San Gorgonio Pass Water Agency

DATE: November 8, 2021

TO: Board of Directors

FROM: Lance Eckhart, General Manager

BY: Lance Eckhart, General Manager

SUBJECT: AWARDING OF CONTRACT TO ALBERT A. WEBB AND ASSOCIATES FOR BACKBONE WATER SYSTEM FEASIBILITY STUDY

RECOMMENDATION

Staff recommends that the Board accept the proposal for consulting services to perform a Backbone Water System Feasibility Study and authorize Staff to enter into a contract with Alber A. Webb & Associates to complete the study.

PREVIOUS CONSIDERATION

- Board of Directors – Various: The Agency has been performing multiple planning-level tasks on the Backbone Pipeline project since the 2000s
- Board of Directors – June 21. 2021: Board of Directors adopted the Fiscal Year 2021-22 General Fund budget, including funds for Backbone Pipeline planning work

BACKGROUND

The Agency has been working on the Backbone Pipeline (Project) concept since the 2000s to address projected growth and distribute imported water throughout the region. The attached letter report titled 'Summary of Justification for the Agency's Proposed "Backbone Water System" – March 2, 2011' (Attachment 1) describes the need for the Project along with other recommended management actions the Agency should consider. Included in the 2011 report was the recommendation to purchase 16-CFS of excess capacity in the Foothill Feeder pipeline from the San Bernardino Valley Municipal Water District. The pipeline capacity was purchased in December, 2020 and positions the Agency to more fully utilize imported supplies to meet projected demands. Planned development in the Banning area, and expected future demands in the Cabazon region, as documented in recent San Gorgonio Pass Subbasin Groundwater Sustainability Agency's planning efforts (https://www.sgpgsas.org/), indicate that renewed interest in the Project is timely.

ANALYSIS

Costs for the Project were updated in October of 2020 (Attachment 2). Over the past decade, the understanding of basin operations, current/projected demands, land use, and State Water Project operations has significantly improved. The general conclusions of the 2011 planning work establishing the need for the Project are still valid. Over the past

10 years, the region has experienced substantial resource/land-use changes. The Project will need to be collaboratively updated to address anticipated near-term needs and long-term regional planning objectives.

Significant state and federal grant funding opportunities associated with the drought, state budget surpluses, and Federal infrastructure bills are expected in the early 2020s. To be competitive for anticipated grant solicitations, the Project will need to be positioned for construction. A "grant-ready" project generally involves a feasibility level study followed by a preliminary design report and associated environmental work. As many of the Project elements will need to be updated (e.g., alignment, stakeholder needs, changing hydrology), a feasibility study to reengage with stakeholders and update the Project is appropriate.

Albert A. Webb & Associates (Webb) has been involved in the planning of the Project for well over ten years. Staff requested that Webb inventory previous Project efforts and prepare a proposal for a Project feasibility study (Attachment 3). Webb has also retained staff from Provost & Pritchard (P&P) and INTERA Geoscience & Engineering (INTERA) to assist with the proposed study. Since 2019, P&P and INTERA have been preparing the San Gorgonio Pass Groundwater Sustainability Plan, which involves an in-depth technical analysis of groundwater resources in the east Banning and Cabazon region. The proposal team has a unique understanding of the Project and the basins that would benefit from artificial recharge. If the Board opts to accept the Project proposal, this would be considered a sole-source contract.

The feasibility study will be a collaborative effort working with key stakeholders to try to ensure maximum opportunity and long-term vision as the Project is updated. In addition to stakeholders, consulting with and leveraging the extensive local experience of staff from the United States Geological Survey and Beaumont Basin Watermaster will be an important part of the planning process.

FISCAL IMPACT

The FY 2021-22 General Fund Budget includes $250,000 for planning work associated with the Project. The proposed Feasibility Study is estimated on a time and materials basis, not to exceed $186,000.

ACTION

Motion to authorize Staff to enter into a contract for consulting services with Albert A. Webb & Associates to prepare a Backbone Water System Feasibility Study.

ATTACHMENTS

1. Summary of Justification for the Agency's Proposed "Backbone Water System" – March 2, 2011
2. Update "Backbone Water System" Project Cost Estimate – October 2, 2020
3. Proposal: Backbone Water System Feasibility Study – October 2021

ALBERT A. WEBB ASSOCIATES

Corporate Headquarters
3788 McCray Street | Riverside, CA 92506 | T: 951.686.1070 | F: 951.788.1256

Desert Region
36951 Cook Street #103 | Palm Desert, CA 92211 | T: 760.568.5005 | F: 760.568.3443

W.O. 2009-0033

March 2, 2011

Mr. Jeff Davis, General Manager
San Gorgonio Pass Water Agency
1210 Beaumont Avenue
Beaumont, CA 92223

Subject: San Gorgonio Pass Water Agency,
Summary of Justification for the Agency's Proposed
"Backbone Water System"

Dear Mr. Davis,

The purpose of this letter report is to provide a summary of the justification for the projects comprising the "Backbone Water System"[1] (listed below) as discussed in SGPWA's "Supplemental Water Supply Planning Study", (Webb Associates, October 2009). The Agency's Backbone Water System is defined by the following proposed projects[2(1)] with their associated costs:

• Banning Pipeline Upsizing	$2,410,800
• Cabazon Pipeline	$18,228,000
• Beaumont Basin Recharge Facility	$6,813,500
• Cabazon Basin Recharge Facility	$15,367,000
• 16 cfs capacity from SBVMWD	$30,000,000

Banning Pipeline Upsizing

As described in the January 8, 2008 Letter Report (Exhibit A), the City of Banning's proposed pipeline will extend from the Department of Water Resources East Branch Extension at Noble Creek (see Plate 1 and Plate 2 of Exhibit A) to a proposed recharge basin within the future Pardee Homes

[1] The "Backbone Water System" and the "State Water Project Aqueduct Extension" facilities were both discussed in the "Supplemental Water Supply Planning Study". The Backbone Water System facilities need to be constructed and/or acquired in the near term to provide a reliable water source for future growth. The "State Water Project Aqueduct Extension" facilities will be required by 2028 or later depending on several factors pertaining to the projected growth in water demand and reliability of SWP deliveries.

[2] Proposed projects are outlined in the "Supplemental Water Supply Planning Study" and in the "Implementation Plan for Capacity Fee, San Gorgonio Pass Water Agency", October 2010 by Webb Associates. Project costs are based on ENR Index 9,948.55 September 2010

Development. Webb's initial recommendation was to increase the proposed diameter from 24 to 54-inches, predicated upon the following:

- Potential connection to Desert Aqueduct Pipeline (Lucerne Valley Alignment)
- Conjunctive Use Program
- Reliability purposes
- SGPWA State Water Project capacity requirements
- Loop pipeline connections

Subsequent to the January 8, 2008 Letter Report (Exhibit A) and as development of the Agency's Supplemental Water Supply Planning Study progressed, the January 30, 2009 Letter Report (Exhibit B) updated the January 8, 2008 Letter Report. During the development of the Supplemental Water Supply Planning Study, it was determined that participation with CVWD and DWA for the Lucerne Valley Alignment was cost prohibitive to the Agency, while other alignments were less costly (North Pass and Independent North Pass Alignment). Therefore the initially proposed upsizing of the Banning pipeline to 54-inch diameter was re-evaluated. The outcome of the re-evaluation was the recommendation to upsize the proposed 24-inch diameter pipeline to the Pardee Homes Development to a 36-inch diameter pipeline. The proposed 36-inch diameter pipeline capacity is sufficient to convey up to 44 cfs to the Cabazon Area for groundwater recharge and direct use.

Cabazon Pipeline

In conjunction with the evaluation of the Supplemental Water Supply Planning Study, the groundwater basin recharge facility for the Cabazon Basin was selected based on Boyle Engineering's Cabazon Groundwater Recharge Project per Exhibit 1 (Exhibit C), which shows the proposed location for the recharge facility at the property currently owned and operated by Robertson's Ready Mix.

In order to convey SWP water for discharge to a future Cabazon Basin Recharge Facility, it was proposed to extend the Banning Pipeline from the Pardee Homes Development to the Cabazon Basin. Pursuant to the Agency's request, a reconnaissance level evaluation was conducted to determine the cost, which was presented in Webb's March 11, 2009 Letter Report (Exhibit D). The sizing of the Cabazon Pipeline was proposed to match the Banning Pipeline's upsized diameter of 36-inches.

Beaumont Basin Recharge Facility

An evaluation of the potential recharge facilities in the Beaumont Basin was conducted and was documented in the May 28, 2008, Evaluation of Potential Recharge Sites for San Gorgonio Pass Water Agency prepared by Albert A. Webb Associates and Lytle Water Solutions, LLC. This report evaluated six recharge sites based on the basin total storage capacity, existing recharge facilities and remaining capacity for recharge. The sites were ranked and the report recommended that new facilities be

constructed to take advantage of potential storage capacities. The findings of this report indicated an additional recharge amount of approximately 16,500 acre-feet per year is possible in the Beaumont Basin and recommended Sites No. 2, 3 and 5. Subsequent to this report and pursuant to the Agency's request, a costs evaluation was conducted around Site No. 4 as detailed in the August 15, 2008 Letter Report (Exhibit E). Based on Table 2-1 of the May 28, 2008 Report, Site 4 has an estimated recharge capacity of 9,000 AF/Y which would satisfy about 50-percent of the additional recharge amount.

Cabazon Basin Recharge Facility

As previously discussed herein, for planning purposes the site of the Cabazon Basin Recharge Facility was based on Boyle Engineering's Cabazon Groundwater Recharge Project per Exhibit 1 (Exhibit C). The recharge facility would be used to recharge the Cabazon Basin with SWP water in order to replenish the overdraft from existing development, provide water for future development, and to store imported water during periods of surplus. There are currently no artificial recharge facilities in the Cabazon Basin. The cost evaluation for planning and funding purposes was performed pursuant to the Agency's request. The cost of this project was presented to the Agency in Webb's April 9, 2009 email.

Purchase of 16 cfs Capacity from SBVMWD

The Agency is currently negotiating with San Bernardino Valley Municipal Water District (SBVMWD) to purchase 16 cfs capacity in their Foothill Feeder and a portion of the capacity rights in the East Branch Extension in order to meet future demands. It is noted that this capacity of 16 cfs offsets an equivalent conveyance capacity of a proposed subsequent conveyance system, as detailed in the October 2009 Supplemental Water Supply Planning Study.

The following Table 1 summarizes the project justifications.

Table 1 – Project Justification

Project	Justification
Banning Pipeline Upsizing	Provides and extends conveyance capacity of the Agency's allocated SWP water rights to the Banning Basin.
Cabazon Pipeline	Provides and extends conveyance capacity of the Agency's allocated SWP water rights to the Cabazon Basin.
Beaumont Basin Recharge Facility	Increase the basin's recharge capabilities to take advantage of the basin's storage capacity and offset overdraft for existing development and provide for future development.

Cabazon Basin Recharge Facility	Provides the basin with recharge capabilities and SWP water to offset overdraft for existing development and provide for future development.
16 cfs Capacity from SBVMWD	Provide for increase of SWP Water capacity and offset cost and timing of future Supplemental Water Supply conveyance projects.

The need for the proposed backbone facilities is based on the following: (1) State Water Project Reliability; (2) Facilities for Conveyance and Recharge; (3) Preparation for Catastrophic Water Supply Interruptions.

State Water Project Reliability

State Water Project (SWP) supply is based upon a long term average reliability of 63 percent. However, should the Sacramento Delta be fixed in the future, the "Percent Reliability" factor may increase. Therefore, for the October 2009 Supplemental Water Supply Study, the projected supplemental water demand was evaluated using a 63 percent reliability factor and an assumed 80 percent reliability factor should the Delta be fixed. If the source of supplemental supply is delivered from the Sacramento Delta, then the reliability of this supply needs to be considered. Table 2 summarizes the SWP reliability criteria of the Delta.

Table 2: Average and Dry Period SWP Table "A" Deliveries from the Delta Under Current Conditions[(1)]

Time Period	Percent Reliability
Long Term Average	63%
Single Dry Year	6%
2 Year Drought	34%
4 Year Drought	35%
6 Year Drought	34%

(1) From Department of Water Resources "The State Water Project Reliability Project 2007" Draft December 2007, Table 6-5.

The reliability factors discussed above were based on DWR's Draft December 2007 Report. As discussed in the Agency's 2010 UWMP, DWR has completed its 2009 update to the SWP Delivery Report (DWR, 2010) which reduces the long-term average reliability of water supplies to 60 percent, expected multiple-dry year deliveries can range from 32 to 38 percent and multiple-wet year deliveries can range from 72 to 93 percent of maximum Table A amounts. Therefore, consideration for long-term average reliability of SWP water will be 60 percent; although to meet long-term average, the Agency will require a means to convey and store SWP water during multiple-wet year delivery periods and to take annually the maximum amount of SWP water available to the Agency.

