PUBLIC REVIEW DRAFT
ENVIRONMENTAL ASSESSMENT

STORM WATER DETENTION AND SEDIMENTATION BASINS

MONTE CARLO, CHALLENGER, AND CHIHUAHUA WASHES

CITY OF NOGALES, ARIZONA

HMGP# 1347-6-5

Prepared for

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44 CFR 9	FEMA regulations for implementing Executive Order 11988, "Floodplain Management"
44 CFR 10	FEMA regulations for compliance with the National Environmental Policy Act
ANPL	Arizona Native Plant Law
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Challenger basin	Challenger Wash storm water detention/sedimentation basin
Chihuahua basin	Chihuahua Wash storm water detention/sedimentation basin
CO	carbon monoxide
DEM	Arizona Division of Emergency Management
EA	Environmental Assessment
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance (Program)
HMGP	Hazard Mitigation Grant Program
KOP	Key Observation Point
Monte Carlo basin	Monte Carlo Wash storm water detention/sedimentation basin
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
O_3	ozone
PM_{10}	particulate matter less than 10 micrometers in diameter
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

The City of Nogales has applied to the Federal Emergency Management Agency (FEMA) (through the Arizona Division of Emergency Management [DEM]) for assistance with a storm water detention and sedimentation basin project. FEMA is proposing to fund the project under the Hazard Mitigation Grant Program (HMGP), as part of the recovery from the flooding that occurred in 2000, which was a Presidentially declared disaster (FEMA-1347-DR-AZ), and under the Flood Mitigation Assistance (FMA) Program.

FEMA has prepared this Environmental Assessment (EA) to evaluate the impacts of the proposed action. The EA has been prepared according to the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508), and FEMA's implementing regulations (44 CFR Part 10).

The EA process provides steps and procedures to evaluate the potential social, economic, and environmental impacts of a proposed action as well as an opportunity for public, local, state, and other federal agencies to provide input and/or comment through scoping studies and a public comment period. These potential impacts are measured by their context and intensity, as defined in the CEQ regulations.

The Monte Carlo Estates and Monte Carlo Hills subdivisions (collectively known as the Monte Carlo subdivision) frequently experience damage from flooding along the Monte Carlo, Chihuahua, and Challenger Washes, particularly after intense rainfalls associated with thunderstorms. After each storm event (approximately 10 to 15 per year), the City of Nogales Public Works Department deploys dump trucks, front-end loaders, and flagmen for traffic control to remove sediment at all street crossings and drainage structures. During significant storm events, the Nogales Fire Department is also deployed to rescue people from flooded homes. The estimated annual cost to repair public facilities is approximately $132,000. This estimate does not include the cost for repairs to private property. During the storm events of October and November 2000, severe thunderstorms resulted in the flooding of residences and sediment deposition on local roads at wash crossings.

In response to the flooding and sediment deposition on local roads in 2000, the City of Nogales applied to FEMA (through the Arizona DEM) for assistance with a project to reduce the effects of flooding in the future. FEMA is proposing to fund the project under the HMGP as part of the recovery from the 2000 flooding event, which was a Presidentially declared disaster. The objective of the HMGP is to implement long-term hazard mitigation measures to reduce the risk of future threats to life and public safety and future damage to public and private property. The purpose of this action is to reduce future impacts from flooding and to protect the health and safety of the residents living in the Monte Carlo subdivision.

FEMA is also providing funding for the project under the FMA Program. Under this program, FEMA provides funding to states and local governments to reduce risk to properties that are subject to repetitive flooding losses.

3.1 ALTERNATIVES NOT CARRIED FORWARD

The City of Nogales evaluated several alternatives for reducing flooding in the Monte Carlo subdivision.

3.1.1 Channelization

The City of Nogales considered improving the channel throughout its urbanized reaches (e.g., by leveeing) to confine storm water as it flows through the Monte Carlo subdivision and to direct flow through the formerly flooded areas and into Nogales Wash. The development of the Monte Carlo subdivision and surrounding areas has advanced to such an extent that major changes to the channel system within the subdivision are not a feasible solution.

3.1.2 Sedimentation Basins

The city evaluated the construction of sedimentation basins on each of the washes (the Monte Carlo Wash, the Chihuahua Wash, and the Challenger Wash) to reduce the amount of sediment that could be deposited in the Monte Carlo subdivision. Each sedimentation basin would consist of a notched berm that would momentarily slow flows to allow suspended material to settle out before continuing through the berm opening. These structures would be sized to provide little or no detention effect in low-flow events, but would provide some mitigation of nuisance sedimentation of the downstream channels in high-flow events.

The construction of sedimentation basins without other concurrent mitigation measures would not eliminate flooding problems within the Monte Carlo subdivision. Therefore, this alternative would not meet the purpose and need of the project. Also, the cost of maintaining these structures (i.e., the sediment removal cost) would be more than current sediment removal expenditures. Therefore, the construction and operation of sedimentation basins would not be cost-effective.

3.2 ALTERNATIVES CARRIED FORWARD

3.2.1 Alternative 1: No Action

Under the No Action Alternative, the City of Nogales would not undertake any activities to prevent or reduce the potential for the Monte Carlo, Chihuahua, and Challenger Washes to flood the adjacent Monte Carlo subdivision and cause sediment deposition on local roads. Therefore, the potential for recurring flooding and sediment deposition issues would persist. Because a high potential exists for flash flooding in Arizona and because development is likely to continue in the City of Nogales, a greater frequency of flooding could occur in the future under the No Action Alternative. Also, the Monte Carlo, Chihuahua, and Challenger Washes continue to be used for illegal dumping, which can raise health issues for the residents of the Monte Carlo subdivision under the No Action Alternative.

3.2.2 Alternative 2: Proposed Action

Under the Proposed Action, the City of Nogales would construct three storm water detention/sedimentation basins to reduce flooding and sediment deposition within the Monte Carlo subdivision.

3.2.2.1 Description of Project Area

The proposed project is located adjacent to the Monte Carlo subdivision within the City of Nogales, Santa Cruz County, Arizona (Figures 1 and 2). The Monte Carlo subdivision consists of approximately 225 single-family homes and 122 multifamily units on 160 acres. One multifamily residence of 108 units is currently under construction. Also, ten businesses are located in this subdivision. The land to the north, south, and east of the Monte Carlo basin site and to the north, east, and west of the Chihuahua Wash and Challenger basin sites is undeveloped but heavily impacted by humans; impacts include high levels of litter, illegal dumping, a network of dirt roads, and off-road vehicle activity. Areas within and surrounding the project area are also used for livestock grazing.

Steep slopes characterize the upstream reaches of the Monte Carlo, Chihuahua, and Challenger Washes. The Chihuahua and Challenger Washes generally flow from north to south, and the Monte Carlo Wash generally flows east to west. Storm water from these washes flows into narrow channels that have a maximum capacity to convey approximately a 2-year storm. These channels run through subdivision alleys and light industrial complexes before flowing into the Nogales Wash. The degree of flood protection provided by the channels varies according to cross-section shape, channel materials, and aboveground utility pedestals. Storm water drainage through the subdivision causes local scour and aggradation. Sediment deposition is a major problem on the road system within the Monte Carlo subdivision, and storm water often inundates homes within the subdivision.

3.2.2.2 Monte Carlo Wash Storm Water Detention/Sedimentation Basin

The Monte Carlo Wash storm water detention/sedimentation basin (the Monte Carlo basin) would be largest of the three basins and would be located immediately upstream and east of the Monte Carlo Estates subdivision. The existing capacity of the Monte Carlo Wash channel within and downstream of the Monte Carlo Estates subdivision approximates the peak discharge of a 2-year storm. The Monte Carlo basin would be designed as a sediment trap that would temporarily store water during a 100-year storm. This storage would reduce the outflow from the basin to a discharge that approximates the peak flow during a 2-year storm. The basin would be designed to provide the City of Nogales with the opportunity to build a soccer field within the basin.

The Monte Carlo basin would consist of a soil cement berm with two emergency overflow spillways. The berm would be approximately 800 feet (244 meters) in length, 94 feet (29 meters) in width, and 15 feet (4.5 meters) in height across the floodplain of the Monte Carlo Wash. The berm would incorporate a 42-inch corrugated metal pipe that connects to an outlet basin and a maintenance road located on top of the berm. On the upstream side of the basin, another soil cement berm and entrance weir would be constructed to allow storm water to enter a small sediment basin. The soil cement entrance weir structure would also contain a pipe drain to

harvest storm water. An earthen berm with rocks would be constructed around the inside of the smaller, upstream sediment basin to trap sediment and detain water during small storm events. The earthen berm would keep storm water from inundating the future soccer field. However, during larger storm events the area of the soccer field would be partially inundated. The floor of the sediment basin would be graded to allow water to enter a bypass channel located on the north side of the basin. Water would then flow down the bypass channel and into the 42-inch corrugated metal pipe and into an outlet basin. From the outlet basin, the water would continue to flow down the Monte Carlo Wash and into the Nogales Wash. The volume of water stored during a 100-year storm would be 36.88 acre-feet, the maximum ponding depth would be 10.91 feet (3.32 meters), and the inundated area would be approximately 10 acres (4 hectares) (Figure 3). A 6-inch natural gas pipeline is located within the footprint of the proposed basin and would need to be relocated outside the ponding limit of a 100-year storm. The natural gas line would be relocated along the southern property boundary line of the basin at the toe of the slope. All vegetation would be removed from within the footprints of the basin, the earthen berms, the soils cement dam, and the inflow and outflow basins.

