



Draft Environmental Impact Statement City of Albuquerque Drinking Water Project Executive Summary

June 2002

**U.S. Department of the Interior
Bureau of Reclamation**



**City of Albuquerque
Public Works Department**



**EXECUTIVE SUMMARY OF
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE
CITY OF ALBUQUERQUE DRINKING WATER PROJECT**

Prepared By: U.S. Department of the Interior, Bureau of Reclamation
City of Albuquerque, New Mexico

In Cooperation With: U.S. Army Corps of Engineers

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Enclosed is an executive summary of the Draft Environmental Impact Statement (DEIS) for the City of Albuquerque Drinking Water Project. This summary is intended for readers who desire a brief but complete overview of the contents of the DEIS.

The DEIS analyzes the impacts of implementing a drinking water project for residents of the City of Albuquerque, New Mexico, that aims to use existing water resources and develop a safe and sustainable water supply to the year 2060. The proposed project would entail four elements: (1) diverting surface water from the Rio Grande, (2) transporting the raw water to a new water treatment plant, (3) treating the raw water to drinking water standards, and (4) distributing the treated, potable water to customers in the City's water service area. The DEIS evaluates four alternatives: a no action alternative and three action alternatives. Each of the three action alternatives would provide a means by which the City would fully consumptively use the City's San Juan-Chama project water to provide a sustainable water supply.

To obtain a copy of the entire DEIS or find out where you can review a copy, please contact Lori Robertson of the Bureau of Reclamation's Albuquerque Area Office (see above address); faxogram (505) 248-5356; e-mail: lrobertson@uc.usbr.gov. The DEIS is also available on the Internet at www.uc.usbr.gov.

Written comments on the DEIS should be submitted to Lori Robertson at the same address by August 13, 2002. Your comments will be evaluated and considered in the preparation of the final environmental impact statement. Public hearings to receive comments will be held in July in Albuquerque, Socorro, and Española, New Mexico. A complete list of the times and locations of the public hearings will be published in the Federal Register and in local newspapers.

EXECUTIVE SUMMARY

The City of Albuquerque (City or Albuquerque) proposes to construct and operate a surface water diversion on the Rio Grande, with associated water-treatment and transmission facilities, to fully consumptively use the City's San Juan-Chama (SJC) water to provide a sustainable drinking water supply for its citizens. The proposed project, referred to as the City's Drinking Water Project (DWP), would entail four elements: diverting surface water from the Rio Grande; transporting the raw water to a new water treatment plant (WTP); treating the raw water to drinking-water standards; and distributing the treated, potable water to customers in the City's water service area. The DWP is the most significant aspect of Albuquerque's Water Resources Management Strategy (AWRMS or the Strategy) for purposes of ensuring a sustainable water supply.

This Draft Environmental Impact Statement (DEIS) is prepared to comply with the requirements of the National Environmental Policy Act (NEPA). The federal actions requiring NEPA compliance are: (1) issuance of a license by Reclamation to the City for the location of project facilities on Reclamation-owned property or right-of-way, or approval of a license between the City and the Middle Rio Grande Conservancy District for the location of facilities on a right-of-way held by Reclamation over property owned by the Middle Rio Grande Conservancy District; (2) execution of a water carriage contract authorizing use of federal irrigation canals to convey non-project water (this action would be required only if there would be diversion of the City's San Juan-Chama Project water at the Angostura Diversion Dam and conveyance of the water through existing facilities of the Middle Rio Grande Project). Special legislation would be needed to authorize carriage of non-project water for municipal and industrial purposes through Middle Rio Grande project facilities; and (3) Clean Water Act Section 404 permitting from the U.S. Army Corps of Engineers in conjunction with construction of project facilities in waters of the United States. The U.S. Fish and Wildlife Service and the Environmental Protection Agency will provide consultation and review pursuant to their respective statutory authority under the Endangered Species Act, Clean Water Act, and NEPA. For purposes of this DEIS, the project's region of influence (ROI) includes portions of the Rio Grande watershed from the outlet works of Heron Reservoir on the Rio Chama, downstream to the headwaters of Elephant Butte Reservoir on the Rio Grande. Figure ES-1 illustrates the ROI with subareas identified. The subareas are identified as follows:

- **Upper Project Subarea** – From the outlet works of Heron Reservoir to the proposed Angostura Diversion (at RM 209.7) (approximately 145 river miles), or from the outlet works of Heron Reservoir to the proposed Paseo del Norte Diversion and Subsurface Diversion facilities (at RM 192) (approximately 165 river miles).
- **Middle Project Subarea** – The approximately 33 river miles from the Angostura Diversion (RM 209.7) to the Albuquerque SWRP outfall (RM 177) or 15 river miles from Paseo del Norte Diversion or Subsurface Diversion (RM 192) to the SWRP outfall (at RM 177).
- **Lower Project Subarea** – The approximately 120 river miles from the SWRP outfall (at RM 177) to the headwaters of Elephant Butte Reservoir (at RM 57).

Construction of the required diversion and raw-water conveyance facilities would occur within Sandoval and/or Bernalillo Counties; the WTP and new potable-water transmission facilities would be constructed entirely in Bernalillo County.

PURPOSE AND NEED

The purpose of and need for the proposed project is to provide a sustainable water supply for the City of Albuquerque through direct and full consumptive use of City San Juan-Chama water for potable purposes in accordance with EPA regulations under the Safe Drinking Water Act. The project would use the City's allocation of its SJC water (48,200 acre-feet per year [ac-ft/yr]), to be supplied through existing SJC Project facilities. After transit losses to Albuquerque, the amount available for full use would approximate 47,000 ac-ft/yr. A total of approximately 94,000 ac-ft/yr, consisting of 47,000 ac-ft/yr of the City's SJC water and 47,000 ac-ft/yr of the native Rio Grande surface water, would be diverted from the Rio Grande near Albuquerque and conveyed to a new WTP. After the City's SJC water is fully consumed, the native Rio Grande water, about half of the 94,000 ac-ft/yr, would be returned to the Rio Grande following treatment at the City's Southside Water Reclamation Plant (SWRP). The proposed diversion and use would allow the City to fully consume its SJC water and provide return flows to the Rio Grande to keep the river whole.

