected to be minor and short-term in duration. Construction activities are estimated to last 150 to 180 days. To minimize this impact, construction activities near residential neighborhoods would be limited to daylight hours during the work week when most of the residents are at school or at work. Specifically, construction activities will be limited to hours between 7:00 am and 7:00 pm, Monday through Friday.

During the operational phase of the proposed project, when utilized, backup generators will create noise levels up to 75 dBA. To minimize noise levels, generators will be equipped with appropriate sound muffling devices.

Wastewater Treatment Plant
The No Action alternative, the Preferred Alternative, and other action alternatives are not expected to impose significant long-term noise impacts on the project area. Background noise levels may be elevated during construction activities associated the Preferred Alternative. Construction noises tend to be short in duration and concentrated around immediate work area. Construction related noise will be mitigated through the use of standard procedures such as specific, weekday hours of operation and the use of mufflers on construction equipment.

4.9 ENERGY AND NATURAL RESOURCES

Bay Acres
The No Action alternative, the Preferred Alternative, and other action alternatives are not expected to impose significant positive or negative impacts on the energy supplies and natural resources. The wastewater collection system flows by gravity and none of the Alternatives will significantly increase the use of electricity required for lift stations.

Wastewater Treatment Plant
The No Action alternative is not expected to impose significant positive or negative impacts on the energy supplies and natural resources.

The action alternatives may impose slight impacts to the energy supplies and natural resources because of the new processes installed; however, these impacts can be minimized by selecting mechanical equipment that is energy efficient.

4.10 ROADWAY AND TRAFFIC

Bay Acres
The No Action alternative is not expected to impose significant positive or negative impacts on roadways and traffic.

Implementing the action alternatives would create minor and short-term impacts on roadways and traffic within the project area. The increase in vehicular traffic would be anticipated due to the delivery of supply materials and the presence of work crews to the site during the construction period. The initial construction would include creation of a staging area for materials and equipment within the project site. Traffic near the construction site would be from construction workers and material once staging is complete. Long-term impacts on traffic are not expected from the installation of the Preferred Alternative.

Wastewater Treatment Plant
The No Action alternative is not expected to impose significant positive or negative impacts on roadways and traffic.

Implementing the action alternatives would create minor and short-term impacts on roadways and traffic within the project area. The increase in vehicular traffic would be anticipated due to the delivery of supply materials and the presence of work crews to the site during the construction period. The initial construction would include creation of a staging area for

materials and equipment within the project site. Traffic near the construction site would be from construction workers and material once staging is complete. Long-term impacts on traffic are not expected from the installation of the Preferred Alternative.

4.11 HAZARDOUS MATERIALS

Bay Acres
The No Action alternative would not involve excavation, so hazardous materials that may be present in the environment would not be encountered. However, sewage already released into the environment would remain in place and future releases of sewage from failing septic systems will continue. The No Action alternative would continue to have adverse impacts that would be substantially reduced with the Preferred Alternative.

The action alternatives would not involve removal or modification of any known hazardous materials.

Wastewater Treatment Plant
The No Action alternative would not involve excavation, so hazardous materials that may be present in the environment would not be encountered. However, sewage already released into the environment would remain in place and future releases of sewage from aging and under capacity treatment plant would continue. The No Action alternative would continue to have adverse impacts that would be substantially reduced with the Preferred Alternative.

Under the Preferred Alternative, the quantity of sludge generated by the wastewater treatment plant is expected to decrease with the addition of an aerobic digester. Even though the amount of wastewater being processed will increase, the digester will reduce the amount of dry solids produced. Furthermore, the dry solids will be stabilized reducing the number of pathogens and vectors associated with the dry solids. Sludge composition is not expected to change significantly as most new users will be residential.

4.12 SOCIOECOMICS

Bay Acres
The No Action alternative may have a negative economic impact on individuals not currently connected to the municipal wastewater collection system. These individuals may have to pump septic systems on a regular basis to prevent failure. Also, septic system owners must absorb the full cost of repairing or replacing their septic systems in the future.

Under action alternatives, property owners will be charged for wastewater service, although these new costs will be offset by the elimination of the costs associated with maintenance and replacement of septic systems. In addition, property owners may experience an increase in property values by being connected to the municipal wastewater collection system. Indirectly, the Preferred Alternative should improve economic opportunities for project area residents by providing reliable sewer service to businesses and households. Population growth may be slightly accelerated as a result of improved services within the project area.

Wastewater Treatment Plant
The No Action alternative may have a negative socioeconomic impact for both individuals currently on septic systems and the City of Douglas. Without the expansion of the wastewater treatment plant, the City will not be able to extend treatment service to the Bay Acres Colonia and to properties within the City of Douglas.