3.2.2.3 Chihuahua Wash Storm Water Detention/Sedimentation Basin

The site of the proposed Chihuahua Wash storm water detention/sedimentation basin (the Chihuahua basin) is immediately upstream of the Monte Carlo Hills subdivision. The existing capacity of the Chihuahua Wash channel within and downstream of the Monte Carlo Hills subdivision is limited to a discharge that is greater than the peak flow of a 2-year storm and less than the peak flow of a 10-year storm. The Chihuahua basin would be designed as a sediment trap that would temporarily store water during a 100-year storm. This storage would reduce the outflow from the basin to a discharge that approximates the existing 2-year storm to 10-year storm peak flow of the Chihuahua Wash.

The Chihuahua basin would consist of a soil cement berm with one emergency overflow spillway. The berm would be approximately 320 feet (97.5 meters) in length, 18 feet (5.5 meters) in height, and 60 feet (18 meters) in width across the Chihuahua Wash floodplain. A soil cement access road would be constructed from the existing Calle Chihuahua Road over the soil cement berm and to the inlet basin. The access road would be elevated and would funnel storm water into the inlet basin. Water would flow through a 36-inch corrugated metal pipe in the soil cement berm to an outlet basin and then into the Chihuahua Wash. The volume of water stored during a 100-year storm would be 11.54 acre-feet, the maximum ponding depth would be 10.27 feet (3.13 meters), and the inundated area would be approximately 2.73 acres (1.10 hectares) (Figure 4).

3.2.2.4 Challenger Wash Storm Water Detention/Sedimentation Basin

The site of the proposed Challenger Wash storm water detention/sedimentation basin (the Challenger basin) is also located immediately upstream of the Monte Carlo Hills subdivision. The existing capacity of the Challenger Wash channel within and downstream of the Monte Carlo Hills subdivision is limited to a discharge that is greater than the peak flow of a 2-year storm and less than the peak flow of a 10-year storm. The Challenger basin would be designed as a sediment trap that would temporarily store water during a 100-year storm. The storage would reduce the outflow from the basin to a discharge that approximates the existing 2-year storm to 10-year storm peak flow of the Challenger Wash.

The Challenger basin would consist of a soil cement berm with one emergency overflow spillway. The berm would be approximately 200 feet (61 meters) in length, 9 to 20 feet (3 to 6 meters) in height, and 60 feet (18 meters) in width across the floodplain. A soil cement access road would be constructed from the existing Calle Nogales Road along the southern side of the soil cement berm and over the berm for access to the inlet basin. Water would flow through a 36-inch corrugated metal pipe in the soil cement berm into an outlet basin and then into the Challenger Wash. A second inlet pipe would be installed to accommodate a small tributary on the east side of the basin. The volume of water stored during a 100-year storm would be 9.70 acre-feet, maximum, the maximum ponding depth would be 14.38 feet, and the inundated area would be 1.74 acres (Figure 5).

This section describes existing conditions in the project area, evaluates the potential for the No Action Alternative and the Proposed Action to result in direct and indirect impacts on the environment, and discusses mitigation measures to avoid or minimize these impacts. This section focuses on the environmental resources for which some level of impact may result: land ownership, jurisdiction, and land use; biological resources; geology, soils, and seismicity; water resources; air quality; utilities; socioeconomics and safety; and cultural resources. No other resource areas require evaluation pursuant to NEPA.

4.1 LAND OWNERSHIP, JURISDICTION, AND LAND USES

The sites of the proposed storm water detention/sedimentation basins are privately owned property adjacent to and upstream of the Monte Carlo subdivision. The sites are currently zoned for single-family housing, though they are currently undeveloped and consist of open space subject to off-road vehicle activity and livestock grazing. Illegal dumping also takes place within the three washes. Land adjacent to the basins contains residential and commercial development. The Monte Carlo subdivision contains approximately 225 single-family residences, four multi-family residences containing 122 units, one multi-family residence containing 108 units (currently under construction), and ten businesses. Residential development is present immediately to the west and downstream of the proposed Monte Carlo basin and immediately to the north and downstream of the proposed Chihuahua and Challenger basins.

4.1.1 Alternative 1: No Action

Under the No Action Alternative, no impacts to the existing land ownership, jurisdiction, or land uses at the proposed basin locations would occur. However, illegal dumping would continue to occur at all three sites.

4.1.2 Alternative 2: Proposed Action

Under the Proposed Action, the three storm water detention/sedimentation basins would be constructed on 31.37 acres (12.69 hectares) of private land (17.33 acres [7.01 hectares] for the Monte Carlo basin, 6.69 acres [2.71 hectares] for the Chihuahua basin, and 7.35 acres [2.97 hectares] for the Challenger basin) adjacent to the Monte Carlo subdivision. The City of Nogales would obtain legal authority to construct, permanently maintain, and operate the basins and all appurtenant features, including potential recreational facilities. Off-road vehicle activity and livestock grazing will no longer occur under the Proposed Action. Illegal dumping will likely be curtailed, as the Proposed Action will limit access to the washes because of the construction of the soil cement berms. Construction of the three basins would also eliminate damages caused by flooding to existing and future residential and commercial businesses located downstream.

Implementation of the proposed action would modify the existing land uses within the project area by converting these land uses into three storm water detention/sedimentation basins and a future recreational facility.

4.2 BIOLOGICAL RESOURCES

The project area is located within the boundaries of the Semidesert Grassland subdivision of the Sonoran Desert (Brown 1994). Plant species occurring within the project area include creosotebush (*Larrea tridentate*), velvet mesquite (*Prosopis velutina*), graythorn (*Ziziphus obtusifolia*), wait-a-minute bush (*Mimosa biuncifera*), desert willow (*Chilopsis lineares*), yucca (*Yucca spp*.), and sotol (*Dasylirion wheeleri*). Lehmann's lovegrass (*Eragrostis lehmannii*), a non-native species, is the dominant grass that occurs within the project area. Plant species within the project area that are typical of disturbed areas include Bermuda grass (*Cynodon dactylon*), desert broom (*Baccharis sarothroides*), and Russian thistle (*Salsola kali*). Animal species common within the Semidesert Grassland that may inhabit the project site include Gambel's quail (*Callipepla gambelii*), cactus wren (*Campylorhynchus brunneicapillus*), mourning dove (*Zenaida macroura*), coyote (*Canis latrans*), black-tailed jackrabbit (*Lepus californicus*), and western diamondback rattlesnake (*Crotalus atrox*).

4.2.1 Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 establishes a federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The ESA specifically charges federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All federal agencies must ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction of critical habitat for these species.

In compliance with Section 7 of the ESA, the sites for the three basins were evaluated for suitable habitat that could potentially support populations or individuals of federally threatened and endangered species and species proposed for listing. The U.S. Fish and Wildlife Service (USFWS) list of threatened, endangered, candidate, and proposed species for Santa Cruz County, Arizona, is given in Table 1. Designated critical habitat for listed species does not occur in the project area.

It was determined that this project would have no effect on the bald eagle, the California brown pelican, the Canelo Hills ladies'-tressess, the Chiricahua leopard frog, the Desert pupfish, the Gila topminnow, the Huachuca water umbel, the Jaguar, the Mexican gray wolf, the Mexican spotted owl, the Northern aplomado falcon, the ocelot, the Sonora chub, the Sonora tiger salamander, the Southwestern willow flycatcher, or the Gila chub. These species are associated with aquatic habitats, broadleaf riparian habitat, and/or perennial water sources. These habitats do not occur within the project area. Only the Lesser long-nosed bat, the Pima pineapple cactus, and the Cactus Ferruginous Pygmy-owl were evaluated to determine if these species could occur in the project area.

4.2.1.1 Species Evaluated

Lesser Long-Nosed Bat

The proposed project area is within the known range of the Lesser long-nosed bat. However, the project area does not contain suitable foraging habitat or roosting sites.

Table 1
U.S. Fish and Wildlife Service List of Threatened, Endangered, Candidate, and Proposed Species for Santa Cruz County, Arizona

Common Name	Scientific Name	Status
Bald Eagle	*Haliaeetus leucocephalus*	Threatened
Cactus Ferruginous Pygmy-owl	*Glaucidium brasilianum cactorum*	Endangered
California Brown Pelican	*Pelecanus occidentalis californicus*	Endangered
Canelo Hills ladies'-tressess	*Spiranthes delitescens*	Endangered
Chiricahua leopard frog	*Rana chiricahuensis*	Threatened
Desert pupfish	*Cyprinodon macularius*	Endangered
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered
Huachuca water umbel	*Lilaeopsis schaffneriana recurva*	Endangered
Jaguar	*Panthera onca*	Endangered
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Endangered
Mexican gray wolf	*Canis lupus baileyi*	Endangered
Mexican spotted owl	*Strix occidentalis lucida*	Threatened
Northern aplomado falcon	*Falco femoralis septentrionalis*	Endangered
Ocelot	*Leopardus pardalis*	Endangered
Pima pineapple cactus	*Coryphantha scheeri* var. *robustispina*	Endangered
Sonora chub	*Gila ditaenia*	Threatened
Sonora tiger salamander	*Ambystoma tigrinum stebbinsi*	Endangered
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered
Gila chub	*Gila intermedia*	Proposed Endangered

Pima Pineapple Cactus

The Pima pineapple cactus is known to occur in southern Arizona and Sonora Mexico. The known range of the Pima pineapple cactus in Arizona is from the Baboquivari Mountains east to the Santa Rita Mountains in Santa Cruz and Pima Counties. The Pima pineapple cactus occurs most commonly on flat ridge tops with little slope, but some plants occur on steeper, south-facing slopes (mid to upper slope) with slopes of up to 15 percent (Mills 1991). During a survey conducted on April 17, 2003, five Pima pineapple cacti were located within the project area on the south-facing slope on the north side of the site of the Monte Carlo basin. Seven more Pima pineapple cacti were located immediately outside the project area at this basin. In addition, one Pima pineapple cactus was located just outside the Chihuahua basin. All Pima pineapple cacti were found outside the 100-year flood ponding limits of the proposed sites and therefore were outside of the areas that would be affected by construction activities.