The Santa Fe Group aquifer, the aquifer underlying the Albuquerque metropolitan area, is currently the City's sole source of water. Continued sole reliance on ground-water as the sole source of supply is not sustainable. The proposed project provides a sustainable water supply through full use of renewable surface supplies, reduces the demand on the aquifer, and restores it as a drought reserve. Demand on the aquifer would be reduced by approximately 94,000 ac-ft/yr. The proposed project also includes a conjunctive use component by using SJC water in an Aquifer Storage and Recovery (ASR) project.

Current and projected water demands would not be met without the proposed project. The aquifer would continue to be mined and could not serve as a drought reserve. The long-term effects on the aquifer from ground-water extraction would have serious consequences for Albuquerque and other users in the metropolitan area and throughout the Middle Rio Grande. Environmental consequences from continued and increased pumping from the aquifer likely would include large ground-water level declines, including some areas of the bosque, land-surface subsidence and water-quality degradation. The proposed project also represents a viable way for the City to satisfy EPA promulgated arsenic standard under the Safe Drinking Water Act (SDWA). The project would combine treated SJC surface water which is low in arsenic, with ground-water which has higher background levels, resulting in lower arsenic levels. Wells high in arsenic would be taken out of service.

PUBLIC AND AGENCY SCOPING

In April 1997, the Albuquerque City Council adopted the AWRMS. The strategy is based on optimizing the City's use of existing water resources and developing surface-water supplies. The various elements of the AWRMS are intended to provide a sustainable drinking-water supply for the City by reducing ground-water pumping and eliminating the City's sole reliance on ground-water resources for potable-water supply. The

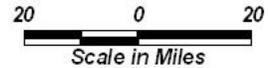
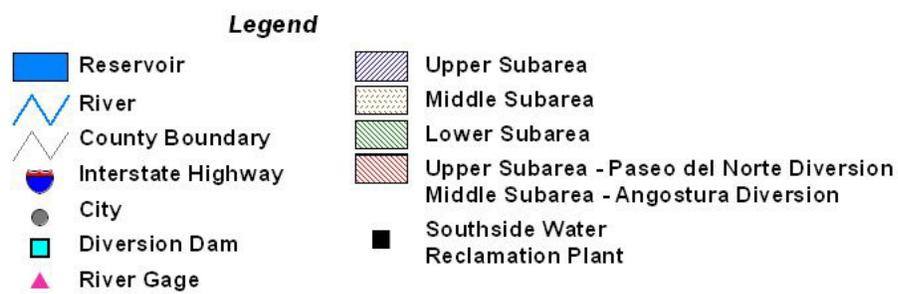
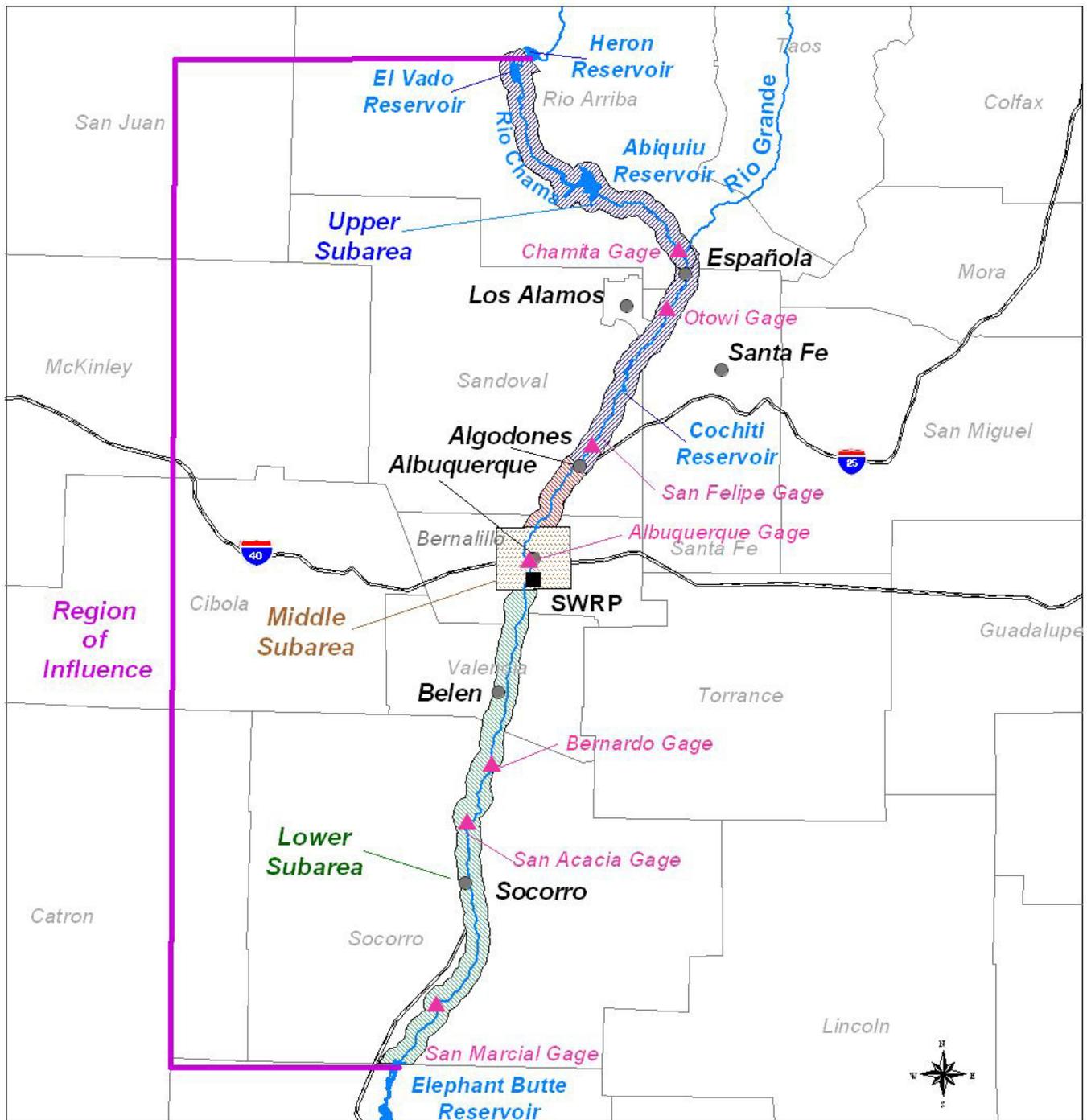