Facilities for Conveyance and Recharge

SGPWA has some conveyance and recharge facilities, but in their current configuration the conveyance and recharge facilities do not take full advantage of the Agency's current and future allocation of SWP water. The implementation of the conveyance system as outlined in this letter report will provide the Agency with the facilities to convey their ultimate SWP capacity of 64 cfs. As discussed above, in order to meet average delivery of SWP water to the Agency's service area, the Agency must have the ability to convey and store SWP water during the multiple-wet years to utilize this water during multiple-dry years. The implementation of recharge facilities in the Beaumont and Cabazon groundwater basins will provide the Agency the terminal storage to implement the required conjunctive use program to fully utilize the Agency's Table A entitlement and be able to provide water to its retail customers during protracted drought periods. This concept was discussed in the Agency's 2010 UWMP, as there are currently two recharge facilities and associated conveyance systems, though this is a limiting factor as described as follows:

"These facilities do not provide sufficient capacity to recharge all imported water supply that may be available in a given year. Conditions in the SWP may require that SGPWA use its Table A allocation over a shorter period of time (e.g. six month window as opposed to spread evenly over the course of the year). This would require SGPWA to plan for surplus capacity. Moreover, SGPWA plans to obtain supplemental sources of imported water and to use SWP Article 21 water whenever possible. The timing of supplemental sources of imported water is not known, but could also require deliveries to occur over a shorter time-period. Article 21 water is declared on a weekly basis, thus its use is highly limited by the capacity of conveyance and recharge facilities."

Preparation for Catastrophic Water Supply Interruptions

Water supply interruptions or significant supply reductions may occur through severe drought, earthquakes, or legal and regulatory restraints.

The Agency's 2010 UWMP describes the Agency's coordination efforts with water retailers for the "general principles and guidelines to manage SWP deliveries during times of drought" and that the "drought protection benefit provided by the large amount of storage capacity in the Beaumont groundwater basin is a critical element of water resources management in the San Gorgonio Pass area".

A severe earthquake anywhere along the SWP transmission system may significantly impact the Agency's ability to provide SWP water in its service area. As estimated by DWR, a worst-case outage such as failures of levees may result in reductions of water. Having terminal storage in the Agency's basins would offset these reductions.

Each planned recharge facility, whether in the Beaumont or Cabazon Basin, represents a storage facility within the Agency's service area and hence enhances reliability during periods of limited supply due to droughts or other constraints. It is noted that any additional storage facility enhances dry-year reliability and increases the delivery reliability as the added storage insulates the Agency against any State Water Project outage for any reason (seismic, operations, hydrologic, etc.). This enhancement and increase of reliability extends not just to the storage facility itself (in this case, recharge facilities), but also to conveyance facilities to those storage facilities.

Thus, the two identified recharge facilities (Beaumont and Cabazon) and the proposed pipeline to the Cabazon facility enhance the Agency's imported water supply reliability to meet future growth. For example, storage of imported water into the Cabazon Basin would allow the Agency to make available its imported water supply and a portion of its groundwater in storage, in a given dry year or periods of dry years, to water purveyors that overlie the Beaumont and Banning Basins, while still providing stored groundwater to purveyors that overlie the Cabazon Basin. Retail water purveyors that overlie the Beaumont and Banning Basins represent a large percentage of total water demand within the Agency's service area. Thus additional groundwater storage, whether in the eastern or western part of the Agency's service area, enables the Agency full utilization of its allocated State Water Project water for future development within the SGPWA's service area.

Timing

As indicated in Section 2 and presented on Figure 2-1 of the 2010 Urban Water Management Plan for the San Gorgonio Pass Water Agency (December 2010) prepared by CDM, and reproduced herein, the "Total Water Demand" is projected to be 77,806 acre-feet per year by the year 2035.

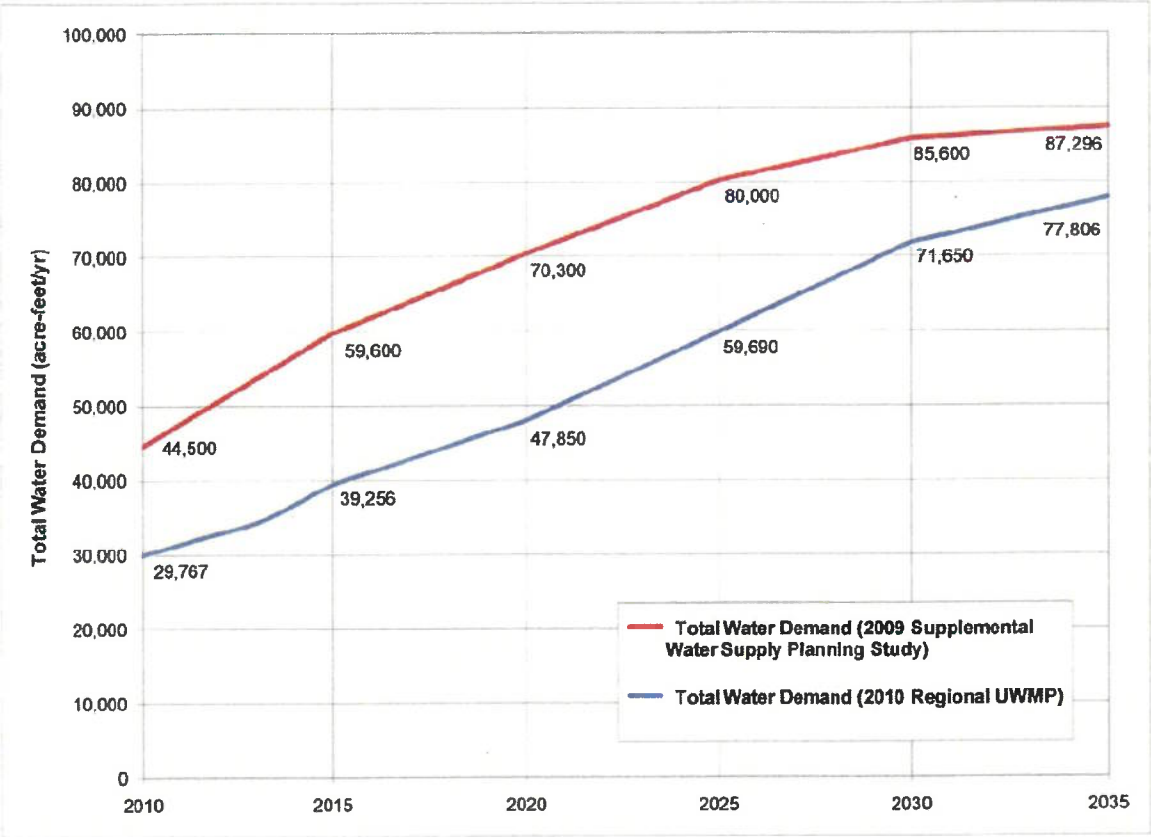


Figure 2-1
SGPWA Service Area Demand Projections (2010-2035)

SGPWA 2010 Urban Water Management Plan explained Figure 2-1 in the following manner:

"The difference between the two projections is due to the economic downturn experienced in the last two years. The data used for 2009 Supplemental Water Supply Planning Study demand projections were based on population growth trends up to 2007, when development in the San Gorgonio Pass area was occurring at a very fast pace. Demand projections used in this 2010 UWMP are based on more conservative development rate assumptions that reflect the impacts of the current economic downturn. In 2035 the gap between the two plans narrows to approximately 9,490 AFY. Ultimate demand projections (occurring after 2035) do not differ substantially between the two plans."

The current and projected water demand for the San Gorgonio Pass Water Agency is presented in Table 3.

Table 3: Current and Projected Water Demands on SGPWA Service Area[1]

Average Hydrologic Year Demand and Supply	Water Demand or Supply (AFY)					
	2010	2015	2020	2025	2030	2035
Total Potable Demands	29,667	31,673	38,838	48,819	58,802	63,737
Total Non-Potable Demands	100	7,583	9,012	10,871	12,849	14,069
Total Consumptive Water Demands	29,767	39,256	47,850	59,690	71,650	77,806
Conservation BMPs Demand Reduction	0	944	3,039	4,141	5,230	5,914
Local Supplies by Retail Agencies	33,700	31,342	37,051	40,534	49,952	44,972
Total Demand on SGPWA (100% Reliability)	0	6,970	7,760	15,015	22,468	26,920

[1]From SGPWA "2011 Urban Management Water Plan" Table 2-3.)

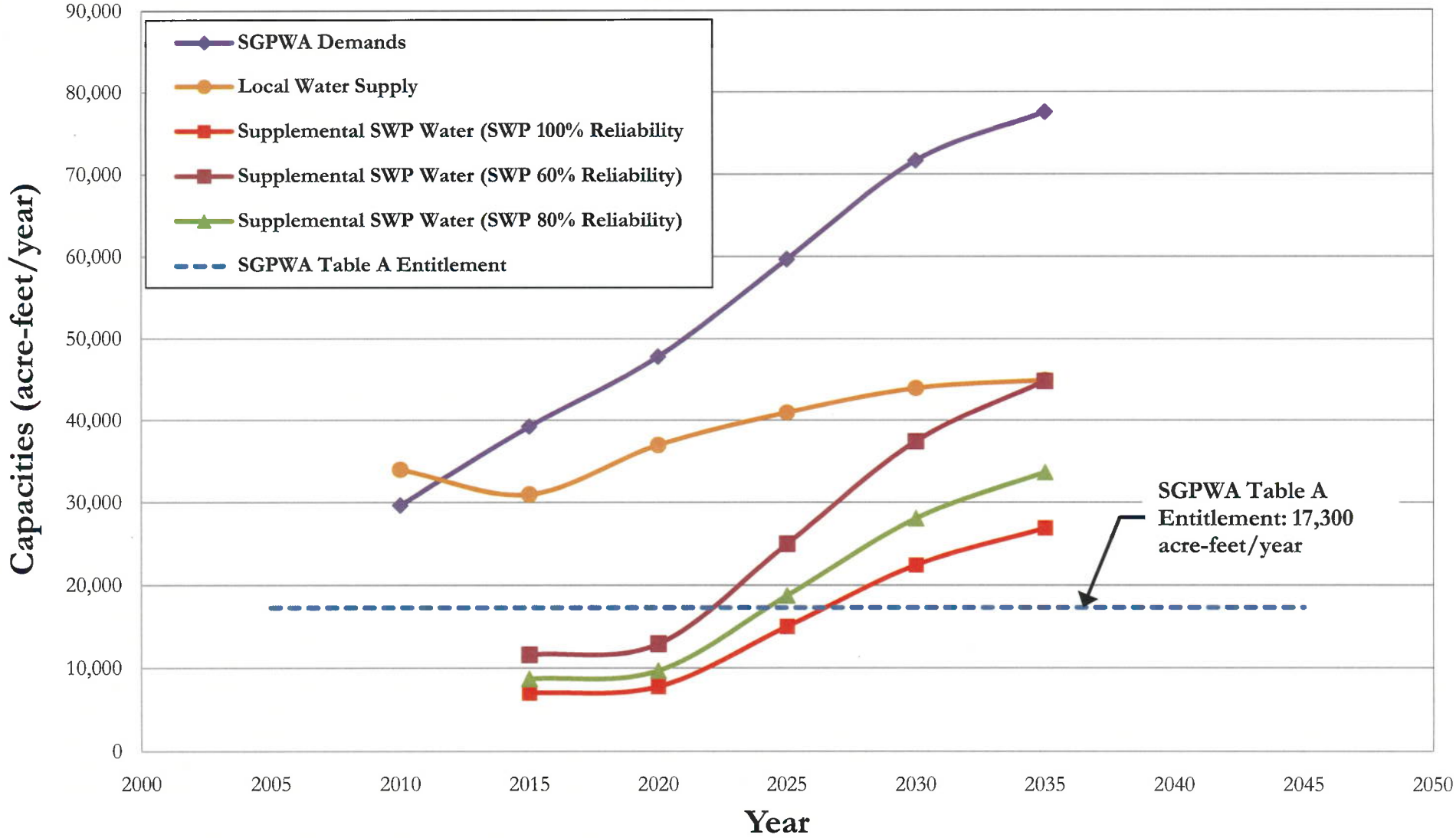
Note:						
	For SWP 80% Reliability	0	8,713	9,700	18,769	28,085	33,650
	For SWP 60% Reliability	0	11,617	12,933	25,025	37,447	44,867

The above table is described in the Urban Water Management Plan as follows:

"The need for imported water increases to over 32,000 AFY by 2035 during an average hydrologic year. Increasing demand for imported water exceeds SGPWA's current SWP Table A allocation of 17,300 AFY prior to 2025 for an average hydrologic condition, assuming full Table A allocations are available from the SWP. Given that reliability of the SWP during average hydrologic years in the San Francisco Bay Delta, at the SWP's major pumping facilities, cannot provide full Table A deliveries, supplemental sources of imported water will be required sooner."

Figure 1 shows the plot of the demands, local supplies and the total demand on SGPWA at various percentages of SWP water reliability.