Cactus Ferruginous Pygmy-Owl

The Cactus Ferruginous Pygmy-owl was historically found in mesquite woodlands, broadleaf riparian forests, and less commonly in paloverde-mixed cactus forests. More recent observations have occurred in Upland Sonoran Desertscrub habitat in association with low-density residential developments. In central and southern Arizona, the primary habitats of pygmy-owls are riparian deciduous forests and woodlands, mesquite bosques, Sonoran desertscrub, and semidesert and Sonoran savanna grasslands with drainages lined with mesquite. However, the most recent observations have occurred primarily in Sonoran desertscrub associations of paloverde, bursage,

ironwood, mesquite, acacia, and saguaro (Federal Register 1999). The project area contains suitable habitat for the pygmy-owl. Westland Resources, Inc., conducted surveys for the pygmy-owl in 2002 and 2003. On one survey occasion in 2002 a pygmy-owl was detected. However, the subspecies of owl was not determined. The remaining surveys resulted in no detections of pygmy-owls.

4.2.1.2 Alternative 1: No Action

The No Action Alternative would not have any effect on threatened or endangered species.

4.2.1.3 Alternative 2: Proposed Action

As described in correspondence with the USFWS (see Appendix A), FEMA determined that the Proposed Action may affect the Cactus Ferruginous Pygmy-owl, but would not likely adversely affect this species or its habitat. The Proposed Action would not affect the Pima pineapple cactus or its habitat or the Lesser long-nosed bat or its habitat.

Lesser Long-Nosed Bat

Because the project area does not contain foraging habitat or roosting sites for the Lesser long-nosed bat, the Proposed Action would not affect this species.

Pima Pineapple Cactus

All pima pineapple cacti in the project area were found outside the 100-year storm ponding limits of the proposed basin sites. Because construction activities at each site would be contained within the 100-year storm ponding limit, construction of the basins and their appurtenant structures would not result in any direct or indirect affects to the Pima pineapple cactus. No construction activities or equipment would be allowed north of the Monte Carlo Wash, with the exception of construction of the soil cement berm. The end of this berm is located approximately 60 feet (18 meters) from two Pima pineapple cacti, but construction activities would not occur on the slope where the cacti occur. At the site of the proposed Chihuahua basin, no construction activities would be allowed outside of the Chihuahua Wash itself.

Cactus Ferruginous Pygmy-Owl

Construction activities at the proposed Monte Carlo, Chihuahua, and Challenger basins would result in the removal of approximately 9.8 acres (4.0 hectares) of vegetation. Vegetation loss would include the removal of mature mesquite trees and other vegetation that is considered suitable habitat for the Cactus Ferruginous Pygmy-owl. Therefore, the Proposed Action may affect, but would not likely adversely affect, this species or its habitat. To mitigate this effect, mesquite trees (less than 5 gallons) would be planted where appropriate in disturbed areas (such as berms) during construction of the basins.

Members of the project team met with representatives of the USFWS on May 21, 2003, and June 4, 2003, to discuss the project, its potential effects, and the proposed mitigation measures for the Lesser long-nosed bat, the Pima pineapple cactus, and the Cactus Ferruginous Pygmy-owl. FEMA initiated ESA Section 7 consultation for the proposed action with the USFWS on

June 13, 2003. FEMA requested concurrence from the USFWS concurred with the determination that the proposed action might affect, but would not likely adversely affect, the Cactus Ferruginous Pygmy-owl or its habitat and would not affect the Pima pineapple cactus or its habitat or the Lesser long-nosed bat or its habitat, provided that the aforementioned mitigation measures would be implemented (Appendix A).

4.2.2 Native Plants

In addition to the special status species, the biological survey documented the presence of native plants in the project area and identified whether they are classified under the Arizona Native Plant Law (ANPL; ARS 3-904). The majority of protected native plants fall into one of five groups: (1) highly safeguarded (no collection allowed); (2) salvage restricted (collection only with permit); (3) salvage assessed (permits required to remove live trees); (4) export restricted (transport out of state prohibited); and (5) harvest restricted (permits required to remove plant byproducts). The protected native plants include all cacti; unique plants such as agave and ocotillo; unique trees such as ironwood (*Olneya tesota*), paloverde (*Cercidium spp*.), mesquite (*Prosopis spp*.); and others. Under the ANPL, the City of Nogales must submit a Notice of Intent to the Arizona Department of Agriculture prior to the removal of protected native plants.

4.2.2.1 Alternative 1: No Action

No impacts would occur to native plant species from the No Action Alternative.

4.2.2.2 Alternative 2: Proposed Action

Under the Proposed Action, protected native plants would be removed or destroyed during the construction of the three basins. The City of Nogales would submit a Notice of Intent to the Arizona Department of Agriculture prior to their removal to afford commercial salvagers the opportunity to remove and salvage these plants.

4.2.3 Executive Order 13112: Invasive Species

Under Executive Order 13112, dated February 3, 1999, projects that occur on federal lands or are federally funded must "subject to the availability of appropriations, and within administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to, and control, populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; and (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded."

To evaluate compliance with Executive Order 13112, the project area was surveyed by URS Corporation on April 17, 2003. During the survey an isolated occurrence of punturevine (*Tribulus terrestris*) was noted within the Monte Carlo basin site and an occurrence of Russian thistle (*Salsola iberica*) was noted within the Chihuahua basin site. Both of these species are considered invasive.

4.2.3.1 Alternative 1: No Action

Under the No Action Alternative, no direct impacts would occur to invasive species. However, the No Action Alternative would allow the punturevine and Russian thistle to continue to disperse into uncontaminated areas, likely resulting in further displacement of native plant species.

4.2.3.2 Alternative 2: Proposed Action

Under the Proposed Action, the punturevine and Russian thistle present on the proposed construction sites would be treated with a herbicide two to three weeks prior to construction to prevent the spread of these two species into uncontaminated areas. If fill is imported for use on the sites, clean, weed-free fill from a certified source would be used.

4.2.4 Executive Order 11990: Protection of Wetlands

Executive Order 11990, "Protection of Wetlands," requires federal agencies to take action to minimize the destruction or modification of wetlands by considering both direct and indirect impacts to wetlands that may result from federally funded actions.

URS Corporation conducted a reconnaissance of the three basin sites in April 2003 and determined that no wetlands occur within or adjacent to the project area. Therefore, no impacts to wetlands would occur under either the No Action Alternative or the Proposed Action Alternative.

4.3 GEOLOGY, SOILS, AND SEISMICITY

The project area is located in the Basin and Range physiographic province of the southern United States. The southern portion of the Basin and Range province is situated along the southwestern flank of the Colorado Plateau and is bounded by the Sierra Nevada Mountains to the west. Formed during the middle and late Tertiary time, the Basin and Range province is dominated by fault-controlled topography. The topography consists of mountain ranges and relatively flat alluvial valleys. These mountain ranges and valleys have evolved from generally complex movements and associated erosional and depositional processes.

The subsurface soils in the three washes and at the bottom of the proposed storm water detention/sedimentation basins consist of sand with gravel and traces of silt. This material is typically underlain by interbedded layers of clayey sand and silty sand with varied amounts of gravel. This soil has a relatively high infiltration rate and is expected to quickly absorb detained runoff. The material on the channel banks and hillsides typically consists of gravelly clayey sand with occasional cobbles and boulders (Terracon 2002).

Damage due to historical earthquakes in the vicinity of Nogales has been fairly minor (Woodward-Clyde 1997). The Basin and Range province is characterized by low levels of diffuse historical seismicity and few active normal faults. Active or potentially active faults that lie within 50 miles of Nogales include the Santa Rita fault, the Patagonia Mountain fault, the Huachuca fault, faults associated with the California Wash monocline, the Hereford fault, and the Little Rincon Mountain fault. Although these faults are capable of generating large, damaging earthquakes, the low slip rates and long recurrence intervals of faults in the Basin and

Range province indicate that the probability of significant earthquake events is low. Only four earthquakes of magnitude 5.0 or greater have occurred or were felt within the project area in recorded history. The largest earthquake to affect the area was the 1887 magnitude 7.3 Sonoran earthquake, which resulted from a rupture along the Pitaycachi fault in northeast Sonora, Mexico.

4.3.1 Alternative 1: No Action

Under the No Action Alternative, no impacts would occur to the existing geology or soils.

4.3.2 Alternative 2: Proposed Action

Soils would be temporarily impacted during the construction of the basins by clearing of vegetation, wind erosion, and compaction due to the activities of heavy equipment and hand crews. Areas that would be disturbed by construction activities would be reseeded to stabilize the soil and reduce any erosion that might occur. Best Management Practices (BMPs), such as installing silt fences or mulching cleared soil, would be employed at all sites to eliminate or reduce soil erosion.

Executive Order 12699, "Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction," requires construction of new buildings to meet standards for seismic safety set by the National Earthquake Hazard Reduction Program. However, this executive order applies only to buildings, which are defined as structures used or intended for sheltering persons or property. Because the Proposed Action does not involve a building, Executive Order 12699 does not apply. However, due to the existence of a seismic hazard in the region, the berms would be designed to meet existing state standards for seismic safety.