Figure ES-1
Region of Influence with Subareas Identified

Note: Riverine corridor not to scale

City's DWP is a major feature of the AWRMS. Public process and participation in the selection and ranking of alternatives for the DWP, and ultimately for analysis in this DEIS, has been extensive. Commencing in 1995 and continuing through the present, the City has held over 100 public meetings for purposes of presenting, analyzing, ranking, or selecting alternatives. Pursuant to compliance with NEPA, the identification of environmental issues and concerns, and development of potential mitigation and environmental enhancements, has been a primary focus of the City throughout the course of the development of the DWP and the alternatives for implementation.

Public and agency scoping and involvement continued with agency scoping workshops conducted in December, 1998. Three formal public scoping meetings were held during September, 1999, one each in the cities of Albuquerque, Socorro, and Española. Table ES-1 lists the resource categories and associated issues compiled from public scoping meetings (details of these meetings are given in Appendices B – D of the DEIS). Eighteen interagency workgroup meetings have been completed, to solicit input from federal, state, city and Pueblo entities. Numerous public meetings to present status reports and obtain input also have been undertaken to review the WTP-siting and DWP alternatives-selection processes. A town hall meeting was held in April, 2001 to present a preferred alternative.

ALTERNATIVES CONSIDERED IN DETAIL

Over the course of six years, the City conducted a comprehensive evaluation process that incorporated public and agency input into the development of the DWP as part of the City's AWRMS. As a result of this extensive public process, three action alternatives and the No Action Alternative were selected for further evaluation of environmental and socioeconomic consequences in this DEIS. The four alternatives retained for detailed analysis are:

- No Action, or continued reliance on ground-water resources to meet current and projected drinking-water demand, and continuation of conservation measures;
- The diversion and full consumptive use of the City's SJC water via the existing Angostura Diversion Dam (a Middle Rio Grande Project Facility) on the Rio Grande, with conveyance of raw water to a new WTP via two existing Middle Rio Grande Project conveyance facilities, and distribution of treated, potable water to consumers in the Albuquerque metropolitan area (hereinafter "Angostura Diversion");
- The diversion and full consumptive use of the City's SJC water at a new surface diversion to be constructed on the Rio Grande north of Paseo del Norte in Albuquerque, with conveyance of raw water to a new WTP via a new pipeline, and distribution of treated, potable water to consumers in the Albuquerque metropolitan area (hereinafter "Paseo del Norte Diversion"); and
- The diversion and full consumptive use of the City's SJC water via new subsurface collectors to be constructed in the Rio Grande near Paseo del Norte, with conveyance of raw water to a new WTP via a new pipeline, and distribution of treated,

potable water to consumers in the Albuquerque metropolitan area (hereinafter “Subsurface Diversion”).

**TABLE ES-1
SUMMARY OF ISSUES IDENTIFIED DURING SCOPING**

Resource Category	Related Issues
Human Health and Safety	<ul style="list-style-type: none"> • Opposition to a South Valley water treatment plant location • Taste of water
Water Quality	<ul style="list-style-type: none"> • Effects on downstream uses • Concerns with downstream water quality • Effects on residential wells and agricultural uses • Effects on ground-water
Water Quantity	<ul style="list-style-type: none"> • Drying or alteration of river channel • Effects on downstream reservoirs • River diversion • Selection of diversion method
Biological Resources	<ul style="list-style-type: none"> • Effects on endangered species • Effects on bosque or riparian areas • Ground-water effects on the bosque • Ecosystem approach to cumulative-effects analysis
Cultural Resources	<ul style="list-style-type: none"> • Identification and consideration of cultural resources
Indian Trust Assets and Other Tribal Resources	<ul style="list-style-type: none"> • Effects of flow reduction on traditional uses of the river, water quality, water rights, and environment
Socioeconomics	<ul style="list-style-type: none"> • Effects of population growth • Albuquerque growth effects on neighbors

The following project components would be common to each of the action alternatives:

- A new WTP;
- A potable water distribution pipeline system and associated storage facilities, and
- Aquifer storage and recovery.

The Chappell Drive Water Treatment Plant (WTP) (Figure ES-2) would treat the raw water diverted from the Rio Grande to meet or exceed federal and state standards for municipal drinking water. The proposed WTP would have a treatment capacity of 92 million gallons per day (mgd), or 142 cubic feet per second (cfs). As a result of the WTP site-selection evaluation, and based on input received at public meetings, the Chappell Drive site was selected as the preferred location of the WTP and has been purchased by the City for \$10.8 million. The potable-water transmission pipeline alignment (Figure ES-3) would distribute treated water via pipelines from the WTP to the City's customers. The selected piping transmission corridors would permit the optimum use of existing hydraulic gradients and existing City water-distribution lines. Aquifer storage and recovery would occur by injection of treated potable water into a number of City wells during low demand periods and later would be recovered by ground-water pumping.

NO ACTION ALTERNATIVE

The No Action Alternative is included in this analysis because it provides an understanding of existing conditions, a forecast of probable future conditions if no action is taken, and defines the basis of comparison for the analysis of effects attributable to the proposed action. The City's current sole source of potable water is the Albuquerque aquifer, a deep ground-water aquifer. The No Action Alternative assumes continued exclusive reliance on ground-water pumping in conjunction with conservation to meet all future City water needs. The No Action Alternative and associated conservation efforts would continue the current trend of aquifer depletion, which would likely result in land subsidence in some areas. The No Action Alternative would require construction of additional wells, replacement wells and ancillary facilities. The City's pumping costs would increase, and water-supply shortages would require acquisition of additional supplies. Assuming current growth trends continue and conservation measures are implemented, ground-water pumping requirements are expected to increase from about 105,000 ac-ft/yr in 2006 to approximately 195,000 ac-ft/yr by 2060. Under the No Action alternative, aquifer water-level declines in the aquifer are projected to exceed 250 feet (the Office of the State Engineer's subsidence threshold) by 2060 throughout a large area of northeastern Albuquerque. Aquifer drawdowns projected for the proposed action generally are less than 175 feet for the same area, potentially offset by the ASR process under all action alternatives. Water quality in some wells or well fields may deteriorate, and the relatively high concentration of arsenic in City wells would trigger the need for additional treatment to meet the federal arsenic standard for drinking water. Additionally, there are potential associated regional issues related to ground-water drawdown because other private and public users draw water from the same aquifer.