Figure 1: SGPWA Incremental Demand, Local Supply and Demand for Supplemental SWP Water



Data from Table 3 of this Leter Report.
G:\2009\09-0033\Projection Analysis (SGPWA) March 2011

Based upon the 2010 UWMP local water supply and demand projections, the demand for water is out-pacing the supply, and therefore the Agency needs to maximize the availability of SWP water to supplement local water supply and to overcome overdraft in the local groundwater basins.

It is noted that the addition of the 16 cfs water capacity from SBVMWD would offset sizing and implementation of the proposed Supplemental Water Project. In order to review this, Figures 7-1 and 7-2 of the Supplemental Water Supply Report were updated with the revised Supplemental SWP Water per 2010 UWMP for 60-percent and 80-percent reliability and have been plotted on the following Figures 2 and 3:

Figure 2: SGPWA Projected Supplement Conveyance Requirements based on 2010 UWMP Projections (SWP 60% Reliability)

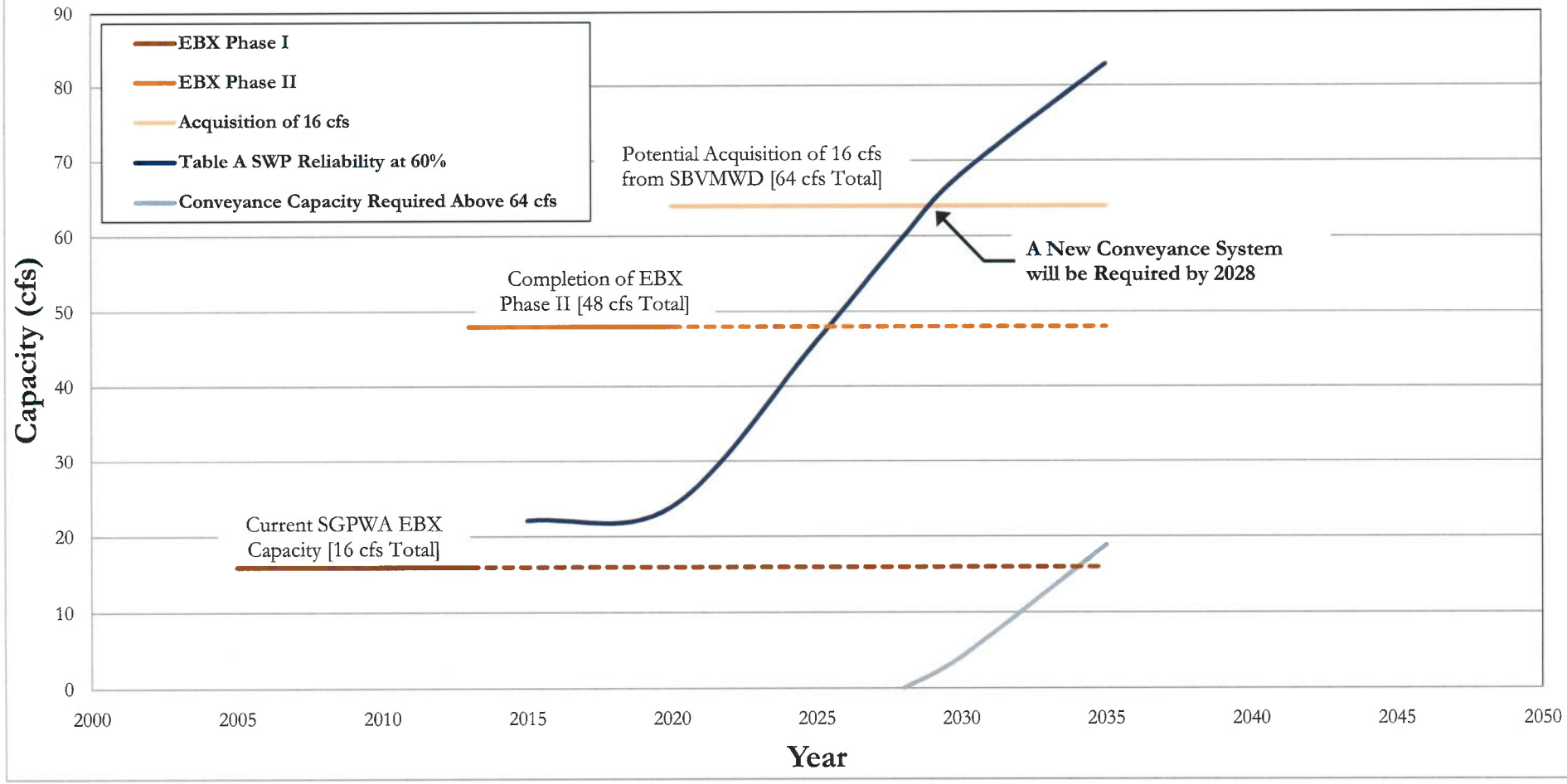
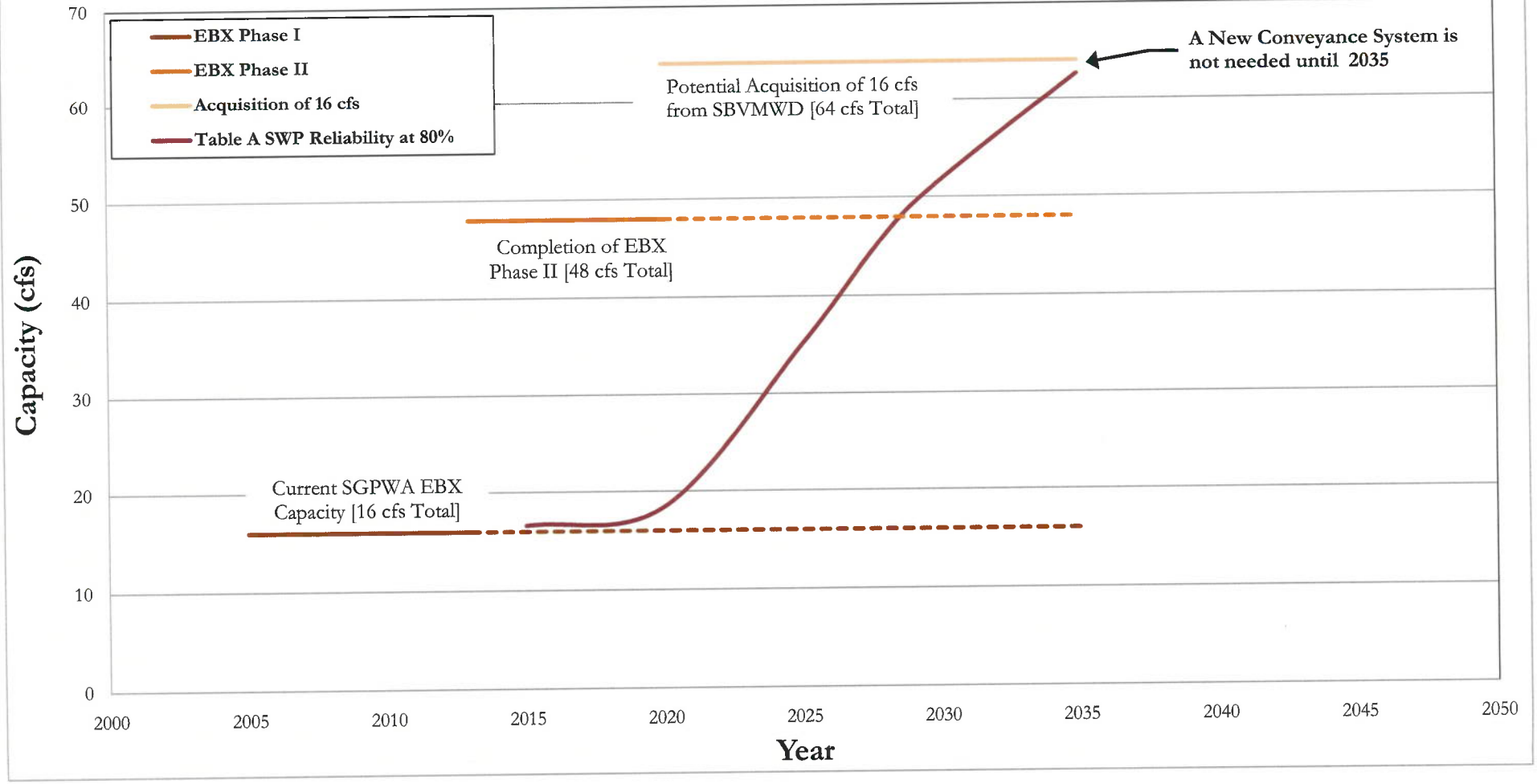


Figure 3: SGPWA Projected Supplement Conveyance Requirements based on 2010 UWMP Projections (SWP 80% Reliability)



Purchasing 16 cfs water conveyance capacity from SBVMWD delays the need for the Agency to construct a Supplemental Water Project. Assuming a 60-percent SWP reliability, the Agency will not need a supplemental water supply project until about 2028. Assuming an 80-percent SWP reliability, a Supplemental Water Project could be delayed until 2035.

Summary

As portrayed in Figures 1, 2 and 3, the Agency's water demands are increasing with time. The need to convey and store the Agency's allocated SWP water capacity needs to be addressed. The implementation of the "Backbone Water System" facilities will provide for conjunctive use, improve reliability, prepare for catastrophic water supply interruptions, maximize the use of SWP water, and provide for the means of conveyance and terminal storage of SWP water during periods of limited supply and surplus. The Backbone Water System will provide the Agency with the means to store imported water in the Beaumont and Cabazon groundwater basins and provide for full use of the Agency's allocated imported water supply. As the planning of these facilities takes several years from concept to construction and implementation, and in order to keep pace with the increasing water demand within the Agency's service area, it is recommended that the Agency commence with the planning of the "Backbone Water System" projects.

Sincerely,

ALBERT A. WEBB ASSOCIATES

Sam I. Gershon, RCE
Senior Vice President

Encl.

APPENDIX A

APPENDIX A

ALBERT A. WEBB ASSOCIATES

3788 McCRAY STREET • RIVERSIDE, CA 92506
PHONE: 951.686.1070 • FAX: 951.788.1256
WWW.WEBBASSOCIATES.COM

Project No.: 2007-0379
File No.: 5137.0003

January 8, 2008

Mr. Jeff Davis, General Manager
SAN GORGONIO PASS WATER AGENCY
1210 Beaumont Avenue
Beaumont, CA 92223

RE: Hydraulic and Sizing Review of City of Banning's Proposed Pipeline Extended from the Department of Water Resources East Branch Extension

Dear Mr. Davis:

The City of Banning is planning to construct a 12,300 feet, 24-inch diameter pipeline (August 2007, City of Banning-Imported Water Pipeline Feasibility Study, **Attachment 1**) from the Department of Water Resources (DWR) East Branch Extension (EBX). The connection point of the proposed Banning pipeline to DWR's facility would be located at the terminus of the EBX pipeline at the intersection of Noble Street and Orchard Street in Cherry Valley and extend to 800 feet south of the intersection of Brookside Avenue and Highland Springs Avenue (**Plate 1**).

The San Gorgonio Pass Water Agency (Agency) would like to explore the feasibility of increasing the diameter of this pipeline in order to provide for the following:

- Optimize conjunctive use opportunities within the Beaumont, Banning and Cabazon Groundwater Basins (**Plate 1**)

- Increase water supply service reliability with a connection to the proposed Desert Aqueduct to create a transmission pipeline loop to supply "Table A" water to the Agency's service areas from both the east and west (**Plate 1**).

City of Banning Demands and Pipeline Diameter Requirements

The projected total water demand for City of Banning for the year 2030 was estimated to be 24,569 acre-feet per year (City of Banning 2005 Urban Water Management Plan, Table 3-1, **Attachment 2**). The majority of the water required would be supplied by various sources such as ground water basins, recycled water usage, return irrigation flows, etc. Based on projected water demand and available water sources, City of Banning would be required to obtain additional water supply to supplement available supply sources. By 2030, the City would require a projected 9,266 acre-feet per year (13

cfs) of State Water Project (SWP) Table A water supply from the San Gorgonio Pass Water Agency (City of Banning 2005 Urban Water Management Plan, Table 2-1, **Attachment 3**). The initial intent of Banning Pipeline was to import and recharge water to offset demand by a proposed residential housing development requiring an estimated annual demand of 5,137 acre-feet per year (7 cfs) (August 2007, City of Banning, Imported Water Pipeline Feasibility Study, **Attachment 4**). The development demand of 5,137 acre-feet per year is the be the minimum water demand required for this pipeline, though, per the August 2007, City of Banning, Imported Water Pipeline Feasibility Study, it was recommended that the City of Banning provide a pipeline with a capacity for conveyance for projected SWP Table A water supply to meet the year 2030 flow requirement and was the basis for the sizing of the proposed 24-inch Banning Pipeline. This would provide for a pipeline velocity of 4 feet per second (fps).

Potential Connection to Desert Aqueduct Pipeline

San Gorgonio Pass Water Agency has been reviewing potential opportunities to provide additional pipeline capacity to expand their capabilities for conjunctive use, and to improve their water supply reliability of State Water Project water. The potential construction of the Desert Aqueduct Pipelines provides this opportunity.