4.4 WATER RESOURCES

The Monte Carlo, Chihuahua, and Challenger Washes drain south and west into Nogales Wash, the major drainage system for the City of Nogales. The watersheds drained by these washes range in elevation from 3,700 feet to 3,900 feet (1,128 meters to 1,189 meters). Upstream of the project area, the watersheds are largely undeveloped but have nonetheless been heavily impacted by human activity, particularly off-road vehicle activity, road construction, and livestock grazing. Also, the washes are often subject to illegal dumping activities. Downstream of the project area, the washes have been channelized in the areas where they pass through residential development and light industrial complexes.

Surface flow in the washes is ephemeral. The average annual rainfall in the project area varies between 16 inches in low valley areas and 20 inches in the higher elevations of the watershed. More than one-half of the area's annual rainfall occurs during the summer rainy season in July and August. These summer rains often come as brief torrential showers that cause flash flooding.

4.4.1 Existing Flood Hazards

FEMA has published a Flood Insurance Study (FIS), dated October 15, 1980, and Flood Insurance Rate Map (FIRM) for the City of Nogales. The project area is shown on FIRM panel 0005 B, dated April 15, 1981. When preparing the FIS and FIRM, FEMA did not study the

Monte Carlo, Chihuahua, or Challenger Washes in the project area. On behalf of the City of Nogales, Tetra Tech, Inc. performed hydrologic and hydraulic analyses of these watersheds to evaluate existing flood conditions and to provide a baseline for evaluating the proposed alternatives. These analyses were prepared using the U.S. Army Corps of Engineers (USACE) HEC-1 precipitation/runoff model and the HEC-RAS hydraulic analysis package. Discharges calculated under existing conditions are given in Table 2. The analyses were used to prepare a delineation of the existing 100-year floodplain (see Appendix B). The analyses and floodplain delineation indicate that the proposed sites for the three basins, as well as the majority of the Monte Carlo subdivision, are located within the 100-year floodplain.

4.4.2 Executive Order 11988: Floodplain Management

Executive Order 11988, "Floodplain Management," requires federal agencies to avoid, to the extent possible, the short- and long-term adverse impacts associated with the occupancy and modification of floodplains. If there is no practicable alternative to undertaking an action in a floodplain, any potential adverse impacts must be mitigated. FEMA's regulations for complying with Executive Order 11988 are found in 44 CFR, Part 9.

4.4.3 Alternative 1: No Action

Under the No Action Alternative, existing water quality conditions would not be changed. Erosion would continue to occur, and sediment would continue to be carried downstream to the Nogales Wash. Periodic flooding of the Monte Carlo subdivision would continue to allow contaminants such as oil and grease, metals, trash, and other chemicals to enter surface water during flood events. Also, illegal dumping in the washes would continue. This dumping poses a threat to water quality because contaminants in dump sites can come into contact with storm water.

Under the No Action Alternative, no impacts would occur to the existing floodplain. Floodwaters would continue to inundate the Monte Carlo subdivision periodically, resulting in sediment deposition on the streets of the subdivision and damage to property. Future flood damage could increase significantly as the area continues to develop.

4.4.4 Alternative 2: Proposed Action

4.4.4.1 Water Quality

The proposed sites of the storm water detention/sedimentation basins are located within waters of the United States; therefore, the City of Nogales would be required to obtain the proper Section 404 Permit from the USACE in compliance with the Clean Water Act. The city filed a Pre-Construction Notice with the USACE on June 19, 2003, regarding such a permit. Also, because the project would disturb more than 5 acres of land, the city would be required to obtain an Arizona Pollution Discharge Elimination System Permit. Under Arizona state regulations regarding such permits, the city must file a Notice of Intent with the Arizona Department of Environmental Quality. The city would be responsible for complying with all other state regulations governing water quality.

The proposed basins would reduce channel velocities and thereby reduce scour of the wash channels and banks and trap debris that would otherwise be carried downstream to the Nogales Wash. The reduced risk of flooding within the Monte Carlo subdivision would reduce the potential that water quality could be degraded by oil and other substances present in the subdivision. The Proposed Action would therefore have a beneficial impact on surface water quality.

The proposed basins would temporarily store storm water, resulting in infiltration and groundwater recharge. However, the duration of water storage is expected to be short; for the largest flood events, the expected detention time would be a matter of days. It is not anticipated that the Proposed Action would result in impacts to groundwater quality.

4.4.4.2 Floodplain Management

The hydrologic and hydraulic analyses referenced above included an evaluation of post-project conditions. The results of the post-project evaluation are presented in Tables 2 and 3. Table 2 compares post-project discharges to existing conditions and demonstrates that the Proposed Action would reduce discharges in each of the three washes downstream of the proposed basins. For a 100-year storm, discharges within the Monte Carlo subdivision would be reduced to values that fall between those of the existing 2-year storm and 10-year storm discharges. Discharges downstream of the Monte Carlo subdivision would also be reduced, but the attenuating effect of the basins would diminish because of the urbanized conditions that exist in the watersheds that contribute flow to the washes downstream of the proposed basins.

Table 2
Peak Discharges for Existing and Post-Project Conditions

	Peak Discharge (cubic feet per second)							
	2-year		10-year		25-year		100-year	
Flooding Source and Location	**Existing**	**Post-Project**	**Existing**	**Post-Project**	**Existing**	**Post-Project**	**Existing**	**Post-Project**
Monte Carlo Wash								
Upstream of Monte Carlo Estates (Detention basin No. 1 outlet)	197	73	487	106	668	119	1,043	139
Downstream of Monte Carlo Estates	210	77	513	115	701	129	1088	153
Downstream of Chihuahua Wash Confluence	423	241	1037	442	1410	543	2152	741
Chihuahua Wash								
Upstream of Monte Carlo Hills (Detention basin No. 2 outlet)	84	44	230	76	323	90	512	106
At Baffert Drive	110	74	278	177	377	242	583	370
Challenger Wash								
Upstream of Monte Carlo Hills (Detention basin No. 3 outlet)	82	76	223	126	317	246	512	164
Upstream of Chihuahua Wash Confluence	105	96	276	162	386	191	608	250

Source: Tetra Tech, Inc., 2002

Table 3 compares water surface elevations and floodplain widths that would be expected for a 100-year flood under existing and post-project conditions. Delineations of the 100-year floodplain for existing and post-project conditions are provided in Appendix B.

Table 3
Comparisons of 100-Year Water Surface Elevations and Floodplain Widths

Flooding Source and Location	Cross Section	Water Surface Elevation (feet NGVD[1])		Floodplain Width (feet)	
		Existing	Post-Project	Existing	Post-Project
Monte Carlo Wash					
At Calle Cananea Road	36	3780	3772	580	219
At Calle Guadelupe Road	31	3754	3754	577	336
Chihuahua Wash					
At detention basin outlet	121	3827	3825	106	19
At Baffert Drive	111	3779	3779	425	411
Challenger Wash					
At detention basin outlet	139	3819	3817	33	18
At Calle Cananea Road	132	3775	3775	37	34

[1] National Geodetic Vertical Datum of 1929.
Source: Tetra Tech, Inc., 2002.

Table 3 indicates that water surface elevations and floodplain widths for the 100-year flood would decrease for post-project conditions, indicating that the Proposed Action would reduce flood hazards downstream of the proposed basins. For the Challenger Wash, this reduction would be adequate to eliminate overbank flooding along the reach located between the detention basin outlet and the Chihuahua Wash confluence. However, for Chihuahua Wash, this reduction would only be beneficial for the reach located immediately downstream of the detention basin; the effectiveness of the detention basin would diminish in areas located further downstream. By definition, the basins will result in impoundment of water, temporarily increasing the extent of flood hazards upstream of the berms. However, the floodwaters would be entirely contained within the basins and would not affect structures, biological resources, or cultural resources. The proposed recreational facilities within the Monte Carlo basin would be designed to withstand the effects of flooding.

The Proposed Action was reviewed according to the criteria outlined in 44 CFR Part 9. As described in Section 3.1 of this EA, alternatives to locating the basins in the floodplain were found to be impracticable. No adverse impacts to floodplain values have been identified. Because the basins would provide flood protection to existing development, the Proposed Action would not support additional development of the floodplain. Also, the Proposed Action would not aggravate flood hazards for others. Accordingly, the Proposed Action complies with Executive Order 11988.

4.5 AIR QUALITY

The Clean Air Act is a comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. The 1990 amendments to the Clean Air Act authorize the U.S. Environmental Protection Agency to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. The NAAQS include the following six criteria pollutants: nitrogen dioxide (NO_2), ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), lead, and particulate matter less than 10 micrometers in diameter (PM_{10}). Areas where the monitored concentration of a pollutant exceeds the federal standard are classified as being in

non-attainment for that pollutant. If the monitored concentration is below the standard, the area is classified as being in attainment. The City of Nogales is classified as being in attainment for all criteria pollutants except PM_{10}.

4.5.1 Alternative 1: No Action

Under the No Action Alternative, air quality standards would not be directly affected. However, each storm event that results in the accumulation of sediment on the roads within the Monte Carlo subdivision could cause temporary impacts to air quality. In addition to wind erosion, the support vehicles used to clean up the sediment within the subdivision would cause a slight, temporary increase in fugitive dust (that is, airborne particulate matter of a relatively large size). The use of support vehicles would also result in minor emissions associated with fossil fuel burning, including carbon monoxide and precursors to ozone.

4.5.2 Alternative 2: Proposed Action

Under the Proposed Action, construction of the three detention basins would result in some short-term deterioration of air quality. The construction-related effects of the project would be limited to increases of fugitive dust and mobile source emissions during construction.