The No Action alternative would result in depletion of surface flows in the Albuquerque reach as a result of continued and increasing ground-water pumping above recharge rates. For purposes of comparison to the action alternatives, City SJC water which will

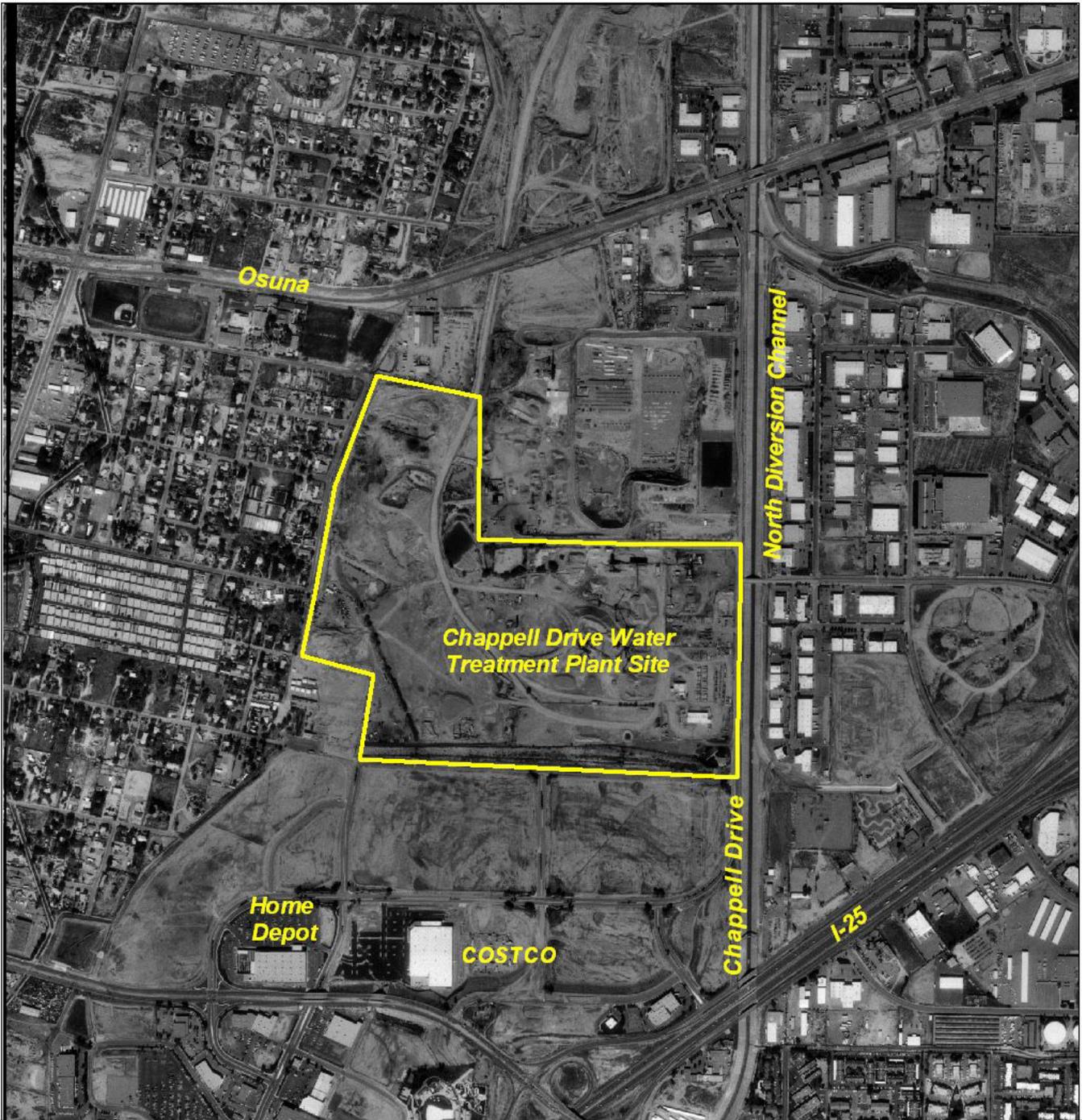
be directly used by the City for the purposes of satisfying offset requirements pursuant to New Mexico State Engineer Permit RG-960, that amount of SJC water necessary to satisfy outstanding City contracts (about 2,600 ac/yr through 2011) and the SJC water to Non-potable Surface Water Reclamation project (3,000 acre-feet per year) is included in the No Action alternative hydrologic baseline. The establishment of a No Action comparative baseline requires determining what future conditions without the project will be, based on what is predictable with some reasonable certainty. The historic use of the City's SJC water cannot reasonably be used to predict a future without the project. Moreover, with these limited exceptions, possible future uses are similarly unpredictable. The amount of SJC water in the comparative baseline is approximately 5,600 acre-feet until 2011, approximately 3,000 acre-feet until 2050, at which time, based on an increased need for offsets, it will increase from 222 acre feet in 2050, to 6,087 acre-feet in 2060. Regardless of the amount of water included in the comparative baseline, the hydrologic analysis demonstrates that any City SJC water in the river historically did not contribute substantively to annual river flow.

Although only the noted quantities of City SJC water are assumed to be in the Rio Grande below Abiquiu Reservoir, No Action assumes the City's SJC allotment of 48,200 ac-ft/yr is taken from Heron Reservoir each year. Because timing, amount, and destination of deliveries from Heron, and ultimate uses for most of the City's SJC water (other than the listed quantities) cannot be predicted, the hydrologic evaluation for the river above and below Abiquiu address only the amounts specified above.