The Desert Aqueduct project (Plate 1) proposes to provide for a connection to the California Aqueduct to deliver SWP water to the Coachella Valley. In previous years, Coachella Valley Water District and Desert Water Agency have investigated the possibility of conveying SWP water to the Coachella Valley. These previous investigations indicated that the cost of such a project could out-weigh the benefits (GEI/Bookman Edmondston).

The recent population growth in the Coachella Valley and the limitations of the existing water supply resulted in a further evaluation of the Desert Aqueduct Pipeline project. Subsequently, the Metropolitan Water District of Southern California and San Gorgonio Pass Water Agency joined with the above to undertake the study.

The project partners have developed the August 2007 Draft Desert Aqueduct Project Development Plan, Phase I Report (GEI/Bookman-Edmonston) which reviewed the agencies water demand and pipeline sizes, as well as, alternative alignments. Per this report, based on various parameters such as cost, right-of-way, physical constraints and other parameters, the report recommends the Lucerne Valley Alignment (Refer to **Plate 1** for Proposed Alignment). The proposed pipeline size would be based on the peak design flow rate of 311 cfs (this flow is preliminary and would be revised upon further input

from project partners and would be further developed in other phases of the Desert Aqueduct study). Based on a design velocity of 7 feet per second, the size of the pipeline based on this flow rate would be 90-inch diameter (August 2007, Draft Desert Aqueduct Project Development Plan, Phase Report, Executive Summary, **Attachment 5**).

The Lucerne Valley Alignment consists of approximately 91 miles of 90-inch diameter pipeline. The pipeline is proposed to connect to the California Aqueduct near the Mojave River Forks Reservoir and then traverses north of the San Bernardino National Forest and then easterly along Highway 18 through the Lucerne Valley and continues to parallel the road as it transitions to Highway 247. The alignment continues southerly through Yucca Valley and Morongo Valley to terminate at the Whitewater Discharge Facility.

As this alignment proposes to utilize water from California Aqueduct from areas north of Lake Silverwood, this alignment would essentially bypass the DWR's Devils Canyon Facility. As the EBX goes through the Devils Canyon Facility, the EBX could be disrupted by a significant earthquake. A loop could be created by increasing the size of the proposed Banning Pipeline and constructing additional facilities (pump stations, pipelines) and connecting to the Desert Aqueduct at its terminus point close to the aqueduct's discharge point at Whitewater River (62 and 10 freeways). This loop could provide additional reliability to the Agency's water supply as the source of water for the Desert Aqueduct is located at the connection point upstream of the Devils Canyon Facility. The size for a looped connection would be based on flows to provide the SGPWA conjunctive use and reliability.

Proposed Pipeline Diameter to Provide for Conjunctive Use Program

The San Gorgonio Pass Water Agency (SGPWA) is currently evaluating possible conjunctive use between the Beaumont, Banning and Cabazon groundwater basins. Based on projected water demands and available water supply for recharge of groundwater for these basins, the Agency would require 103 cfs to 207 cfs (August 2007 Draft Desert Aqueduct Project Development Plan, Phase 1 Report, Executive Summary, Table 4-4, **Attachment 6**). A pipeline diameter was selected to convey these flows and in order to maintain less than 10 fps pipeline velocity. To convey a flow of 103 cfs with a pipeline size of 48-inch diameter would provide for a pipeline velocity of 8.2 fps. To convey a flow of 207 cfs with a pipeline size of 66-inch diameter would provide for a pipeline velocity of 8.7 fps.

Proposed Pipeline Diameter to Provide for Reliability Purposes

The total flow required by SGPWA was approximated to be in the range of 119 cfs to 223 cfs (August 2007 Draft Desert Aqueduct Project Development Plan, Phase 1 Report, Executive Summary, Table 4-4, **Attachment 6**). A pipeline diameter was selected to convey these flows and in order to maintain less than 10 fps pipeline velocity. To convey a flow rate of 119 cfs, a pipeline size of 54-inch diameter would have a velocity of 7.5 fps. To convey a flow rate of 223 cfs, with a pipeline of 66-inch diameter, would have a velocity of 9.4 fps.

San Gorgonio Pass Water Agency State Water Project Requirement

The SGPWA would require a 64 cfs capacity of SWP water (August 2007 Draft Desert Aqueduct Project Development Plan, Phase 1 Report, Executive Summary, **Attachment 7**). A pipeline diameter was selected to convey these flows and in order to maintain less than 10 fps pipeline velocity. To convey a flow rate of 64 cfs with a pipeline of 36-inch diameter would have a velocity of 9.1 fps.

Proposed Diameters of Loop Connections

Table 1 lists the various pipeline diameters based upon design criteria. The projected pipeline diameter of the proposed loop connection varies from 36 inches in diameter to 66 inches.

Table 1- Summary of Pipeline Size

Criteria	Size (inch diameter)	Flow (acre-feet per year/ cfs)	Velocity (fps)
SGPWA's Delivery of SWP, Table A Water to City of Banning	24	9,266/13	4.1
SGPWA Total SWP Capacity	36	46,400/64	9.1
SGPWA Conjunctive use for Banning, Beaumont and Cabazon Ground Water Basins	48 (Low Range)	75,000/104	8.2
	66 (High Range)	150,000/207	8.7
SGPWA Total Capacity for Reliability	54 (Low Range)	86,200/119	7.5
	66 (High Range)	151,500/223	9.4

Cost Estimate of Upsizing

The following is a summary of estimated project cost for the Banning pipeline alignment based on a total length of 12,300 feet (Refer to **Plate 2** for Banning Pipeline Alignment).

Table 2- Project Cost Estimates [1]

Diameter (in)	Cost per ft. [2]	Total Costs [3]	Cost of Increase for Upsizing
24	$360	$4,428,000	$0.00
36	$540	$6,642,000	$2,214,000
48	$720	$8,856,000	$4,428,000
54	$810	$9,963,000	$5,535,000
66	$990	$12,177,000	$7,749,000

[1] Estimated Project Cost Which would typically include: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. **Escalation, financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.**
[2] Cost per foot of pipeline was determined using a unit cost factor of $15 per diameter inch.
[3] Based on the proposed 12,300 linear feet of Banning raw water pipeline.

Recommendations on Pipeline Diameter Increase

A review of pipeline diameters in conjunctions with available capacities to convey the maximum flow based on maintaining 10 fps pipeline velocity was conducted. The 54-inch diameter pipeline has a maximum capacity of 115,000 acre-feet per year (159 cfs) based on a pipeline velocity of 10 fps. This capacity meets the low range requirement of conjunctive use demand as well as the low range requirement of total SGPWA demand. Though the use of a 66-inch diameter pipeline would significantly increase capacity, the cost of this increase is approximately 70-percent greater than that of a 54-inch diameter pipeline.

Based on these criteria, we recommend an increase of the size of pipeline from 24-inch diameter to 54-inch diameter.

Sincerely,

ALBERT A. WEBB ASSOCIATES

Sam I. Gershon, RCE
Senior Vice President

Enclosures

ATTACHMENT 1
August 2007, City of Banning, Imported Water Pipeline Feasibility Study, PBS&J, Parameters of Banning Pipeline

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions can be drawn from this preliminary feasibility evaluation:

1. As projected by its 2005 Urban Water Management Plan, Banning's demand for water in 2030 will require water supplies that included an imported component of an estimated 9,266 AFY. This is equivalent to 12.8 cfs, if taken on a continuous basis.
2. Due existing and projected regional demand, best management practices are being applied to protect the long term health of the Beaumont groundwater basin. These include efforts by the San Gorgonio Pass Water Agency (SGPWA) and other regional agencies to import and recharge water from the Department of Water Resources East Branch Extension (EBX).
3. The capacity of the EBX, currently 16 cfs, is limited by the Cherry Valley Pump Station (CVPS). The CVPS can be expanded to 48 cfs, which is the assumed capacity for the purpose of this analysis.
4. Existing and planned recharge projects will divert at least 34 cfs from the EBX at or upstream of Noble Creek, the existing EBX end point. If taken on a continuous basis, this leaves 14 cfs for Banning to carry in its proposed pipeline.
5. A 24-inch pipeline, 12,300 feet long, extending from the existing EBX endpoint at Noble Creek to the Banning Border south of the intersection of Brookside Avenue and Highland Springs Avenue, can feasibly deliver the UWMP project flow requirement. This diameter allows flexibility in delivery regimes which will be important in operating within a regional scenario.
6. Pipeline diameters of 16-inch and 36-inch were also evaluated, but 24-inch is recommended because it most directly addresses the long-term water supply needs of Banning.
7. Various feasible pipeline alignments exist due to the grid pattern of streets in Cherry Valley. An alignment which maximizes its run in Brookside Avenue may be advantageous to coordinating with a regional effort to transmit water to the east. For example, agreements may be reached to share the cost of a larger capacity pipeline in that reach that could serve the needs of Banning and others.
8. Three pipeline materials were evaluated, steel, ductile iron and PVC. PVC is estimated to have the least capital cost, however, it is recommended that steel or ductile iron pipe be selected for the Banning Pipeline. Banning operations staff prefers metallic pipe materials due to the poor long-term performance of PVC in their experience. Ultimately, this decision can be deferred until the design phase of work.

ATTACHEMENT 2
2005 City of Banning Urban Water Management Plan,
Wildermuth, Projected 2030 City of Banning Water Demand

Table 3-1
Past, Current, and Projected Water Use Based on Planned Development
(acre-ft/yr)

Water Use Sectors	1990	1995	2000	2004	2005	2010	2015	2020	2025	2030
Residential	2,319	3,431	4,745	5,263	5,724	8,031	10,338	12,645	14,953	17,260
Commercial	1,300	1,861	2,161	2,289	2,349	2,649	2,950	3,250	3,551	3,851
Industrial	0	77	83	136	151	226	301	375	450	525
Public	96	16	6	83	84	91	97	104	110	117
Irrigation	381	845	1,037	1,110	1,176	1,504	1,832	2,160	2,488	2,816
Total	**4,096**	**6,230**	**8,032**	**8,881**	**9,484**	**12,501**	**15,518**	**18,535**	**21,552**	**24,569**

3.2.2 Projected Water Demands by Land Development

Future water demand can be projected based on the expected development in the region. Table 1-3 shows a large increase in agricultural lands, rural residential lands, and open spaces. These increases reflect the City's commitment to preserving hillsides and open spaces for the enjoyment of its citizens. However, these landuses do not require connection to the City's water system, and therefore, were not included in the determination of water demand based on acreage of future landuse. Water demand, as it corresponds to landuse, was determined using the water duty factors reported in the *City of Banning Water System Hydraulic Modeling Report* (Montgomery Watson Harza, 2002).

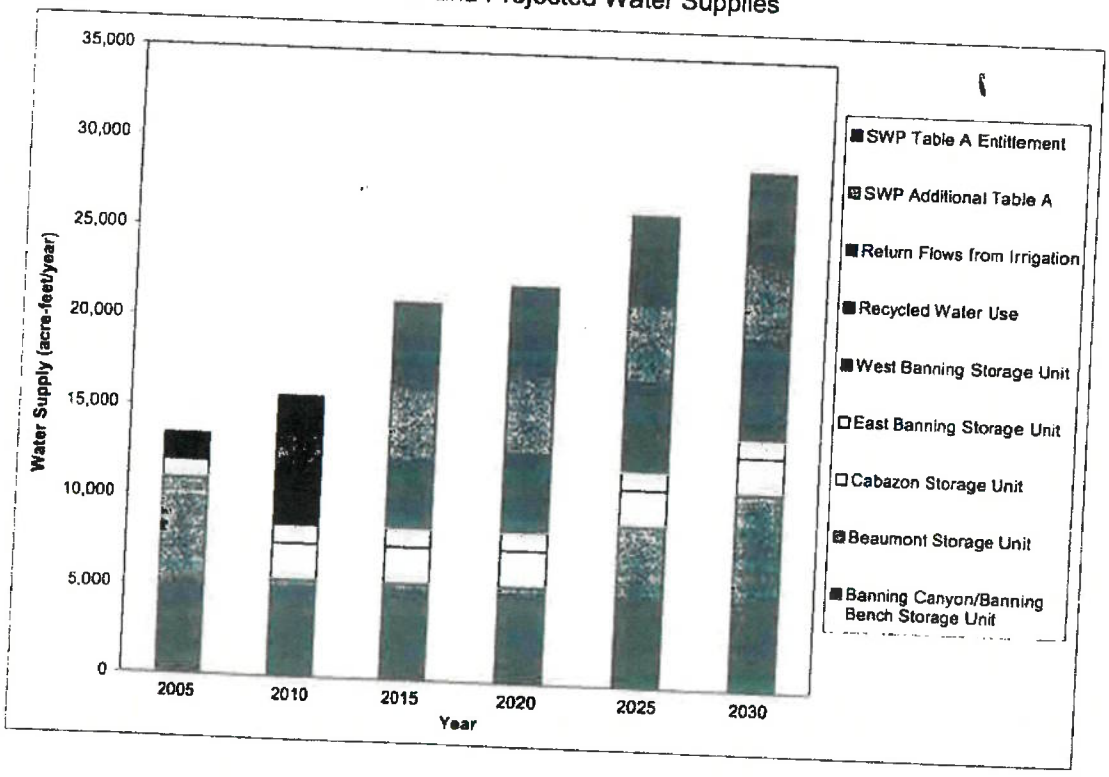
The acreage of developed land and land available for development within the City's limits, sphere of influence, and planning area is shown in Table 3-2. Landuse designations were categorized based on water billing accounts. For example, schools are typically considered a public facility, yet are billed as a commercial account in the City of Banning. The greatest percent increase in development will be in the residential, commercial, and irrigation sectors. Industrial and public facilities will approximately double at buildout.