Construction-related fugitive dust would be generated by haul trucks, concrete trucks, delivery trucks, and other earthmoving vehicles operating at and near the construction sites. The fugitive dust would result primarily from particulate matter re-suspended by vehicle movement over paved and unpaved roads, dirt tracked onto paved surfaces from unpaved areas at access points, and material blown from uncovered haul trucks. These vehicles would also release minor emissions associated with fossil fuel burning, including carbon monoxide and precursors to ozone. The City of Nogales would be responsible for ensuring that all construction occurs in compliance with local air pollution control laws and regulations, including implementation of dust-control BMPs.

4.6 UTILITIES

Citizen Utility maintains a 6-inch natural gas line that supplies natural gas to the City of Nogales and the Monte Carlo subdivision. The gas line runs north to south and crosses the Monte Carlo Wash within the footprint of the proposed Monte Carlo basin.

4.6.1 Alternative 1: No Action

Under the No Action Alternative, no impacts would occur to the natural gas line or to utility services.

4.6.2 Alternative 2: Proposed Action

Construction of the proposed Monte Carlo basin would require the relocation of the Citizen Utility gas line. Under the Proposed Action, the City of Nogales would be responsible for ensuring that Citizen Utility relocates the natural gas line to an area on the south side of, and outside of the full-pool elevation of the Monte Carlo basin. The connection of the new line would cause a temporary (short-term) interruption to the service of this utility.

4.7 SOCIOECONOMICS AND SAFETY

4.7.1 Public Safety

Public safety in the project area is frequently affected by floods. Periodic flooding of the Monte Carlo subdivision damages property and presents a threat to the health and safety of residents. Roads must be closed during and after floods, preventing proper access by police and fire department emergency response vehicles. High-velocity flow in the washes during floods presents an additional hazard to public safety.

4.7.2 Demographics of the Project Area

Demographic data obtained from the U.S. Bureau of the Census were used to compare the demographic profile of the project area to that of Santa Cruz County and surrounding local jurisdictions (Table 4). Census Tract 9963 and Block Groups 2 and 3 represent the population within the project area. Census tracts represent small statistical subdivisions of a county and the block groups represent statistical subdivisions on the census tract. The area described by these statistics extends outside the project area; therefore, the exact population and demographic characteristics of the project area may vary from these data.

In 2000, the residents of Nogales reported a median household income of $22,306, with approximately 33 percent of the households falling below the federal poverty threshold (defined by the U.S. Census Bureau as $17,463 for a family of four in 2000 [U.S. Census Bureau 2003]). Block Group 3 within Census Tract 9963 reported a lower median household income of $17,202, with approximately 43 percent of the households falling below the federal poverty threshold. In comparison, Santa Cruz County as a whole reported a median household income of $29,710 with approximately 23 percent of the county residents falling below the 2000 poverty threshold.

Small differences exist in the percentage of disabled people over the age of 16 in Block Group 3 compared to Block Group 2, the Census Tract 9963, the City of Nogales, and Santa Cruz County. Slight differences also occur in the Hispanic/Latino population in Santa Cruz County and the City of Nogales. In addition, a slight difference occurs in the percentage of people over the age of 60 in Block Group 3 compared to Block Group 2, Census Tract 9963, the City of Nogales, and Santa Cruz County. However, a large difference exists in the percentage of people over the age of 60 in Block Group 2 compared to the other units (Table 4).

4.7.2.1 Environmental Justice

Title VI of the Civil Rights Act of 1964 and related statutes ensure that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, and disability. Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” directs federal agencies to ensure that programs, policies, and activities not have a disproportionately high and adverse human health and environmental effect on minority and low-income populations. This executive order also tasks federal agencies with ensuring that public notification regarding environmental issues is concise, understandable, and readily accessible.

The population of the project area is predominately of Hispanic/Latino origin and includes a significant number of residents living below the federal poverty threshold (Table 4). Also, many residents of the area do not speak English well or at all.

Table 4
Demographic Concentrations: Year 2000

Demographic Characteristic	Block Group 2	Block Group 3	Census Tract 9963	City of Nogales	Santa Cruz County
Total Population	2,708	1,566	7,944	20,878	38,381
Race:					
White alone	3.0%	3.5%	5.5%	5.5%	17.8%
Black or African-American Alone	0.1%		0.1%	0.2%	0.2%
American Indian/Alaska Native alone	0	0.4%	0.1%	0.2%	0.2%
Asian alone	0.3%		0.2%	0.3%	0.5%
Native Hawaiian and Other Pacific Islander alone	0	0.1%	0.1%	0	0.4%
Some Other Race alone[1]	0	0	0.1%	0.1%	0.7%
Two or More Races alone	0.1%	0	0.2%	0.2%	0.4%
Hispanic or Latino	96.5%	96.0%	93.7%	93.5%	80.0%
Do not speak English well or do not speak English at all[2]	26%	42%	30%	30%	22%
Age 60 years and over	9.3%	19%	15%	15%	15%
Disabled[3]	18%	33%	26%	28%	27%
Below poverty level	19%	43%	19%	33%	23%
Median household income[4]	$28,444	$17,202	$21,555	$22,306	$29,710

Note: Percentages may not total 100 due to rounding.
[1] Includes Native Hawaiian and Other Pacific Islander.
[2] Ages 18 to 64.
[3] Defined as civilian non-institutionalized persons 16 years of age and over.
[4] Represents average median income reported for all affected Census tracts.

Source: U.S. Bureau of the Census 2002.

4.7.3 Alternative 1: No Action

Under the No Action Alternative, periodic flooding would continue to affect nearby residences, damaging property, closing streets, and jeopardizing public health and safety. Illegal dumping would continue to occur, presenting potential health problems. Hispanic/Latino, low-income, and disabled residents in the area would continue to experience these impacts. However, because there would be no federal undertaking, compliance with Executive Order 12898 would not be required.

4.7.4 Alternative 2: Proposed Action

The Proposed Action would have the positive effects of reducing flooding of nearby residences, road closures due to sediment deposition, and illegal dumping in the washes. The Proposed Action would also create a recreational facility for the community. In addition, the basins would reduce high-velocity flows in the washes, increasing public safety during floods. Any adverse effects, such as increases in air emissions and removal of habitat, would be relatively minor and mitigated through compliance with appropriate environmental laws, such as the Clean Air Act and the Endangered Species Act.

The temporary and permanent impacts on natural resources and environmental conditions would be borne equally by all residents living within the Monte Carlo subdivision and in the immediate project vicinity; therefore, the Proposed Action would not have a disproportionately high and adverse effect on the Hispanic/Latino, low-income, or disabled populations. Also, these populations would benefit from the positive effects of the project described above. Therefore, the proposed action complies with Executive Order 12898.

4.8 CULTURAL RESOURCES

To evaluate the existence of potential cultural resources in the project area, a records search and intensive field inventory were completed (Morton and Rogge 2003; Swartz 2002). Only two isolated artifacts were found, and both were determined to have no values warranting preservation. FEMA also consulted with the Tohono O'odham Nation, the San Carlos Apache Tribe, and the Hopi Tribe, as well as the staff of the Nogales Certified Local Government program. No traditional cultural places or other concerns about impacts to archaeological or historical resources were identified through these consultations.

4.8.1 Alternative 1: No Action

Under the No Action Alternative, no impacts would occur to cultural resources.

4.8.2 Alternative 2: Proposed Action

The area of potential effect on cultural resources was defined as the parcels of land that the City of Nogales would acquire to construct and operate the three storm water detention/sedimentation basins. All construction activity and the ponding of flood flows would be confined to these parcels. Because the relatively low embankments would be constructed within steep-sided washes, little potential exists for impacts on any historic properties beyond the project parcels, and no potential for other indirect effects on cultural resources was identified. The State Historic Preservation Office (SHPO) concurred with FEMA's determination of "no historic properties affected," as defined by federal regulations for protection of historic properties at 36 CFR, Subparagraph 800.4(d)(1). Documentation of the consultation with the SHPO is given in Appendix C.

In the unlikely event that archaeological resources are discovered during the construction of the project, they would be protected in place, and FEMA would evaluate and treat the findings as a post-review discovery in compliance with 36 CFR Section 800.13. If any discovery includes human burials and associated objects, they would be protected in place and reported immediately to the Arizona State Museum in accordance with the Arizona Antiquities Act.

4.9 VISUAL RESOURCES

The existing visual character of Monte Carlo, Chihuahua, and Challenger washes is similar. Gently sloping terrain covered with a mix of grass, scrub, and mesquite trees is the typical natural setting within and adjacent to the proposed sites. The existing visual character is typical within the region, and no areas of scenic importance were inventoried. Primary viewers adjacent to the proposed sites consist of residential areas and travelers along secondary arterial roads. Representative Key Observation Points (KOPs) in the immediate zone of influence (that is, within a quarter mile of the proposed site), including residential and transportation viewers, were identified and views were characterized according to the visibility of the proposed basins. In general, visibility from KOPs is locally governed by factors such as existing vegetation, existing buildings, aboveground electrical facilities, and the orientation of viewers within the areas of the proposed basins.

4.9.1 Alternative 1: No Action

Under the No Action Alternative, no impacts would occur to existing visual resources. However, illegal dumping would continue to occur at all three sites and would continue to affect their visual character.

4.9.2 Alternative 2: Proposed Action

The proposed project would have a direct effect on the character of the setting. Existing vegetation would be removed within the area of the berms and storm water detention/sedimentation basins would be constructed that would create distinct line and form changes within the existing landscape character. These effects are not expected to be significant because the changes will occur in areas with typical visual features that lack distinct visual appeal.