ANGOSTURA DIVERSION ALTERNATIVE

The Angostura Diversion Alternative would divert a total of 94,000 ac-ft/yr from the Rio Grande (47,000 ac-ft/yr of SJC water and 47,000 ac-ft/yr of Rio Grande native water) at the existing Middle Rio Grande Project Angostura Diversion Dam. The existing Angostura Diversion Dam would be rehabilitated by making structural repairs, installing new motorized operators and gates, constructing a fish screen and fishway, removing sediment and debris from the concrete-lined settling channel immediately downstream from the diversion gates that lead to the Middle Rio Grande Project irrigation system, and repairing this channel. Figure ES-4 shows the Angostura Diversion Dam site plan and proposed fish screen, return flow bypass pipe, and fishway.

The Angostura Diversion Alternative would use the existing Albuquerque Riverside Drain (also known as the Atrisco Feeder) as the primary raw-water conveyance route, with the Albuquerque Main Canal available for emergency use. The canal and the drain, portions of which traverse San Felipe, Santa Ana and Sandia Pueblos, comprise the dual-conveyance feature of this alternative. Improvements to the Riverside Drain would involve reshaping and enlarging approximately 14.5 miles of the channel, removing vegetation, improving access roads, and improving hydraulic structures. Renovation along the canal and drain would improve conveyance efficiency. From a pump station in the vicinity of the North Diversion Channel, on Sandia Pueblo property, water collected from the Main Canal and Riverside Drain would be conveyed about 5 miles along the North Diversion Channel right-of-way, via a new pipeline (maximum diameter of 72 inches), to the proposed Chappell Drive Water Treatment Plant. After treatment, the potable water is provided for distribution through the same transmission corridors for each alternative.



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Scale in Miles

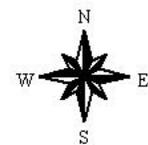
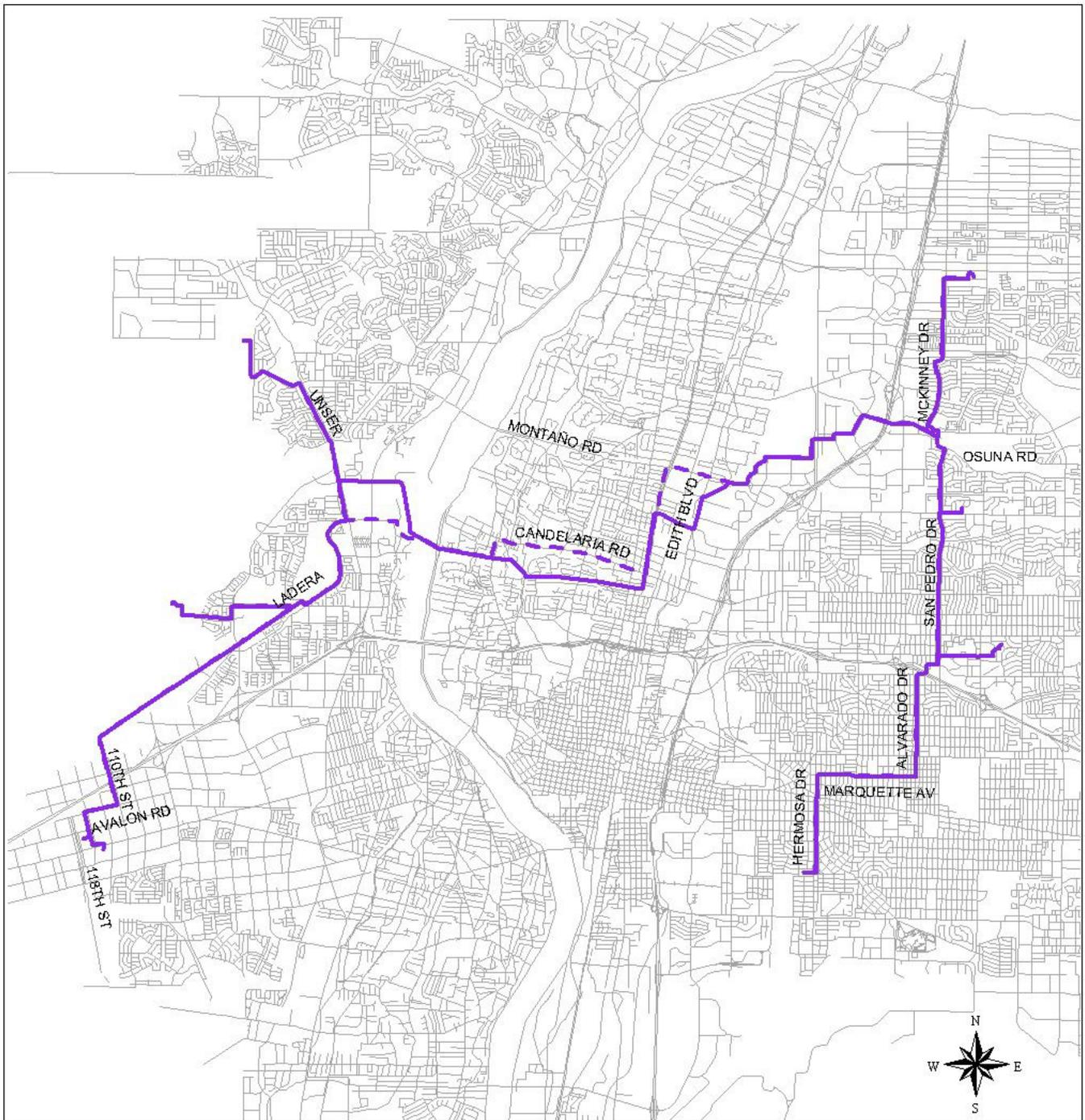


Figure ES-2
Chappell Drive Water Treatment Plant Site



- Legend**
-  Potable-Water Transmission Line
 -  Alternate Potable Water Transmission Line
 -  Proposed Reservoir
 -  Street

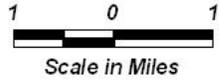


Figure ES-3
Potable-Water Transmission Pipeline Alignment



Figure ES-4
 Angostura Diversion
 Site Plan

Source: CH2M Hill. Scale is approximate.