ATTACHMENT 3
2005 City of Banning Urban Water management Plan,
Wildermuth, State Water Project Requirement

Table 2-1
Current and Projected Water Supplies
(acre-ft/yr)

Water Supply Source	2005	2010	2015	2020	2025	2030
Banning Canyon/Banning Bench Storage Unit	5,000	5,000	5,000	5,000	5,000	5,000
Beaumont Storage Unit	5,900	400	400	400	4,000	6,000
Cabazon Storage Unit	0	2,050	2,050	2,050	2,050	2,050
East Banning Storage Unit	1,050	1,050	1,050	1,050	1,050	1,050
West Banning Storage Unit	350	350	350	350	350	350
Recycled Water Use	0	1,504	1,832	2,160	2,488	2,816
Return Flows from Irrigation	1,128	1,309	1,564	1,822	2,077	2,330
SWP Table A Entitlement	0	2,129	4,667	4,931	4,931	4,931
SWP Additional Table A	0	1,871	4,104	4,335	4,335	4,335
Total	**13,428**	**15,663**	**21,017**	**22,098**	**26,281**	**28,863**

Figure 2-1
Current and Projected Water Supplies



ATTACHMENT 4
August 2007, City of Banning, Imported Water Pipeline Feasibility Study, PBS&J, Flow Requirements of Banning Pipeline

projects include a turnout to the SGPWA Little San Gorgonio Creek (LSGC) Spreading Grounds and a turnout at Noble Creek to supply the BCVWD Oda Spreading Facilities. Each of these turnouts is designed to divert as much as 20 cfs. Also, a future diversion for spreading is being planned by SGPWA at an existing turnout near the Mountain View Channel. For purposes of this evaluation, it is assumed that the combined diversion rates from these three existing/planned turnouts, with the expanded CVPS and all spreading facilities operational, would total 34 cfs (8 cfs at LSGC, 10 cfs at Oda, and 16 cfs at Mountain View). If these flows were realized on a continuous basis, the capacity available for the Banning Pipeline would be 14 cfs. Additional flows may be possible if regional agreements for sharing resources can be negotiated.

WATER DEMAND

An initial purpose for the Banning Pipeline is to import and recharge water to offset demand from a proposed development by Pardee Homes. The planned Pardee development will be comprised of approximately 5,000 residential units and a golf course, which Pardee estimates will have an average annual demand of 5,137 AFY (*SB610 Water Supply Assessment, Banning Tract Project*, Pardee Homes). This is considered the minimum capacity requirement for this pipeline project.

Flow may be delivered to recharge the groundwater basin in a variety of diurnal or seasonal patterns, but in any case it is independent of demand patterns of the customers as long as there is a mass balance on an annual basis. For the purpose of establishing the minimum rate for this study, it is assumed that the groundwater basin is recharged continuously at a constant rate, which is about 3,200 gallons per minute (gpm) or about 7.1 cfs. The actual operation of a recharge project may work differently and would likely involve sharing of resources regionally.

As stated previously, an appropriate longer term project goal would perhaps be to provide imported water to meet the stated 2030 requirement in the 2005 UWMP, estimated to be 9,266 AFY. This is equivalent to about 12.8 cfs if taken on a continuous basis.

SYSTEM HYDRAULICS

It is proposed that the Banning Pipeline connect to the existing EBX pipeline near its terminus at Orchard Street and Noble Street in unincorporated Cherry Valley. Figure 1 is a vicinity map that illustrates the relevant elements of the EBX system, which is owned and operated by the California Department of Water Resources (DWR). The eastern segment of the EBX pipeline is supplied by the CVPS located at Taylor Drive and Orchard Avenue. The EBX pipeline east of the CVPS consists of about 9,600 feet of 36-inch welded steel pipe. Officially, DWR lists the capacity of the EBX downstream of CVPS as 32 cfs. However, as demonstrated in this section, up to 48 cfs can comfortably be passed within reasonable design criteria. The additional flow is necessary for feasibility of the Banning pipeline project.

ATTACHMENT 5
August 2007 Draft Desert Aqueduct Project Development, Phase 1 Report, Executive Summary, GEI/Bookman-Edmonston, Desert Aqueduct Criteria

5 Initial Criteria and Alternatives Development

5.1 Introduction

This section reviews the initial criteria established to allow development of the four alignments evaluated in this study. It then reviews the four alignments and discusses the opportunities and challenges presented by each one. The majority of information in this chapter was developed in Technical Memoranda No. 002 and No. 003. The Technical Memoranda are included as appendices to this report.

5.2 Initial Criteria

Design Criteria used for the comparison of the four different alternatives is discussed comprehensively in Chapter 4 and Technical Memorandum No. 004. The pipeline is assumed to be welded steel pipe with single or double welded lap joints. Each of the pump stations includes a fore bay to provide a constant water surface elevation for the pumps to pump from and to. The hydro power stations include after bays that will provide a constant downstream discharge elevation and prevent the piping downstream of the hydro power stations from seeing the head on the upstream side of the hydro power stations should the turbines or control valves have a rejection of flow. The after bays will require an emergency spillway that can release water to a local stream during emergency conditions. It is assumed that all of the discharge facilities at the river recharge basins will discharge to atmospheric conditions.

The peak design flow rate of 311 cfs is based on providing a peak monthly flow rate of 11 percent of 171,100 acre-ft per year. This flow rate was selected to allow a direct cost comparison with the results of the previous investigation completed in 2005 (Krieger & Stewart, 2005). This flow rate also could deliver CVWD's and DWA's future Table A amount including pending transfers of 194,100 acre-ft/year in about 10 months. When operated continuously, it provides the ability to deliver 225,200 acre-ft per year, or about 80 percent of the estimated SWP Table A requirement in 2040. This design flow will be re-evaluated in future phases to address contemplated changes in DWA and CVWD entitlements, the needs of partners, and banking opportunities.

Using a design velocity of 7 feet per second, a 90-inch pipeline is required.

ATTACHMENT 6
August 2007 Draft Desert Aqueduct Project Development,
Phase 1 Report, Executive Summary,
GEI/Bookman-Edmonston, Conjunctive Use

incorporates Recharge Basin 3 recharge, a separate hydrologic unit of the Warren Valley Basin. The anticipated capacity for this project is 6,400 acre-ft annually.

The proposed Means/Ames Valley Recharge Ponds would serve Bighorn-Desert View Water Agency, Hi-Desert Water District, and County of San Bernardino Special Districts, County Service Area 70, Improvement District W-1. There is also a potential benefit to Pioneertown. Further study is required to determine to what extent Joshua Basin Water District would benefit from recharge of SWP water at this site. The recharge ponds are anticipated to have an annual capacity of 2,500 acre-ft.

The proposed Joshua Basin District Recharge and Pipeline project would require a pipeline extension from the Morongo Basin Pipeline to the recharge site in the Copper Mountain Valley Basin where Joshua Basin Water District is located. Joshua Basin Water District is a part of Improvement District M and therefore has already been paying debt service on the Morongo Basin Pipeline. The completion of this project will allow Joshua Basin Water District to make use of SWP water via the Morongo Basin Pipeline. The anticipated annual recharge capacity is 1,000 acre-ft.

4.8 Range of Potential Capacities for Desert Aqueduct

The potential capacity for the Desert Aqueduct is based on the Project Partner needs and requests for capacity by other potential participants. The needs of the Project Partners and other agencies as determined from the agency interviews are shown in Table 4-4. As shown, CVWD and DWA would need a minimum of 236 cfs (average) and 311 cfs (with 132 percent peaking) to convey their existing Table A water (171,100 acre-ft per year). This capacity would need to increase by 32 cfs (average) and 43 cfs (peak) to 268 (average) and 353 (peak) to convey the Table A transfers to be effective in 2010. Capacity to deliver CVWD's and DWA's potential future Table A needs could be in the range of 387 cfs to 510 cfs, assuming the standard SWP peaking. Additional capacity to convey water for Table A deliveries and conjunctive use water for certain agencies could potentially increase the capacity by about 300 to 400 cfs. Since much of this capacity is for conjunctive use, it may be possible to coordinate deliveries such that the combined additional capacity is not required. Several agencies did not indicate their future needs because they have on-going studies to evaluate their future demands and supply plans. Since these agencies have not determined their future needs, the additional capacity must be deferred to Phase 2.

Table 4-4
Desert Aqueduct Capacities

Agency	*Basic Conveyance (cfs)*	*Conjunctive Use (cfs)*	*Total (cfs)*
Coachella Valley Water District and Desert Water Agency – Existing Table A	236-311 [1]		236-311
Coachella Valley Water District and Desert Water Agency – Future Table A	151-199 [2]		151-199
Metropolitan Water District of Southern California	0	207 [3]	207
San Gorgonio Pass Water Agency	16	103 – 207 [4]	119-223
Mojave Water Agency	TBD	TBD	TBD
San Bernardino Valley MWD	0	TBD	TBD
Hi-Desert Water District	TBD	TBD	TBD
Total	403-526	310-414	713-943

1 – Continuous flow and peak flow assuming 132% peaking factor of 171,100 acre-ft/yr of existing Table A water.
2 – Continuous flow and peak flow assuming 132% peaking factor for 108,900 acre-ft per year of additional Table A water 9280,000 – 171,100 acre-ft per year).
3 – Assumes 150,000 acre-ft per year for conjunctive use operated continuously; could be delivered from Colorado River Aqueduct.
4 – Assumes 75,000 to 150,000 acre-ft per year for conjunctive use operated continuously; could be delivered from Colorado River Aqueduct.
TBD – To be determined; agencies have studies underway.

It should be noted that the minimum capacity required by CVWD and DWA would be 387 cfs to deliver 280,000 acre-ft per year of Table A water on a continuous basis. Additional capacity would provide increased flexibility of deliveries as well as capacity to take Article 21 or Turnback Pool water. Since Article 21 water deliveries must not impact Table A deliveries, and this water is available about 11 percent of the time, primarily in January through March, CVWD and DWA may wish to consider including 10 to 20 percent additional capacity. An evaluation of the cost-effectiveness of providing additional capacity to receive Article 21 water should be performed in Phase 2. The decision to include additional capacity should be compared with the incremental supply provided by that capacity. This evaluation should also consider the potential for continued use of Colorado River exchanges during periods of abundant supply.

As indicated previously, CVWD and DWA may be limited in their current SWP capacity. This would require them to rely on "as-available" capacity to convey a portion of their water supply. A review of the frequency of flows at several key pumping stations and power plants – Edmonston, Pearblossom, Mojave, and Devil Canyon – was performed using daily operations data for January 2002 through February 2005 (DWR, 2005). These data indicate that there is significant capacity available during "off-peak" delivery periods. As shown in Table 4-5, for the period evaluated, there was about 1.2 million acre-ft of available delivery potential on the East Branch. During this period, SWP deliveries averaged about 72 percent of Table A amounts. Consequently, if full Table A amounts were available and delivery patterns were similar, then about 890,000 acre-ft of additional delivery capability may still be

ATTACHMENT 7
August 2007 Draft Desert Aqueduct Project Development, Phase 1 Report, Executive Summary, GEI/Bookman-Edmonston, SGPWA's SWP Water Requirement

improvements upstream of the SGPWA service area. SGPWA staff anticipates full deliveries of SGPWA's Table A allocation will be available starting in 2012 (WEI, 2006; Davis, pers. comm., 2007). SGPWA is not participating in the East Branch Enlargement project.