Impacts on KOPs were determined by evaluating the change in views resulting from the introduction of the proposed basins. Views to the proposed basins were analyzed from representative viewpoint locations, primarily residential and transportation views, including the adjacent Monte Carlo subdivision. Potential negative impacts on viewers in the immediate foreground zone of influence (that is, within a quarter mile) would be minimal because the proposed facilities would be sited low within the representative viewsheds adjacent to the proposed sites. Travelers along secondary arterial roads would have views of the proposed facilities, but these views would be of short duration and the viewer would typically be focused on driving rather than viewing the proposed facilities. Therefore, impacts to identified KOPs are not anticipated to be significant.

4.10 CUMULATIVE IMPACTS

The CEQ defines a cumulative impact as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions…” (40 CFR 1508.7). For this project, cumulative impacts would be generally related to growth and residential development in the general project vicinity. Residential development could increase the adverse effects of minor project impacts to wildlife, native vegetation, and visual resources. No significant residential or commercial developments are expected in the near future in the immediate vicinity of the project.

Table 5 summarizes the impacts and mitigation measures associated with the No Action Alternative and the Proposed Action.

Table 5
Summary of Impacts and Mitigation

Description	No Action Alternative	Proposed Action
Description of Alternative	No actions would be taken to reduce flooding within the Monte Carlo subdivision.	Storm water detention/sedimentation basins would be constructed in the Monte Carlo, Chihuahua, and Challenger Washes to eliminate flooding within the Monte Carlo subdivision.
Potential Impacts		
Land ownership, jurisdiction, and land uses	No impacts; existing conditions would remain.	The existing land uses would be modified by converting private lands into city land for the operation and maintenance of three basins and a potential recreational facility.
Biological resources	No impacts; existing conditions would remain.	Construction of the basins would result in the direct loss of suitable habitat for the Cactus Ferruginous Pygmy-owl. No other effects to threatened or endangered species would occur.
Geology, soils, and seismicity	No impacts; existing conditions would remain.	Soils would be temporarily impacted during construction by clearing of vegetation, wind erosion, and compaction due to the activities of heavy equipment and hand crews. Berms would be constructed in accordance with standards for the prevailing seismic hazard in the region.
Water resources	Flooding would continue to affect nearby residences, causing property damage and closing roads. Water quality would continue to be degraded by erosion and contaminants, such as oil on roads in the Monte Carlo subdivision.	Construction of the basins would reduce downstream discharges, reducing the risk of flooding to the Monte Carlo subdivision. Flooding behind the berms would be contained within the basins. Water quality would be improved as erosion is reduced and floodwaters are prevented from entering the Monte Carlo subdivision and thereby picking up oil and other contaminants.
Air quality	No impacts; existing conditions would remain.	Construction of the basins would have local, temporary impacts to air quality. The construction-related effects of the project would be limited to short-term increased fugitive dust and mobile source emissions during construction. This impact would be minimized through compliance with local pollution control measures.

Table 5
Summary of Impacts and Mitigation

Description	No Action Alternative	Proposed Action
Utilities	No impacts; existing conditions would remain.	Citizen Utility gas pipeline at the site of the Monte Carlo basin would be relocated outside the ponding limits of the basin. A temporary, short-term impact would occur to individuals that are receiving natural gas from this line during the reconnection phase.
Socioeconomics and safety	Flooding would continue to affect nearby residences, causing property damage and closing roads. High-velocity flow in the washes would continue to present a hazard.	A reduction in the risk of flooding and the elimination of high-velocity flow in the washes would increase public safety. No disproportionately high and adverse effect would occur for Hispanic/Latino, low-income, or disabled populations.
Cultural resources	No impacts; existing conditions would remain.	Artifacts found within the area of potential effect have no value warranting preservation. No additional cultural resources have been cited by Native American groups or local government programs. The SHPO has concurred with the "no historic properties affected" determination.
Visual resources	No impacts; existing conditions would remain.	Minor impacts to views from nearby residences and secondary arterials. Impacts would be minimal because proposed facilities would be sited low within representative viewsheds adjacent to basin sites.
Cumulative impacts	No cumulative impacts.	No significant residential or commercial developments are expected in the near future in the immediate vicinity of the project.

FEMA is the lead federal agency for conducting the NEPA compliance process for the construction of the proposed storm water detention/sedimentation basins. It is the lead agency's responsibility to expedite the preparation and review of NEPA documents in a way that is responsive to the needs of the City of Nogales residents while meeting the spirit and intent of NEPA and complying with all NEPA provisions.

The City of Nogales will initiate a two-week public comment period by placing a notice in the local newspaper. Due to the number of residents who do not speak English well or at all, a notice will be published in Spanish at the same time. The Draft EA will be available for public review via the FEMA Web site. Following completion of the comment period, FEMA will incorporate public responses into the Draft EA as appropriate.

The public notice prepared for the NEPA process also serves as the final public notice for an action taken in the floodplain, as required by Executive Order 11988. FEMA published the initial public notice for floodplain actions in November 2000.

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Figures

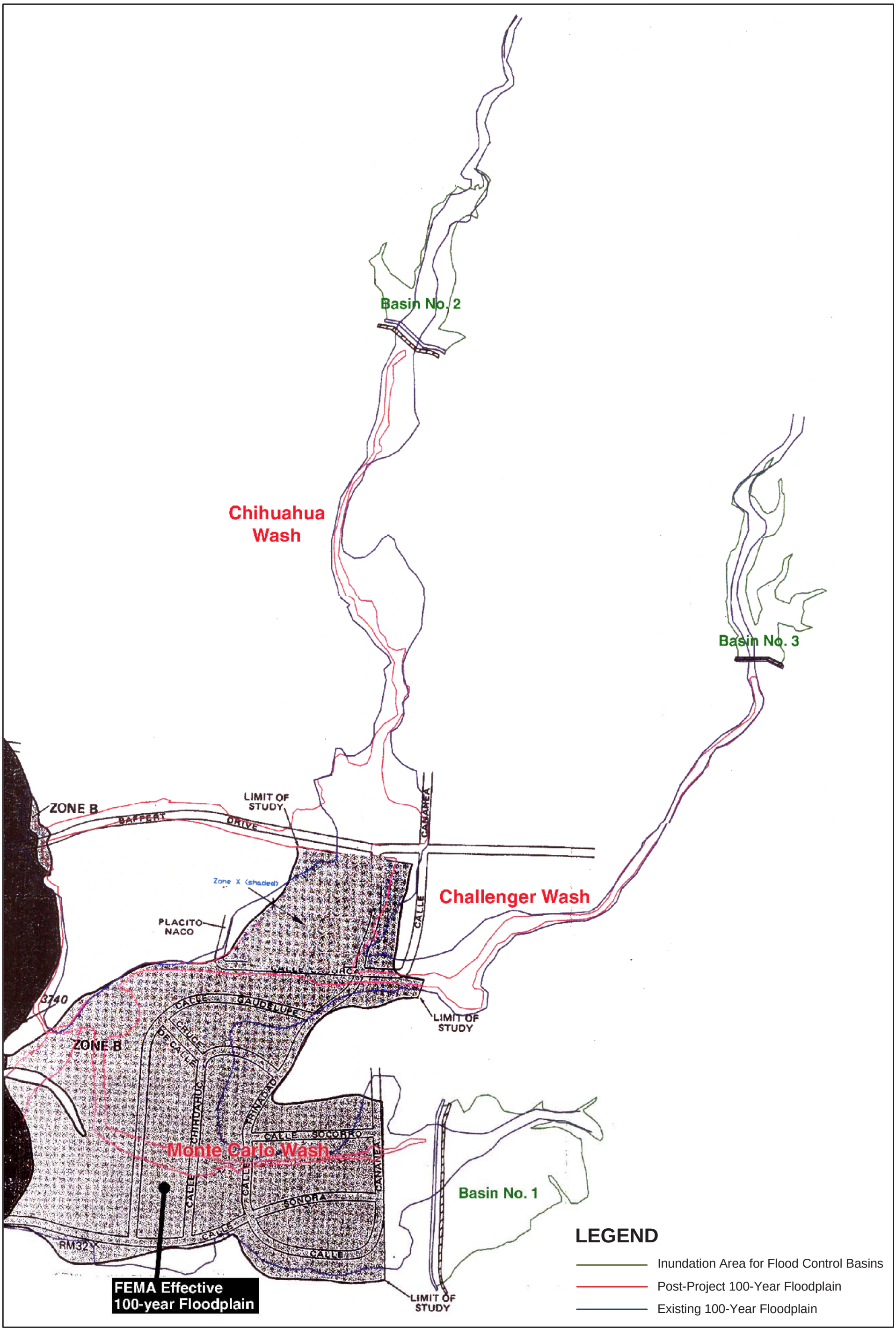
Appendix A
Fish and Wildlife Service Consultation