PASEO DEL NORTE DIVERSION ALTERNATIVE

The Paseo del Norte Diversion Alternative is the preferred alternative. A new surface diversion would divert a total of 94,000 ac-ft/yr of water from the Rio Grande (47,000 ac-ft/yr of SJC water and 47,000 ac-ft/yr of Rio Grande native water). The new surface diversion facility would consist of a low-head (approximately 2.5 to 3.5 feet in height), adjustable-height dam in the Albuquerque Reach of the Rio Grande, approximately 0.7 miles north of Paseo del Norte. The approximately 600-foot-long dam would consist of inflatable bladder structures mounted on a concrete base across the active river channel. Gates on the east side of the dam would route water to an inlet structure, from which a pump station would pump water into a pipeline for conveyance to the Chappell Drive Water Treatment Plant. The new diversion dam would include fish-screen and fishway facilities, as shown on Figure ES-5.

SUBSURFACE DIVERSION ALTERNATIVE

Under the Subsurface Diversion Alternative, subsurface diversion facilities would divert a total of 94,000 ac-ft/yr (47,000 ac-ft/yr of SJC water and 47,000 ac-ft/yr of Rio Grande native water) from the Rio Grande near Paseo del Norte. This alternative would involve construction of underground collector systems adjacent to, and under the river to collect and divert water to pump stations located either in, or adjacent to, the bosque and flood control levees. The alternative would involve the construction of three horizontal collector systems using perforated pipes buried 20 feet beneath the riverbed perpendicular to the riverbank. The pipe trenches would be backfilled with gravel, and would extend about 400 feet along the active river channel. Three collector systems would be constructed along a 1.5-mile reach of the river north and south of the Paseo del Norte Bridge. Each of the three systems would have 11 arms of 20 -inch-diameter perforated pipes manifolded to a common header, which would be connected to a pump station for each of the three collector systems. Figure ES-6 shows the site plan of the subsurface diversion alternative at Paseo del Norte.

MAJOR CONCLUSIONS

The No Action Alternative would result in continued depletion of the aquifer, resulting in regional ground-water decline, reduced water-table in some areas of the bosque, land-subsidence and deterioration of ground-water quality. The No Action Alternative would not provide a drought reserve and would not provide a viable measure for meeting the SDWA standard for arsenic.

The Angostura Diversion would require construction on, and continuing access to Native American lands. The access to and location of some facilities on Native American lands raise cultural resource concerns. In addition, the Angostura Alternative has the longest segment of river (from the point of diversion at Angostura to the SWRP outfall) in which native flows would be diminished (33 miles versus 15 miles for the Paseo del Norte Diversion and Subsurface Diversion Alternatives). The surface diversion dam would have fish screens and a fishway, and other operational features (see Figure ES-4), to mitigate effects on the endangered Rio Grande silvery minnow and other aquatic organisms.

The Paseo del Norte Diversion would require construction of a surface diversion in-river and a pump station within the bosque. The Paseo del Norte Diversion is the pre-

ferred alternative for meeting the project purpose and need and includes proposed mitigation and design elements that would mitigate environmental effects. The surface diversion dam would have fish screens and a fishway, and other operational features (see Figure ES-5), to mitigate effects on the endangered Rio Grande silvery minnow and other aquatic organisms. The inflatable dam structure would allow flexible operational configurations to avoid adverse river effects. The Paseo del Norte Diversion would require construction of a pump station in the bosque.

The Subsurface Diversion Alternative would require a large in-river construction effort, likely extending over two low-flow seasons. The Subsurface Diversion Alternative would affect a large area of riparian vegetation, both during construction and operations, and would require construction of three permanent pump stations in the bosque. After construction there will be no affects to aquatic life.

Effects from construction and operation of the Chappell Drive Water Treatment Plant and the potable-water delivery system would be the same under all three action alternatives.

Based on public scoping results and the analyses presented in this DEIS, hydrologic effects, effects on riparian vegetation, and effects to threatened and endangered species may be controversial.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Aesthetics and Visual Resources

Under the No Action Alternative, new wells could be constructed in existing viewsheds within the Albuquerque area. Under the Action alternatives, project facilities would be planned and designed to be compatible with surrounding landscapes. Two public-use areas with unobstructed views would be located within 0.25 miles of any DWP facility. There are no residences in the immediate vicinity of the proposed DWP facility.

The Angostura Diversion Alternative would affect existing views. The Paseo del Norte Diversion would be visible from roads and some places in the bosque. The pump station located within the bosque would be visible. The Subsurface Diversion Alternative, would require three pump stations to be constructed within the bosque which would affect views in the area.

Cultural Resources

Under the No Action alternative, subsidence could be a general “adverse affect” to historic structures. Construction or operation of the Paseo del Norte and Subsurface Alternatives would not affect traditional cultural properties, and would not adversely affect historical structures or historical irrigation and distributions systems. The Angostura Diversion would affect cultural resources, historical structures and historical irrigation and distribution systems, as the alternative requires crossing Pueblo lands, and would require construction of a pump station on about 5 acres of land within the Sandia Pueblo near the North Diversion Channel. This alternative would also require modifications to historic irrigation and distribution system, including the Angostura diversion dam.