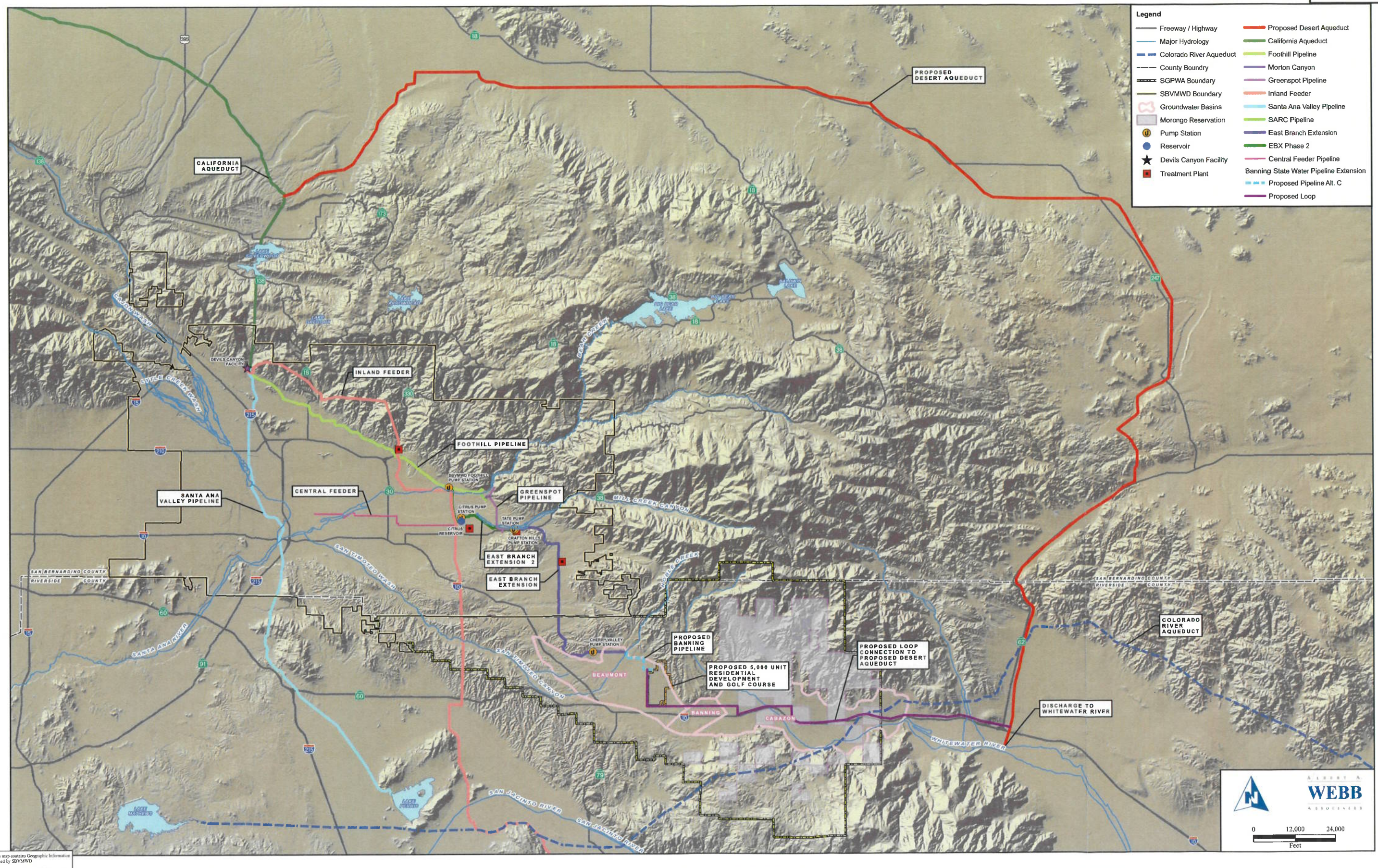
In May 2006, SGPWA and San Timoteo Watershed Management Authority prepared a report on water supply conditions in the San Gorgonio Pass. This report estimated that water demands in the SGPWA service area will increase from 23,900 acre-ft per year in 2005 to 85,300 acre-ft per year in 2030. The report estimates that SGPWA will need to increase its Table A amount from 17,300 to 41,100 acre-ft per year to meet projected demand (WEI, 2006). Discussion with SGPWA staff indicates a need for 20,000 acre-ft per year of additional Table A amount by 2035, for a total of 37,300 acre-ft per year (Davis, pers. comm., 2007). SGPWA does not envision purchasing Article 21 water per se. Instead, it is negotiating with SBVMWD to purchase excess Table A water when available.

SGPWA's Strategic Plan (SGPWA, 2006) indicates several goals that relate to SWP water. Priority 1 objectives include identifying additional supplemental water available for the Pass, including SWP Water and other alternatives, and taking steps to secure additional rights as needed and complete deals to get the rights as available. Priority 2 objectives include completing the EIR and design for the EBX2, advertising for pipeline construction bids by December 2007, constructing additional permanent recharge facilities in local groundwater basins to augment the Little San Gorgonio Creek facility by 2007, and extending the EBX to Cabazon by 2016. The Strategic Plan also envisions utilizing the Cabazon Basin as a storage reservoir providing opportunities to use water conjunctively and a strategic location to store Colorado River Water and/or SWP water (SGPWA, 2006).

According to SGPWA staff, the agency will need approximately 16 cfs of additional SWP capacity, for a total of 64 cfs (Davis, pers. comm., 2007). The existing EBX will provide 48 cfs of capacity when Phase 2 is completed. This capacity could be provided either from a future Phase 3 of the EBX or from the proposed Desert Aqueduct. Since this additional capacity will be required to deliver water to the Cabazon area, it could be supplied through a branch pipeline from a Lucerne Valley alignment of the Desert Aqueduct. The planned 64 cfs capacity is sufficient to convey 46,300 acre-ft per year when operated continuously. This provides SGPWA with the ability to meet a peak monthly demand of 25 percent above average. This capacity could be used to convey surplus water for groundwater storage when available or to meet peak demands if direct deliveries are made to a future water treatment plant.

As indicated in its Strategic Plan, SGPWA is actively evaluating groundwater storage in its service area (SGPWA, 2006). SGPWA is currently working with the USGS to develop information on the Cabazon Basin. The objectives of the study are to identify, characterize,

PLATE 1


Legend
Freeway / Highway
Major Hydrology
Colorado River Aqueduct
County Boundry
SGPWA Boundary
SBVMWD Boundary
Groundwater Basins
Morongo Reservation
Pump Station
Reservoir
Devils Canyon Facility
Treatment Plant
Proposed Desert Aqueduct
California Aqueduct
Foothill Pipeline
Morton Canyon
Greenspot Pipeline
Inland Feeder
Santa Ana Valley Pipeline
SARC Pipeline
East Branch Extension
EBX Phase 2
Central Feeder Pipeline
Banning State Water Pipeline Extension
Proposed Pipeline Alt. C
Proposed Loop
PROPOSED DESERT AQUEDUCT
CALIFORNIA AQUEDUCT
INLAND FEEDER
FOOTHILL PIPELINE
SBVMWD FOOTHILL PUMP STATION
GREENSPOT PIPELINE
CENTRAL FEEDER
SANTA ANA VALLEY PIPELINE
CITRUS PUMP STATION
CITRUS RESERVOIR
TATE PUMP STATION
CRAFTON HILLS PUMP STATION
EAST BRANCH EXTENSION 2
EAST BRANCH EXTENSION
DEVILS CANYON FACILITY
CHERRY VALLEY PUMP STATION
PROPOSED BANNING PIPELINE
PROPOSED 5,000 UNIT RESIDENTIAL DEVELOPMENT AND GOLF COURSE
PROPOSED LOOP CONNECTION TO PROPOSED DESERT AQUEDUCT
COLORADO RIVER AQUEDUCT
DISCHARGE TO WHITEWATER RIVER
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
BEAUMONT
BANNING
CABAZON
MILL CREEK CANYON
NOBLE CREEK
SAN TIMOTEO WASH
SAN TIMOTEO CANYON
SANTA ANA RIVER
SAN JACINTO RIVER
WHITEWATER RIVER
SAN JACINTO RIVER
LAKE MATHEWS
LAKE PERRIS
ALBERT A. WEBB ASSOCIATES
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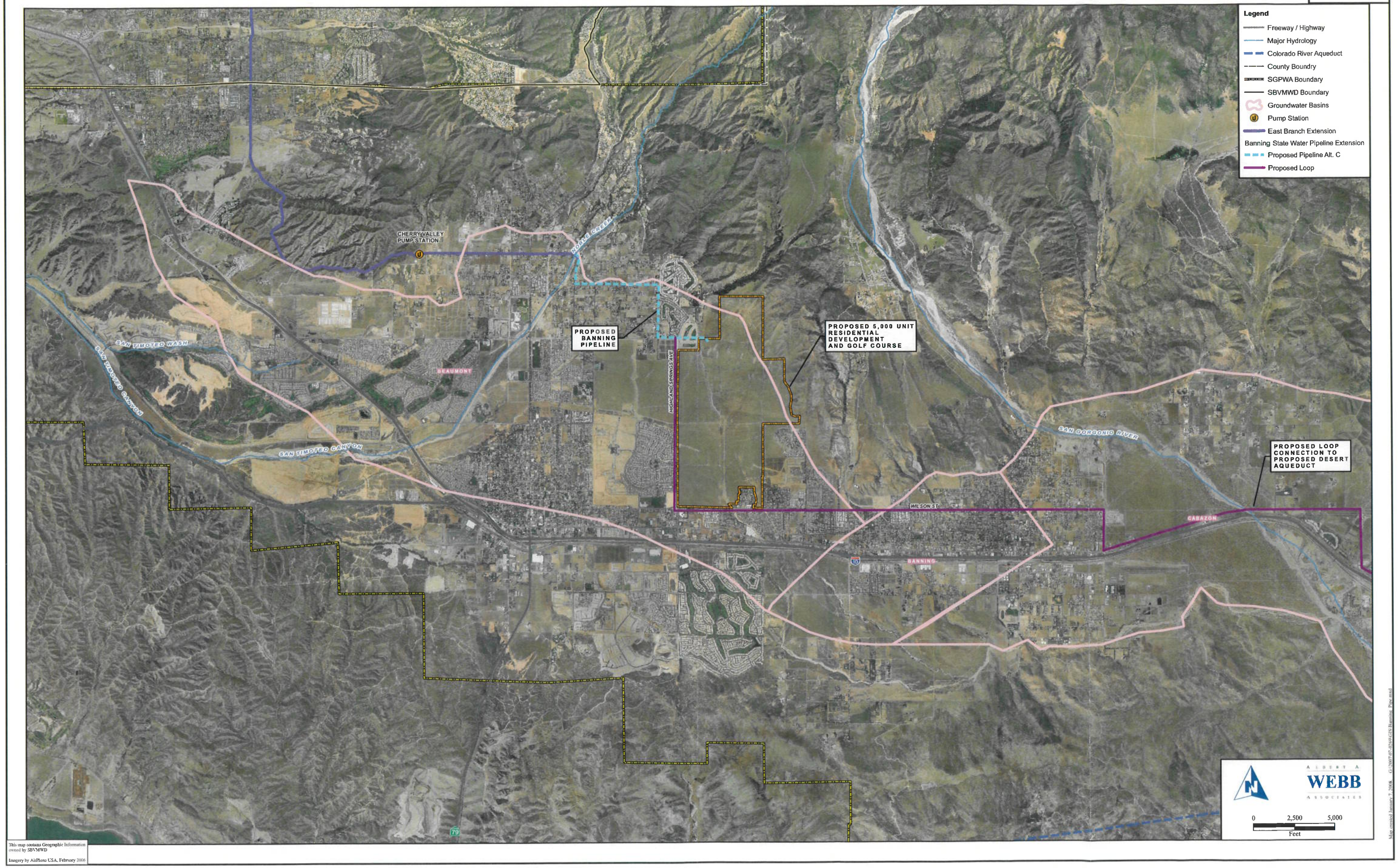
This map contains Geographic Information owned by SBVMWD
Imagery by AirPhoto USA, February 2006
Map created January 2, 2008 G:\2007\07-0269\GIS\Pipelines.mxd

PLATE 2


Legend
Freeway / Highway
Major Hydrology
Colorado River Aqueduct
County Boundry
SGPWA Boundary
SBVMWD Boundary
Groundwater Basins
Pump Station
East Branch Extension
Banning State Water Pipeline Extension
Proposed Pipeline Alt. C
Proposed Loop
CHERRY VALLEY PUMP STATION
PROPOSED BANNING PIPELINE
PROPOSED 5,000 UNIT RESIDENTIAL DEVELOPMENT AND GOLF COURSE
PROPOSED LOOP CONNECTION TO PROPOSED DESERT AQUEDUCT
SAN TIMOTEO WASH
SAN TIMOTEO CANYON
BEAUMONT
HIGHLAND SPRINGS AVE
SAN GORGONIO RIVER
WILSON ST
BANNING
CABAZON
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Imagery by AirPhoto USA, February 2006
Map created January 7, 2008. G:\2007\07-0049\GIS\Banning_Pipe.mxd

APPENDIX B

ALBERT A. WEBB ASSOCIATES

3788 McCray Street • Riverside, CA 92506
Phone: 951.686.1070 • Fax: 951.788.1256
www.webbassociates.com

Project No.: 2008-0330
File No.: 5137.0007

January 30, 2009

Mr. Jeff Davis, General Manager
SAN GORGONIO PASS WATER AGENCY
1210 Beaumont Avenue
Beaumont, CA 92223

RE: Update to Hydraulic and Sizing Review of City of Banning's Proposed Pipeline Extended from the Department of Water Resources East Branch Extension

Dear Mr. Davis:

The City of Banning is planning to construct a 12,300 feet, 24-inch diameter pipeline (August 2007, City of Banning-Imported Water Pipeline Feasibility Study, (**Attachment 1**) from the Department of Water Resources (DWR) East Branch Extension (EBX). The connection point of the proposed Banning pipeline to DWR's facility would be located at the terminus of the EBX pipeline at the intersection of Noble Street and Orchard Street in Cherry Valley and extend to 800 feet south of the intersection of Brookside Avenue and Highland Springs Avenue (**Plate 1**).