Appendix B

Existing and Post-Project 100-Year Floodplains

Appendix C

State Historic Preservation Office Consultation



0 200 400 800 Feet

Scale is approximate

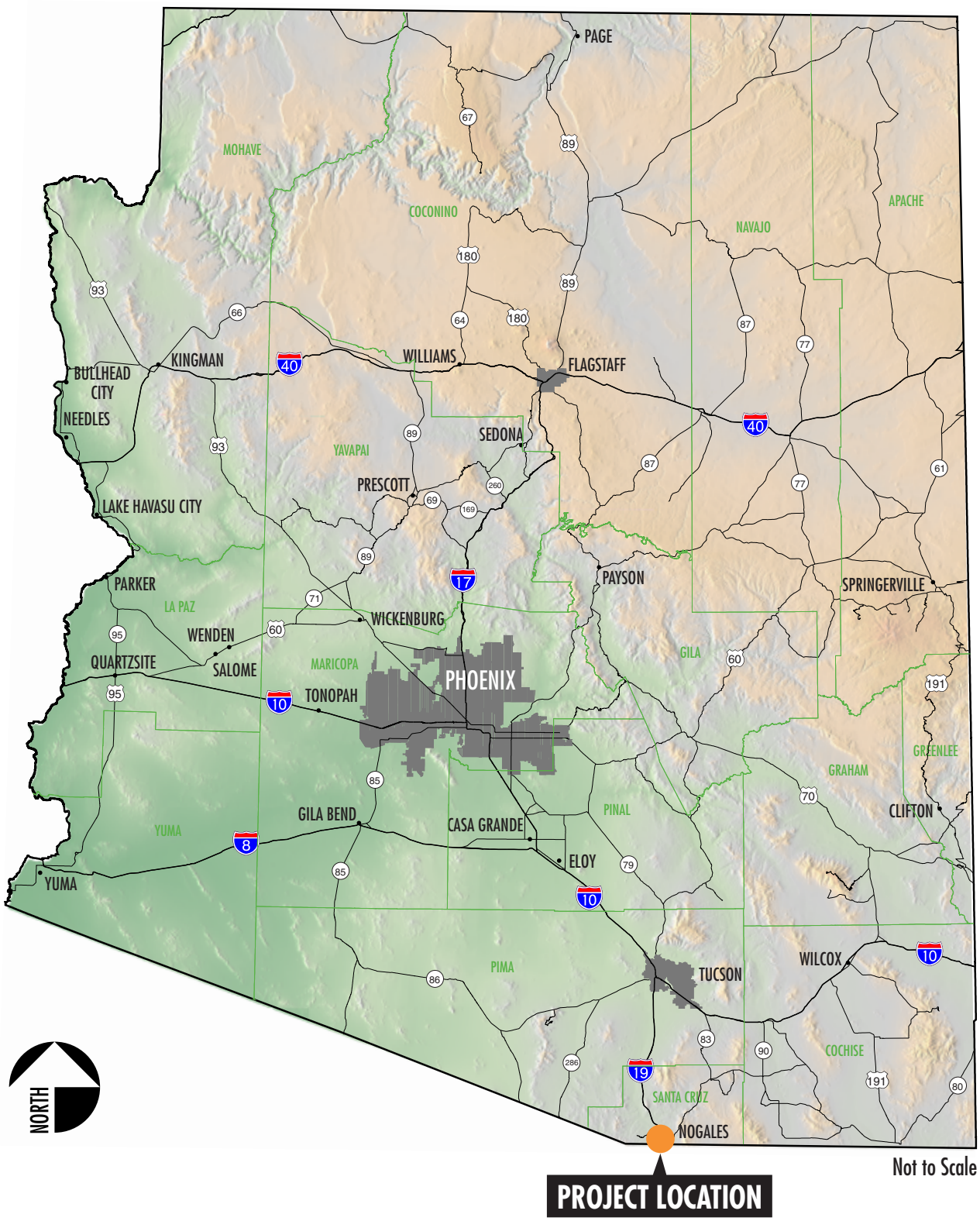
N W E S

100-Year Floodplain Delineations

Existing and Post-Project Conditions

Data Source: Tetra Tech Inc., 2002
URS Corporation, 2003

URS



Monte Carlo, Challenger, Chihuahua Wash
Storm Water Detention/Sedimentation Basins

URS

Figure 1

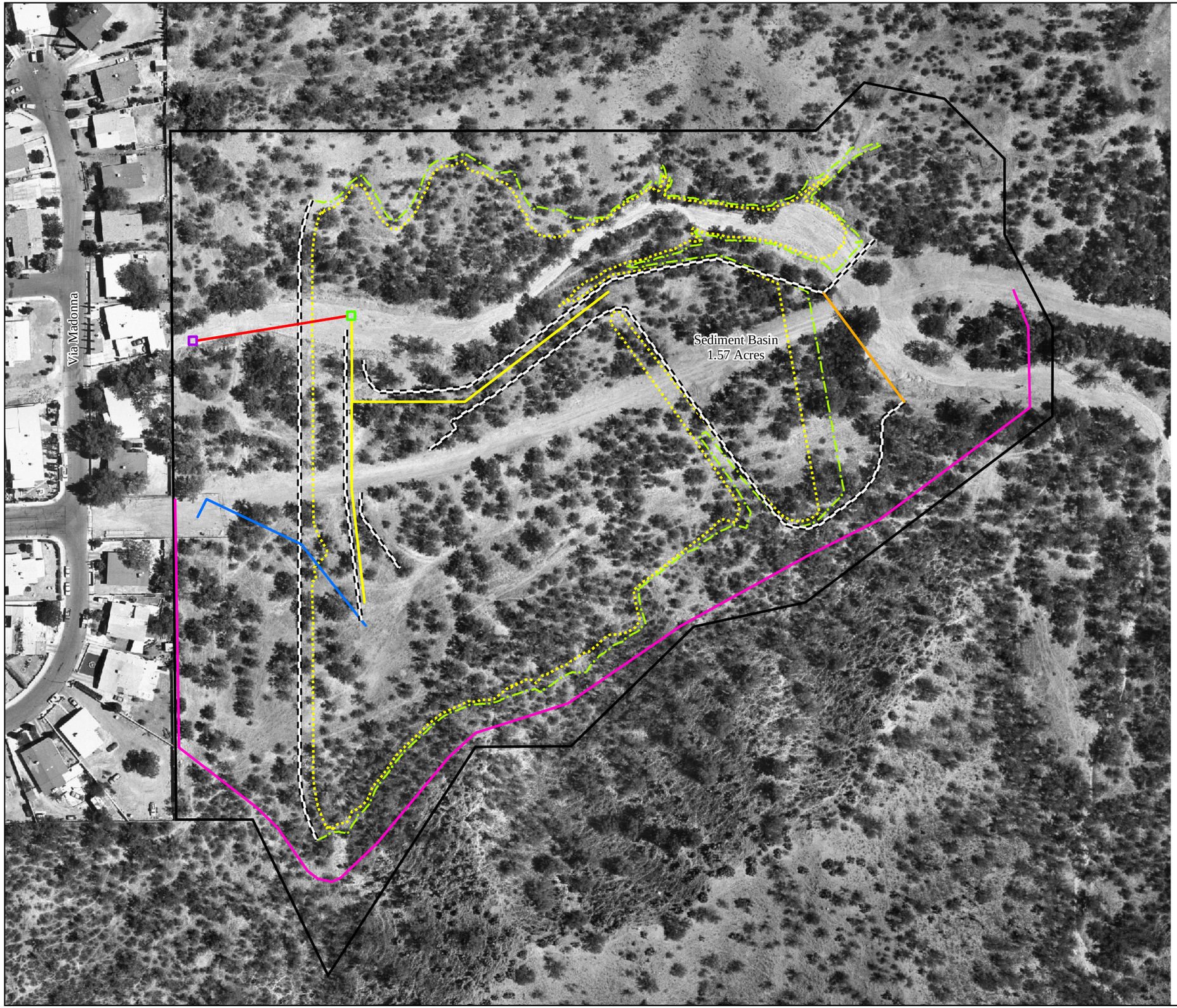


Figure 3
Monte Carlo Wash
Storm Water Detention/
Sedimentatin Basin

Legend

- Acquisition Boundary
- Ponding Limits, 100-Year Storm, WSE=3789.13
- Ponding Limits, Weir EL=3790.70
- Berm
- Outlet Basin
- Inlet Basin
- Drainage Channel
- Maintenance Road
- Pipe Drain
- Entrance Weir
- Proposed Natual Gas Pipeline

Source:
Imagery: City of Nogales
Tetra Tech Inc., 2002
URS Corporation, 2003

N
W E
S

1 inch equals 120 feet

0 60 120 240
Feet

Working Draft

URS

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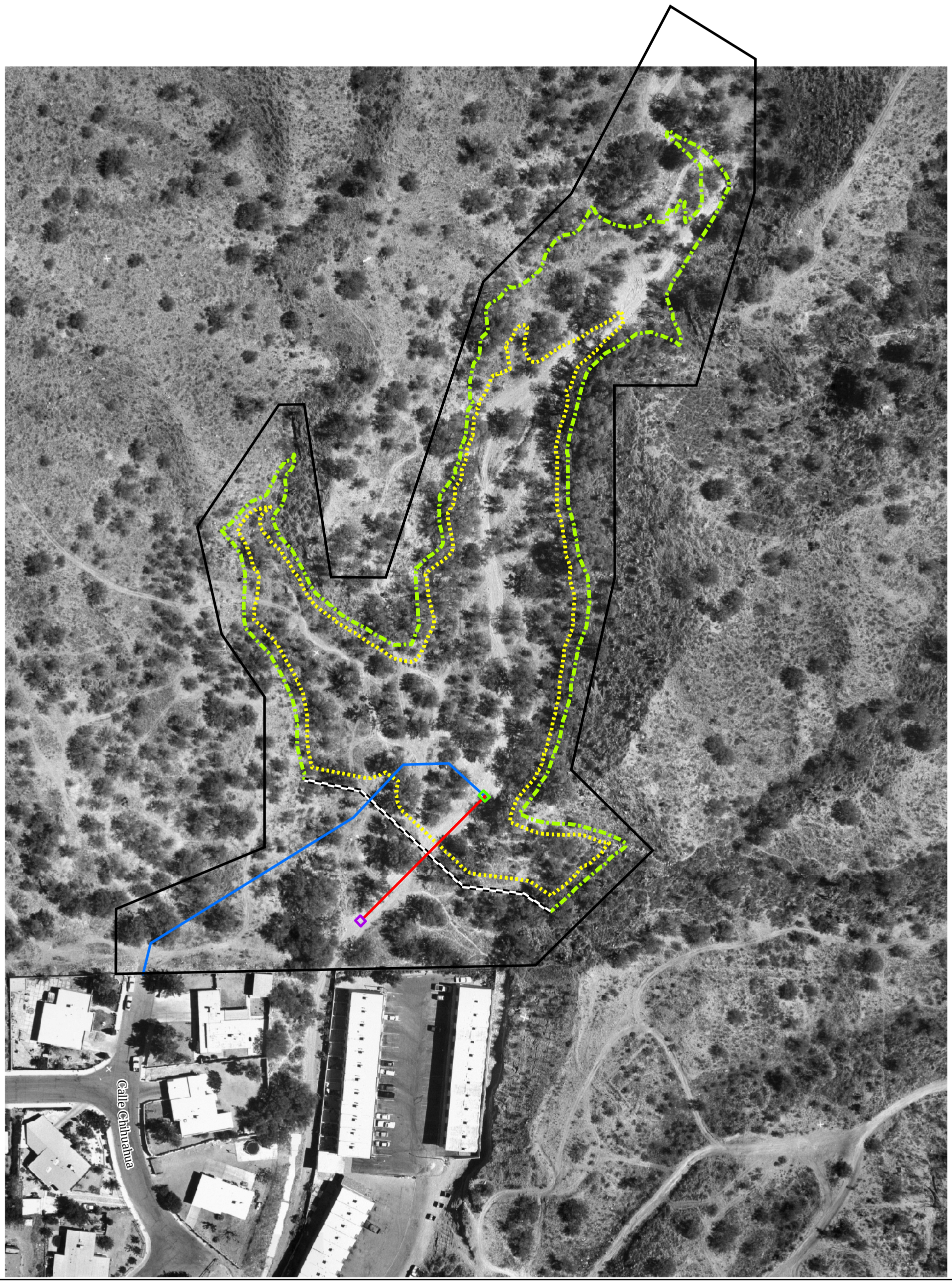