Figure ES-5
 Paseo del Norte
 Diversion Site Plan

Source: CH2M Hill

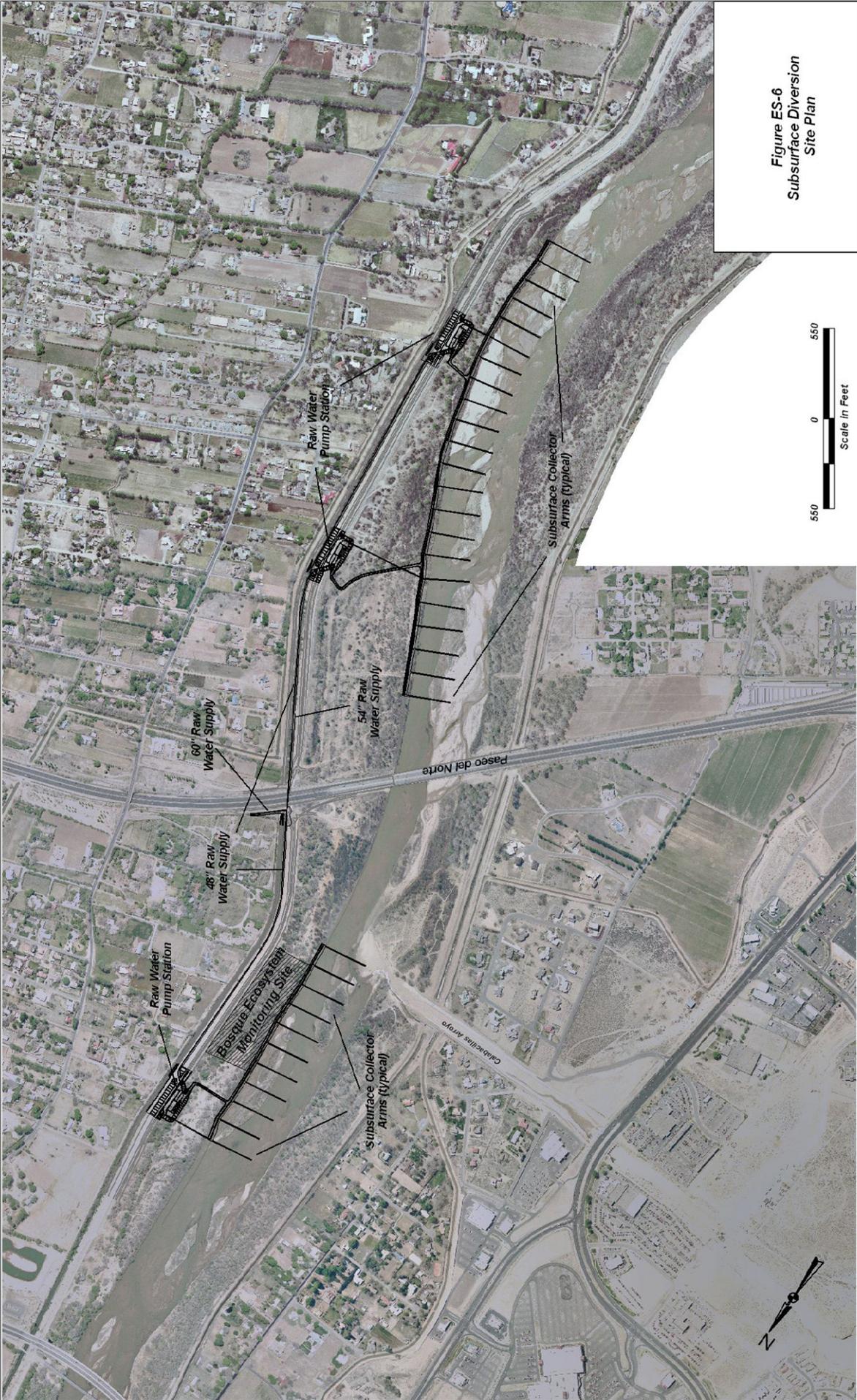


Figure ES-6
Subsurface Diversion
Site Plan



Source: CH2M Hill

Geology

Under the No Action Alternative, subsidence risk would increase as a result of increased pumping (and water-table drawdown) to meet City water requirements. There would be no effects on geologic resources or geologic structures within the evaluation area from DWP construction or operations. None of the facilities would be constructed in areas affected by shallow ground-water constraints or subject to subsidence. The reduction of ground-water pumping once the DWP is operational would reduce the possibility of land subsidence in the Albuquerque area.

Hydrology (Surface Water and Ground-water)

The No Action Alternative would lead to installation of more wells required to meet an increasing water demand. Likely degradations of water quality would occur from No Action, and pumping costs would increase. The potential for land-subsidence would increase in northeastern areas of the City, potentially adversely affecting water quality and infrastructure. There would be no drought reserve capability.

As a result of the City's proposed voluntary cooperation on the timing of releases from Heron to Abiquiu Reservoirs to the point of diversion (either at Angostura or near Paseo del Norte), flows would increase. In-stream flows in this river segment at the San Felipe gage would be approximately 61 cfs. From the diversion point to the City's SWRP outfall, there would be a net depletion of 11 cfs to 33 cfs of Rio Grande flows as compared to No Action. The affected reaches would be 33 miles long under the Angostura Diversion Alternative and approximately 15 miles long under Paseo del Norte and Subsurface Diversion Alternatives. A comparison of severe dry year flows in the Rio Grande below the diversion points for the Paseo del Norte and Subsurface Diversion Alternatives shows an improvement during curtailed periods of 5 to 15 cfs, as compared to the No Action alternative. This is a result of proposed operating criteria for cessation of diversions during low flows.

The amount of surface water to be diverted during the project operations would be approximately 94,000 ac-ft/yr (47,000 ac-ft/yr. City SJC water and 47,000 ac-ft/yr of native water). The average annual reduction in Rio Grande flows within the Middle Project Subarea, as measured at the Albuquerque gage, would be 7 percent under all three-action alternatives. There would be a range of change of flow from -14 cfs to +21 cfs attributable to the proposed action in the Rio Grande south of the City SWRP outfall at the I-25 bridge.

If the DWP is implemented, the maximum aquifer drawdown (from pre-development conditions) in the ground-water critical-management area would be approximately 100-150 feet below ground surface by 2060, while under the No Action Alternative, the aquifer drawdown would exceed 250 feet from pre-development conditions. The supply of ground-water would be improved over time by the reduction in aquifer pumping allowed by the use of the City's SJC water. This increase in ground-water supply would be a positive effect of the proposed action. No contamination of existing wells would occur from implementing the action alternatives. Ground-water drawdown in the bosque in the vicinity of the subsurface collectors, under the Subsurface Diversion Alternative, would be 3 to 3.5 feet relative to current conditions.