The San Gorgonio Pass Water Agency (Agency) would like to explore the feasibility of increasing the diameter of this pipeline in order to provide for the following:

- Optimize conjunctive use opportunities within the Beaumont, Banning and Cabazon Groundwater Basins (**Plate 1**)

- Increase water supply service reliability with a potential connection to the proposed Desert Aqueduct (Lucerne Valley Alignment) to create a transmission pipeline loop to supply "Table A" water to the Agency's service areas from both the east and west (**Plate 1**).

As a result of the Agency's request, Webb prepared the January 8, 2008 Hydraulic and Sizing Review of City of Banning's Proposed Pipeline Letter Report (January 2008 Letter Report). Webb evaluated the Banning pipeline upsizing based on the following factors:

- City of Banning Demands and Pipeline Diameter Requirements

- Potential Connection to Desert Aqueduct Pipeline

- Proposed Banning Pipeline Diameter for Conjunctive Use Program
- Proposed Pipeline Diameter to Provide for Reliability Purposes
- San Gorgonio Pass Water Agency State Water Project Requirement
- Proposed Diameter of Loop Connections

The results and recommendations provided in the January 2008 Letter Report was predicated on the Agency's participation with Coachella Valley Water District (CVWD) and Desert Water Agency (DWA) on the Lucerne Valley Alignment of the State Water Project Aqueduct Extension Pipeline. Participation by the Agency in the Lucerne Valley Alignment would allow the Agency to take advantage of this route for possible conjunctive use programs and increase its water supply reliability. At the time of development of the January 2008 Letter Report, Webb proposed that the Banning pipeline be upsized from 24-inch diameter to 54-inch diameter in order to provide for additional opportunities for conjunctive use and reliability capacity assuming participation in the proposed Lucerne Valley Alignment. Agency participation in the Lucerne Valley Alignment would allow the Agency's service area to be provided with State Water Project water from the east, in addition to the west from DWR's EBX project. The increased sizing of the proposed Banning Pipeline to 54-inch diameter provided for a pipeline capacity of 159 cfs which meets the low range requirement of conjunctive use demand of 103 cfs as well as the low range requirement of total SGPWA demand for reliability of 119 cfs. (Refer to **Attachment 2** for both these values, August 2007 Draft Desert Aqueduct Project Development Plan, Phase 1 Report, Executive Summary, Table 4-4).

Subsequent to the Agency's January 2008 Letter Report the Agency's Draft January 2009 Supplemental Water Supply Planning Study (Draft January 2009 Supplemental Supply Study) was under development to evaluate the feasibility for the Agency to participate with CVWD and DWA for the Lucerne Valley Alignment. It is noted that the Lucerne Valley Alignment was one of the four (4) alignments evaluated in the August 2007 Draft Desert Aqueduct Project Development Plan. The alignments evaluated are as follows (**Plate 2**):

- Lucerne Valley Alignment
- North Pass Alignment
- South Pass Alignment
- San Jacinto Alignment

In developing the Draft January 2009 Supplemental Supply Study, several alignments were evaluated included participation with CVWD and DWA's State Water Project Aqueduct Extension and an independent Agency alignment. The Draft January 2009 Supplemental Supply Study concluded that participation with CVWD and DWA's Lucerne Valley Alignment was cost prohibitive for the Agency while other alignments were less costly. One of the less costly alignments was the North Pass Alignment (**Plate 3**) which included participation with CVWD and DWA. Another alignment, similar to the North Pass Alignment, was the Agency's Independent North Pass Alignment which did not include participation with CVWD and DWA. These alignments (North Pass Alignment and Independent North Pass Alignment) provided for delivery of supplemental SWP water from the west to the east to discharge water into the Cabazon Ground Water Basin. These alignments also passes the area of the proposed Banning pipeline and therefore an outlet was proposed for possible connection to the Banning Pipeline. Based on the North Pass Alignment delivery scenario, (or Independent North Pass), it was necessary to re-evaluate the upsizing of the proposed Banning pipeline per the Agency's request.

The minimum flow requirements[1] for the Banning pipeline was based on the City of Banning's SWP Table A water supply per the City of Banning 2005 Urban Water Management Plan. This flow requirement is 9,266 acre-feet per year (13 cfs) which included 5,137 acre-feet per year (7 cfs) for a proposed residential housing development (**Attachment 3**). Therefore, initial sizing for the Banning pipeline was proposed to be 24-inch diameter (based on 4 fps velocity).

Another sizing criteria reviewed within the January 2008 Letter Report for the Banning pipeline increase was the Agency's SWP water capacity. Per the August 2007 Draft Desert Aqueduct Project Development Plan, Phase I Report, Executive Summary, the Agency would require 64 cfs of SWP water capacity (**Attachment 4**). A 36-inch diameter pipeline was selected to convey this flow rate, though, at this flow rate, would provide for a pipeline velocity of 9.1 fps, which is excessive.

One of the tasks performed for the development of the Draft January 2009 Supplemental Water Supply Planning Study was to determine the ultimate potential water demand for the Agency's service area and ultimate delivery capacities.[2] A review of various delivery parameters resulted in the Agency's SWP Supplemental Table A water

[1] See January 2008 Letter Report
[2] Agency currently owns 24 cfs within the EBX, Phase I, though once the EBX, Phase II has completed construction and is in operation, the Agency will be their full allocated EBX capacities of 48 cfs.

delivery requirement of 44 cfs (Refer to **Attachment 5**, October 13, 2008 letter to Mr. John Zoraster of Bookman-Edmonston Engineering which documented the derivation of this capacity requirement).

Subsequent to this January 2008 Letter Report, during the development of the Agency's Draft January 2009 Supplemental Water Supply Study, as per a July 30, 2008 correspondence and an August 13, 2008 meeting with the Agency's representative, the Agency indicated the potential negotiations for acquiring an additional 16 cfs from San Bernardino Valley Municipal Water District (SBVMWD) through the EBX, therefore, providing for a total of 64 cfs[3] of long-term capacity ownership.

As a result of the above we reevaluated increasing the proposed 24-inch pipeline to 30-inch, 36-inch or 42-inch in diameter. The sizing review was based on a pipeline velocity of 7 fps maximum. **Table 1** summarizes the capacity criteria evaluated in reviewing the upsizing of the proposed Banning Pipeline.

Table 1- Summary of Capacity Criteria

Capacity Criteria	Conveyance Capacity (cfs)
Agency's Delivery of SWP, Table A Water to City of Banning	13
Agency's Potential Ultimate SWP Table A Water Capacity	44
Agency's Potential EBX Capacity[4][5]	64

[3] The ultimate capacity was based on utilizing 63-percent SWP water reliability, deduction of the Agency's existing and future EBX capacity, deduction of local water supplies and 100-percent delivery of SWP in 9 months.

[4] 24 cfs (EXB Phase 1 Capacity) + 24 cfs (EBX Phase 2 Capacity) + 16 cfs (Potential Negotiated Capacity from SBVMWD) = 64 cfs.

[5] This capacity is the same as the Agency's required SWP water capacity documented in the August 2007 Draft Desert Aqueduct Project Development Plan and discussed in the January 2008 Letter Report.

Table 2 lists various pipeline diameter and velocities based upon capacity criteria.

Table 2- Pipeline Diameters

Capacity Criteria	Conveyance Capacity (cfs)	Pipeline Velocity Per Diameter			
		24-inch	30-inch	36-inch	42-inch
Agency's Delivery of SWP, Table A Water to City of Banning	13	4.1	2.7	<2	<2
Agency's Potential Ultimate SWP Table A Capacity	44	>10	9.0	6.3	4.6
Agency's Potential EBX Capacity	64	>10	>10	9.0	6.6

Cost Estimate of Upsizing

The following is a summary of estimated project cost for the proposed Banning pipeline alignment based on a total length of 12,300 feet (Refer to **Plate 1** for proposed alignment).

Table 3- Project Cost Estimates [6]
Banning Pipeline

Diameter (in)	Cost per ft. [7]	Total Costs [8]	Cost of Increase for Upsizing
24	$384	$4,723,200	$0.00
30	$480	$5,904,000	$1,180,800
36	$576	$7,084,800	$2,361,600
42	$672	$8,265,600	$3,542,400

[6] Estimated Project Cost Which would typically include: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. **Escalation, financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.**

[7] Cost per foot of pipeline was determined using a unit cost factor of $16 per diameter inch. (January 2008 ENR Index: 9,183.67 / January 2009 ENR Index: 9,810.94

[8] Based on the proposed 12,300 linear feet of Banning raw water pipeline.

Recommendations on Pipeline Diameter Increase

A review of pipeline diameters in conjunctions with available capacities to convey the maximum flow based on maintaining 7 fps pipeline velocity was conducted. The 36-inch diameter pipeline has a maximum capacity of 50 cfs based on a pipeline velocity of 7 fps. This capacity meets the Agency's delivery requirement for the Agency's ultimate Supplemental Table A capacity of 44 cfs. The Agency's capacity (Supplemental Table A capacity of 44 cfs) is within the ultimate capacity of EBX Cherry Hills Pump Station capacity of 52 cfs. Expansion of this pump station would require a significant capital investment; hence expanding the proposed Banning Pipeline beyond 36-inch diameter would require additional investment to expand the Cherry Hills Pump Station.

Based on the above, we recommend that the Agency participate with the City of Banning to increase the subject pipeline from 24 inch to 36-inch diameter.

Sincerely,

ALBERT A. WEBB ASSOCIATES

Sam I. Gershon, RCE
Senior Vice President

Enclosures

ATTACHMENT 1

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions can be drawn from this preliminary feasibility evaluation:

1. As projected by its 2005 Urban Water Management Plan, Banning's demand for water in 2030 will require water supplies that included an imported component of an estimated 9,266 AFY. This is equivalent to 12.8 cfs, if taken on a continuous basis.
2. Due existing and projected regional demand, best management practices are being applied to protect the long term health of the Beaumont groundwater basin. These include efforts by the San Gorgonio Pass Water Agency (SGPWA) and other regional agencies to import and recharge water from the Department of Water Resources East Branch Extension (EBX).
3. The capacity of the EBX, currently 16 cfs, is limited by the Cherry Valley Pump Station (CVPS). The CVPS can be expanded to 48 cfs, which is the assumed capacity for the purpose of this analysis.
4. Existing and planned recharge projects will divert at least 34 cfs from the EBX at or upstream of Noble Creek, the existing EBX end point. If taken on a continuous basis, this leaves 14 cfs for Banning to carry in its proposed pipeline.
5. A 24-inch pipeline, 12,300 feet long, extending from the existing EBX endpoint at Noble Creek to the Banning Border south of the intersection of Brookside Avenue and Highland Springs Avenue, can feasibly deliver the UWMP project flow requirement. This diameter allows flexibility in delivery regimes which will be important in operating within a regional scenario.
6. Pipeline diameters of 16-inch and 36-inch were also evaluated, but 24-inch is recommended because it most directly addresses the long-term water supply needs of Banning.
7. Various feasible pipeline alignments exist due to the grid pattern of streets in Cherry Valley. An alignment which maximizes its run in Brookside Avenue may be advantageous to coordinating with a regional effort to transmit water to the east. For example, agreements may be reached to share the cost of a larger capacity pipeline in that reach that could serve the needs of Banning and others.
8. Three pipeline materials were evaluated, steel, ductile iron and PVC. PVC is estimated to have the least capital cost, however, it is recommended that steel or ductile iron pipe be selected for the Banning Pipeline. Banning operations staff prefers metallic pipe materials due to the poor long-term performance of PVC in their experience. Ultimately, this decision can be deferred until the design phase of work.

ATTACHMENT 2

incorporates Recharge Basin 3 recharge, a separate hydrologic unit of the Warren Valley Basin. The anticipated capacity for this project is 6,400 acre-ft annually.

The proposed Means/Ames Valley Recharge Ponds would serve Bighorn-Desert View Water Agency, Hi-Desert Water District, and County of San Bernardino Special Districts, County Service Area 70, Improvement District W-1. There is also a potential benefit to Pioneertown. Further study is required to determine to what extent Joshua Basin Water District would benefit from recharge of SWP water at this site. The recharge ponds are anticipated to have an annual capacity of 2,500 acre-ft.

The proposed Joshua Basin District Recharge and Pipeline project would require a pipeline extension from the Morongo Basin Pipeline to the recharge site in the Copper Mountain Valley Basin where Joshua Basin Water District is located. Joshua Basin Water District is a part of Improvement District M and therefore has already been paying debt service on the Morongo Basin Pipeline. The completion of this project will allow Joshua Basin Water District to make use of SWP water via the Morongo Basin Pipeline. The anticipated annual recharge capacity is 1,000 acre-ft.