The action alternatives will provide the capacity needed to extend sewer service to the Bay Acres Colonia and provide capacity for growth within the City of Douglas. Current septic users will be able to curtail use of septic systems and avoid the costs associated with maintenance and replacement of failed systems by being on the municipal sewer system. Indirectly, the Preferred Alternative should improve economic opportunities and growth for project area residents by providing reliable sewer service to businesses and households.

4.13 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

No disproportionately-high or adverse environmental health or safety impacts on minority or low-income populations or children would be expected with any of the project alternatives.

4.14 SUSTAINABILITY AND GREENING

Bay Acres
The No Action alternative would not result in any direct or indirect impacts, as no construction activities would take place.

Under the Preferred Alternative and other action alternatives, greenhouse emissions and energy consumption would be minimized since the wastewater collection system will be gravity. Therefore, no major adverse impacts are expected to occur as a result of the Preferred Alternative.

Wastewater Treatment Plant
The No Action alternative would not result in any direct or indirect impacts, as no construction activities would take place.

Under the Preferred Alternative and other action alternatives, greenhouse emissions and energy consumption will be closely monitored to incorporate equipment and processes that realize the opportunities for sustainability.

4.15 HUMAN HEALTH AND SAFETY

Bay Acres
The No Action alternative results in a continuation of public health and safety concerns within the project area. Without proper maintenance, septic systems will continue to fail.. The lot sizes typically found in the project area do not have extra room for the replacement of septic tank systems and this may continue to result, as it has in the past, in sewage overflows coming from the septic tanks and reaching backyards and the surrounding streets.

The action alternatives provide the most positive benefits to public health and safety. Under the Preferred Alternative, residents of the Bay Acres Colonia and the residents adjacent to the collection system alignment will be connected to the sewer system. Under the Preferred Alternative, the City will be able to ensure that all project area residents have access to a public wastewater collection system.

Wastewater Treatment Plant
The No Action alternative results in a continuation of public health and safety concerns within the project area. Without the expansion of the wastewater treatment plant, the City of Douglas will not be able to extend service to the Bay Acres Colonia and future infill development will be restricted. The effluent that the wastewater treatment plant produces will continue to be a Class C, greatly limiting the uses.

The action alternatives provide the most positive benefits to public health and safety. Under the Preferred Alternative, the treatment plant will be able to extend service to the Bay Acres Colonia and other residents along the new collection alignment. The effluent that is produced from the treatment plant will be a Class B+, which offers more opportunities for reuse.

4.16 CUMULATIVE EFFECTS

CEQ defines cumulative impacts as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time by various agencies or individuals. Informed decision-making is served by consideration of cumulative impacts resulting from projects that are proposed under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

The Preferred Alternative would accommodate the addition of 138 new homes within the service area. Currently, there are no other development plans in the nearby area that would have a cumulative effect in the environment.

The combination of the alternatives and the improvements to the Douglas wastewater treatment plant is expected to generate positive cumulative impacts. Currently, septic conditions exist in the Rio Agua Prieta because of the river's flat gradient, warm air temperatures, occasional overflow from Douglas' secondary clarifier, and illegal sewage discharges originating in Mexico. Upgrading the WWTP and improving the water quality of the effluent will improve the water quality of the Rio Agua Prieta.

The quality of water discharged by the Douglas wastewater treatment plant to Agua Prieta is expected to improve with the installation of a new secondary clarifier and the issuance of a new APP by the ADEQ. The proposed improvements at the wastewater treatment plant require an Aquifer Protection Permit (APP) from the Arizona Department of Environmental Quality (ADEQ). The City of Douglas will need to submit monthly discharge monitoring reports to ADEQ to ensure that water quality standards are not being violated (AAC Title 18, Ch. 9). Additionally, effluent turbidity cannot exceed one nephelometric turbidity unit based on a

monthly average (AAC Title 18, Ch. 11); low turbidity is indicative of an efficient treatment process. The combination of improvements to the wastewater treatment plant and compliance with the APP are expected to significantly and consistently improve the quality of Douglas' effluent and have a positive effect on odors in Mexico.

The cumulative environmental impacts from the Preferred Alternative are positive. The City of Douglas is in the process of constructing improvements to the municipal wastewater treatment plant. The combination of an improved wastewater treatment plant with the expanded wastewater collection system is expected to result in increased, higher quality discharges to the Rio Agua Prieta. Increased surface water flows can be used by Mexican irrigators and potentially reduce groundwater withdrawals. Higher flow levels have additional environmental benefits, including dilution of other sources of water pollution in Mexico and in-stream flows for aquatic and terrestrial wildlife.

The City of Douglas has considered implementing a Wastewater Reuse Program at some point in the future. The Reuse Program will allow for the reduction of groundwater withdrawal from the Douglas-Agua Prieta basin. Water reuse eliminates the need for additional water wells for irrigation purposes. This program would use treated effluent to irrigate the golf course, airport, and other public spaces. The reuse project, however, is not part of the BECC project certification package.

APPENDIX A – Class III Cultural Resources Survey