Indian Trust Assets and Other Tribal Resources

No adverse effects to ITAs were identified, although other tribal resources could be affected. The No Action could possibly have an indirect effect on the quantity or quality of ground-water pumped from the Santa Fe group aquifer. Operation of the DWP would change river flows through Pueblos. Above Paseo del Norte, Rio Grande flows would increase by approximately 61 cfs if the Paseo del Norte location is selected. If the Angostura Diversion is selected, flows would increase by approximately 61 cfs above Angostura and would be depleted by a maximum of 65 cfs immediately below Angostura, affecting the Pueblos of San Felipe, Santa Ana, and Sandia. Regardless of diversion location, the DWP would result in small flow decreases and small flow increases between the SWRP and the Pueblo of Isleta. These flow changes would occur between 2006 and 2060. None of the flow changes would be adverse and there would be no substantial change in water surface elevation or water quality. The Angostura Diversion Alternative would require approximately 5 acres of land on Sandia Pueblo for the location of a pump station and would involve modification of approximately 14 miles of canals on the Pueblos of San Felipe, Santa Ana, and Sandia. These activities would require a lease or other suitable agreement with the Pueblo and possible approvals from the Bureau of Indian Affairs.

Riparian Areas

The No Action Alternative would have no construction effects upon riparian vegetation but ground-water level declines could adversely affect the bosque. Under the action alternatives, there would be disturbance of the riparian areas along the Rio Grande from construction and operation activities. The amounts of riparian vegetation to be temporarily affected during construction of diversion facilities would be 8.2 acres under the Angostura Diversion Alternative, 14.7 acres under the Paseo del Norte Diversion Alternative, and 23.1 acres under the Subsurface Diversion Alternative. Another 2.4 acres of riparian area would be temporarily affected by water pipeline construction under each of the action alternatives. The amounts of riparian area that would be removed due to the construction of new facilities would be 1.8 acres under the Angostura Diversion Alternative, 6.6 acres under the Paseo del Norte Diversion Alternative, and 10.6 acres under Subsurface Diversion Alternative.

Operation of the subsurface collectors under the Subsurface Diversion Alternative would depress local ground-water levels, which could result in changes in overall plant community structure in approximately 552 acres of bosque/riparian habitat. The enhancement of riparian areas, and on-going and planned bosque restoration activities in the Albuquerque area, would help offset riparian area effects.

Socioeconomics

The No Action Alternative would require some increase in expenditures for the drilling and operation of new wells. Quality of life was a factor in evaluating alternatives and assessing socioeconomics. There would be increases in water rates, staged over a period of years, to pay for the construction and operations of the DWP. The rate increases have been approved by the City Council and would be borne by all commercial and private customers of the City.

Threatened and Endangered Species

There would be no effects on threatened or endangered species under the No Action Alternative except during low flow periods the City's pumping effects on the river could cause river drying. Three federally listed endangered or threatened species may be affected by the action alternatives. The only known population of the endangered Rio Grande silvery minnow is located in the Rio Grande reaches between Cochiti and Elephant Butte reservoirs. The endangered southwestern willow flycatcher uses riparian habitat along the Rio Grande for nesting and rearing their young. However, the presence of southwestern willow flycatcher has not been documented within the middle subarea of the project ROI. The threatened bald eagle has been known to roost near Alameda Boulevard in Albuquerque, and uses the river corridor for feeding and roosting. Habitat enhancement and restoration is proposed to be implemented to minimize project effects on the Rio Grande silvery minnow, southwestern willow flycatcher, and bald eagle. Effects on the Rio Grande silvery minnow could consist of modification and fragmentation of habitat, loss of individuals, disruption of flow requirements, and possible disruption of spawning and fish movement within the Rio Grande. There would be effects of a temporary nature on the minnow population during in-river construction for all action alternatives. Fish screens and fishways would be constructed under both surface-diversion alternatives (Angostura Dam and Paseo del Norte) to minimize effects on fish in the river. River drying in the Albuquerque reach could be lessened under all Action alternatives. Project effects on the bald eagle, southwestern willow flycatcher, and the yellow-billed cuckoo, if present, would consist of the removal of potential roosting trees or the disruption of feeding behavior during construction. Consultation with the U.S. Fish and Wildlife Service would be required under the ESA.

Water Quality

The No Action alternative would result in decreased drinking water quality over time with pumping. The diversion and treatment of river water for consumptive use would not result in any change in taste because the City plans to provide water of comparable taste to all water customers. The finished water quality, after treatment at the WTP, would meet all current and anticipated drinking-water standards. The DWP will provide water to the distribution system that is very low in arsenic. The Rio Grande typically has arsenic concentrations ranging from 2 µg/L to 3 µg/L. The DWP water treatment process will utilize ferric chloride as a coagulant, and thus remove any arsenic from the Rio Grande to less than 2 µg/L on a consistent basis. As such, the DWP would significantly reduce the arsenic levels in Albuquerque's drinking water and would allow the high arsenic wells to be shut off. The primary use of the City's SJC water and native Rio Grande water to be diverted would be for domestic purposes.

No federal or state water quality criteria would be exceeded downstream from Albuquerque because of project construction or operations. Treated wastewater to be discharged to the Rio Grande at the SWRP would meet all applicable discharge standards and is not expected to negatively affect water quality in the Rio Grande.

CONSULTATION AND COORDINATION

Reclamation has been in consultation with several federal, state, and local agencies, including U.S. Fish and Wildlife Service, the State of New Mexico, Office of Cultural

Affairs, and City Open Space Division, and Environmental Health Department. Twenty Pueblos, seven tribes, and the BIA have been contacted regarding Reclamation request for government-to-government consultation. There have been numerous public meetings, announcements, and workshops. Agency coordination has been facilitated by a series of interagency workgroup meetings. Specific consultation steps are ongoing with the U.S. Fish and Wildlife Service to comply with the Endangered Species Act and consultation with the New Mexico State Historic Preservation Officer regarding compliance with the National Historic Preservation Act of 1966.

PROPOSED MITIGATION MEASURES

The City has initiated several mitigation measures, including fish screens and fishways. The City has been funding recovery efforts and studies for the Rio Grande silvery minnow. There are numerous mitigation steps that would be implemented, including cultural resource recovery plans, best management practices during construction, and operational curtailment when river flows so indicate.