Legend

- Acquisition Boundary
- Ponding Limits, 100-Year Storm, WSE=3843.22
- Ponding Limits, Weir EL=3848.00
- Berm
- Outlet Basin
- Inlet Basin
- Pipe Drain
- Maintenance Road

N
W E
S

1 inch equals 100 feet

0 50 100 200
Feet

Figure 4
Chihuahua Wash Storm Water Detention/Sedimentation Basin

Working Draft

Source:
Imagery: City of Nogales
Tetra Tech Inc., 2002
URS Corporation, 2003

URS

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Legend

- Acquisition Boundary
- Ponding Limits, 100-Year Storm, WSE=3835.94
- Pond Limits, Weir EL=3840.00
- Berm
- Outlet Basin
- Inlet Basin
- Pipe Drain-Tributary
- Maintenance Road

N
W E
S

1 inch equals 100 feet

0 50 100 200
Feet

Figure 5
Challenger Wash Storm Water Detention/Sedimentation Basin

Working Draft

Source:
Imagery: City of Nogales
Tetra Tech Inc., 2002
URS Corporation, 2003

URS

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FINDING OF NO SIGNIFICANT IMPACT

Monte Carlo, Challenger, and Chihuahua Washes Stormwater Detention and Sedimentation Basins Project

FEMA-1347-DR-AZ, HMGP #1347-6-5

The City of Nogales has applied through the Arizona Division of Emergency Management (DEM) to the Federal Emergency Management Agency (FEMA) for assistance with a storm water detention and sedimentation basin project. FEMA is proposing to fund the project under the Hazard Mitigation Grant Program as part of the recovery from the flooding event of 2000, which was a Presidentially declared disaster; and under the Flood Mitigation Assistance Program.

FEMA has prepared an Environmental Assessment (EA) to evaluate the impacts of the proposed action. The EA has been prepared according to the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality's regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and FEMA's implementing regulations (44 CFR Part 10).

The Monte Carlo Estates and Monte Carlo Hills subdivisions frequently experience damaging effects from flooding along the Monte Carlo, Challenger, and Chihuahua washes, particularly after the intense rainfalls associated with thunderstorms. After each storm event, the City of Nogales Public Works Department deploys dump trucks, front-end loaders, and flagmen for traffic control to remove sediment at all street crossings and drainage structures. During significant storm events, the Nogales Fire Department is also deployed to rescue people from flooded homes.

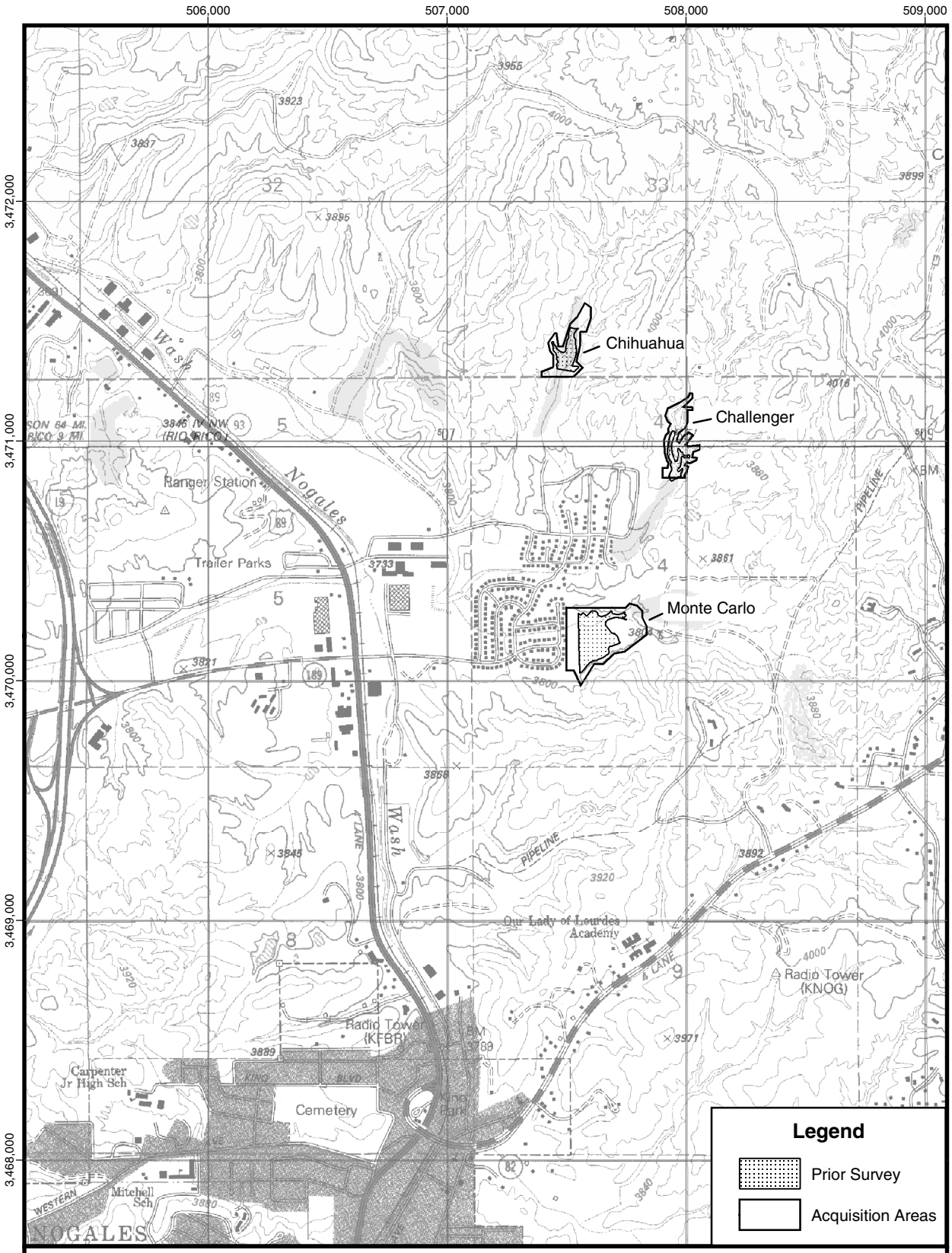
The storm water detention and sedimentation basins would be designed to temporarily store water during a 100-year flood event, reducing the outflow to a discharge that approximates the existing 2-year peak flow in the washes. Each basin would consist of a soil cement dam with outlet structure and an earthen berm. The Monte Carlo basin would also be designed to provide the City of Nogales with the opportunity to construct a soccer field within the sediment basin.

The EA for this action is available for public review and comment. The document may be obtained online at http://www.fema.gov/ehp/docs.shtm. A Spanish-language version of the EA will be made available upon request.

Based upon the conditions and information contained in the EA for the Stormwater Detention and Sedimentation Basins Project, dated July 2003, and in accordance with FEMA's regulations in 44 CFR Part 10 (Environmental Considerations) and Executive Orders 11988 (Floodplain Management), 11990 (Protection of Wetlands), and 12898 (Environmental Justice), the following is concluded:

A Finding of No Significant Impact. Therefore, an Environmental Impact Statement will not be prepared based on the fact that there will be no short or long-term adverse impacts to the natural environment resulting from this project.

For more information, contact Sandro Amaglio, FEMA Region IX Environmental Officer, at (510) 627-7027. No action will be allowed to occur until 15 days after publication of this notice.



Map Source: Nogalas and Rio Rico, 7.5' USGS Quadragle (central portion)
Arizona 1981 (31110C&D8) NAD 1927, UTM Zone 12

0 1,000 2,000 3,000 4,000 5,000 Feet

0 200 400 600 800 1,000 Meters

N

Monte Carlo, Challenger Wash, and Chihuahua Wash Flood Control Projects

FEMA HMGP # 1347-6-5

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