4.8 Range of Potential Capacities for Desert Aqueduct

The potential capacity for the Desert Aqueduct is based on the Project Partner needs and requests for capacity by other potential participants. The needs of the Project Partners and other agencies as determined from the agency interviews are shown in Table 4-4. As shown, CVWD and DWA would need a minimum of 236 cfs (average) and 311 cfs (with 132 percent peaking) to convey their existing Table A water (171,100 acre-ft per year). This capacity would need to increase by 32 cfs (average) and 43 cfs (peak) to 268 (average) and 353 (peak) to convey the Table A transfers to be effective in 2010. Capacity to deliver CVWD's and DWA's potential future Table A needs could be in the range of 387 cfs to 510 cfs, assuming the standard SWP peaking. Additional capacity to convey water for Table A deliveries and conjunctive use water for certain agencies could potentially increase the capacity by about 300 to 400 cfs. Since much of this capacity is for conjunctive use, it may be possible to coordinate deliveries such that the combined additional capacity is not required. Several agencies did not indicate their future needs because they have on-going studies to evaluate their future demands and supply plans. Since these agencies have not determined their future needs, the additional capacity must be deferred to Phase 2.

Table 4-4
Desert Aqueduct Capacities

Agency	Basic Conveyance (cfs)	Conjunctive Use (cfs)	Total (cfs)
Coachella Valley Water District and Desert Water Agency -- Existing Table A	236-311 [1]		236-311
Coachella Valley Water District and Desert Water Agency – Future Table A	151-199 [2]		151-199
Metropolitan Water District of Southern California	0	207 [3]	207
San Gorgonio Pass Water Agency	16	103 – 207 [4]	119-223
Mojave Water Agency	TBD	TBD	TBD
San Bernardino Valley MWD	0	TBD	TBD
Hi-Desert Water District	TBD	TBD	TBD
Total	403-526	310-414	713-943

1 – Continuous flow and peak flow assuming 132% peaking factor of 171,100 acre-ft/yr of existing Table A water.
2 – Continuous flow and peak flow assuming 132% peaking factor for 108,900 acre-ft per year of additional Table A water (280,000 – 171,100 acre-ft per year).
3 – Assumes 150,000 acre-ft per year for conjunctive use operated continuously; could be delivered from Colorado River Aqueduct.
4 – Assumes 75,000 to 150,000 acre-ft per year for conjunctive use operated continuously; could be delivered from Colorado River Aqueduct.
TBD – To be determined; agencies have studies underway.

It should be noted that the minimum capacity required by CVWD and DWA would be 387 cfs to deliver 280,000 acre-ft per year of Table A water on a continuous basis. Additional capacity would provide increased flexibility of deliveries as well as capacity to take Article 21 or Turnback Pool water. Since Article 21 water deliveries must not impact Table A deliveries, and this water is available about 11 percent of the time, primarily in January through March, CVWD and DWA may wish to consider including 10 to 20 percent additional capacity. An evaluation of the cost-effectiveness of providing additional capacity to receive Article 21 water should be performed in Phase 2. The decision to include additional capacity should be compared with the incremental supply provided by that capacity. This evaluation should also consider the potential for continued use of Colorado River exchanges during periods of abundant supply.

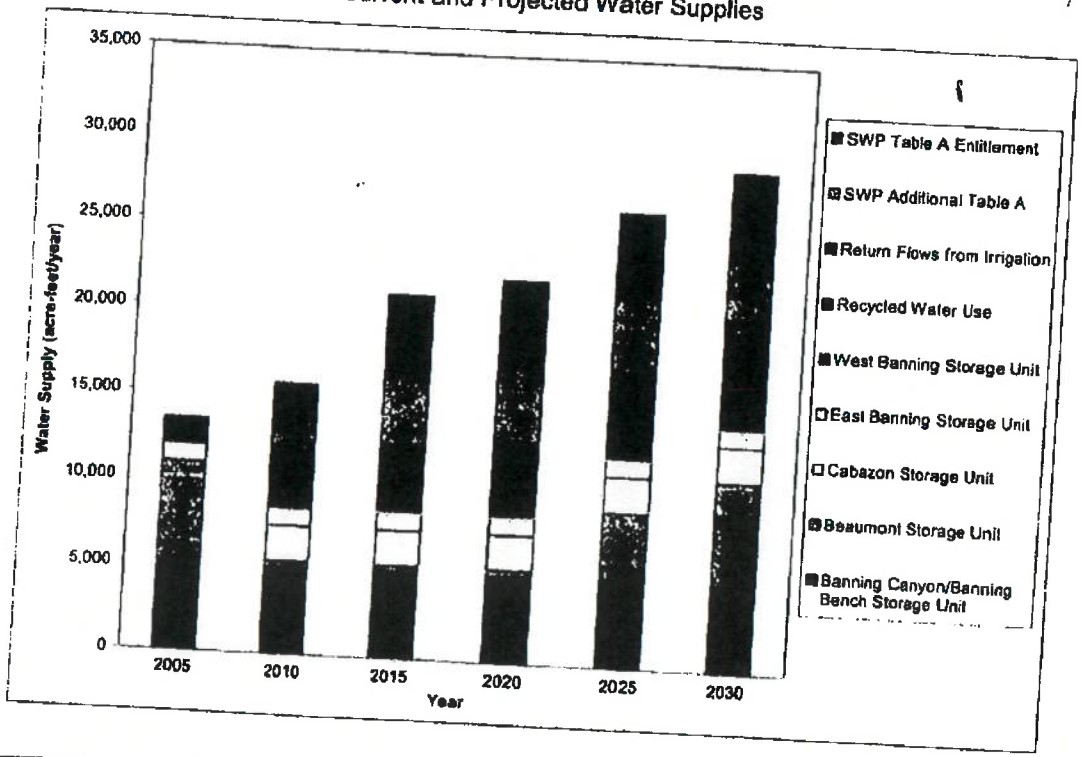
As indicated previously, CVWD and DWA may be limited in their current SWP capacity. This would require them to rely on "as-available" capacity to convey a portion of their water supply. A review of the frequency of flows at several key pumping stations and power plants – Edmonston, Pearblossom, Mojave, and Devil Canyon – was performed using daily operations data for January 2002 through February 2005 (DWR, 2005). These data indicate that there is significant capacity available during "off-peak" delivery periods. As shown in Table 4-5, for the period evaluated, there was about 1.2 million acre-ft of available delivery potential on the East Branch. During this period, SWP deliveries averaged about 72 percent of Table A amounts. Consequently, if full Table A amounts were available and delivery patterns were similar, then about 890,000 acre-ft of additional delivery capability may still be

ATTACHMENT 3

Table 2-1
Current and Projected Water Supplies
(acre-ft/yr)

Water Supply Source	2005	2010	2015	2020	2025	2030
Banning Canyon/Banning Bench Storage Unit	5,000	5,000	5,000	5,000	5,000	5,000
Beaumont Storage Unit	5,900	400	400	400	4,000	6,000
Cabazon Storage Unit	0	2,050	2,050	2,050	2,050	2,050
East Banning Storage Unit	1,050	1,050	1,050	1,050	1,050	1,050
West Banning Storage Unit	350	350	350	350	350	350
Recycled Water Use	0	1,504	1,832	2,160	2,488	2,816
Return Flows from Irrigation	1,128	1,309	1,564	1,822	2,077	2,330
SWP Table A Entitlement	0	2,129	4,667	4,931	4,931	4,931
SWP Additional Table A	0	1,871	4,104	4,335	4,335	4,335
Total	**13,428**	**15,663**	**21,017**	**22,098**	**26,281**	**28,863**

Figure 2-1
Current and Projected Water Supplies



ATTACHMENT 4

improvements upstream of the SGPWA service area. SGPWA staff anticipates full deliveries of SGPWA's Table A allocation will be available starting in 2012 (WEI, 2006; Davis, pers. comm., 2007). SGPWA is not participating in the East Branch Enlargement project.

In May 2006, SGPWA and San Timoteo Watershed Management Authority prepared a report on water supply conditions in the San Gorgonio Pass. This report estimated that water demands in the SGPWA service area will increase from 23,900 acre-ft per year in 2005 to 85,300 acre-ft per year in 2030. The report estimates that SGPWA will need to increase its Table A amount from 17,300 to 41,100 acre-ft per year to meet projected demand (WEI, 2006). Discussion with SGPWA staff indicates a need for 20,000 acre-ft per year of additional Table A amount by 2035, for a total of 37,300 acre-ft per year (Davis, pers. comm., 2007). SGPWA does not envision purchasing Article 21 water per se. Instead, it is negotiating with SBVMWD to purchase excess Table A water when available.

SGPWA's Strategic Plan (SGPWA, 2006) indicates several goals that relate to SWP water. Priority 1 objectives include identifying additional supplemental water available for the Pass, including SWP Water and other alternatives, and taking steps to secure additional rights as needed and complete deals to get the rights as available. Priority 2 objectives include completing the EIR and design for the EBX2, advertising for pipeline construction bids by December 2007, constructing additional permanent recharge facilities in local groundwater basins to augment the Little San Gorgonio Creek facility by 2007, and extending the EBX to Cabazon by 2016. The Strategic Plan also envisions utilizing the Cabazon Basin as a storage reservoir providing opportunities to use water conjunctively and a strategic location to store Colorado River Water and/or SWP water (SGPWA, 2006).

According to SGPWA staff, the agency will need approximately 16 cfs of additional SWP capacity, for a total of 64 cfs (Davis, pers. comm., 2007). The existing EBX will provide 48 cfs of capacity when Phase 2 is completed. This capacity could be provided either from a future Phase 3 of the EBX or from the proposed Desert Aqueduct. Since this additional capacity will be required to deliver water to the Cabazon area, it could be supplied through a branch pipeline from a Lucerne Valley alignment of the Desert Aqueduct. The planned 64 cfs capacity is sufficient to convey 46,300 acre-ft per year when operated continuously. This provides SGPWA with the ability to meet a peak monthly demand of 25 percent above average. This capacity could be used to convey surplus water for groundwater storage when available or to meet peak demands if direct deliveries are made to a future water treatment plant.

As indicated in its Strategic Plan, SGPWA is actively evaluating groundwater storage in its service area (SGPWA, 2006). SGPWA is currently working with the USGS to develop information on the Cabazon Basin. The objectives of the study are to identify, characterize,

ATTACHMENT 5

ALBERT A. WEBB ASSOCIATES

3788 McCRAY STREET • RIVERSIDE, CA 92506
PHONE: 951.686.1070 • FAX: 951.788.1256
WWW.WEBBASSOCIATES.COM

W.O.: 2007-0269
File No.: 5137.0002

October 13, 2008

Mr. John Zoraster, P.E.
BOOKMAN-EDMONSTON ENGINEERING
101 N. Brand Blvd., Suite 1780
Glendale, CA 91203

RE: San Gorgonio Pass Water Agency (SGPWA)
Summary of Supplemental Water Capacity Determination

Dear Mr. Zoraster:

Pursuant to the September 29, 2008 e-mail request **(Attachment A)** regarding future imported water conveyance capacity for San Gorgonio Pass Water Agency (SGPWA), we have provided the following summary:

A. ULTIMATE WATER DEMAND WITHIN SAN GORGONIO PASS WATER AGENCY (SGPWA) – (ATTACHMENT B)

SGPWA:	92,000 ac-ft/yr
Morongo:	33,000 ac-ft/yr
Total:	125,000 ac-ft/yr

B. LOCAL WATER SUPPLY – (ATTACHMENT C)

Local Water Supply in SGPWA Area:	55,000 ac-ft/yr

C. SGPWA AND MORONGO TRIBAL LANDS SUPPLEMENTAL STATE WATER PROJECT (SWP) WATER DEMAND – (ATTACHMENT D)

SGPWA:	37,000 ac-ft/yr
Morongo:	33,000 ac-ft/yr
Total:	70,000 ac-ft/yr

D. PROJECTED SGPWA TABLE "A" WATER REQUIREMENTS – (ATTACHMENT E)

	SWP RELIABILITY	
Service Area	63-Percent	80-Percent
SGPWA:	59,000 ac-ft/yr	46,000 ac-ft/yr
Morongo:	52,000 ac-ft/yr	41,000 ac-ft/yr
Total:	111,000 ac-ft/yr	87,000 ac-ft/yr

D1. AQUEDUCT DELIVERY CAPACITIES BASED ON 100% DELIVERY IN 9 MONTHS – (ATTACHMENT E)

	SWP RELIABILITY	
Service Area	63-Percent	80-Percent
SGPWA:	108 cfs	85 cfs
Morongo:	96 cfs	75 cfs
Total:	204 cfs	160 cfs

E. SGPWA EBX CAPACITY – (ATTACHMENT F)

SGPWA Owned EBX Capacity:	48 cfs
Acquisition w/ Additional EBX Capacity (SBVMWD):	16 cfs
SGPWA Total Potential EBX Capacity:	64 cfs

E1. SGPWA & MORONGO TRIBAL LAND CAPACITY NEEDED IN THE STATE WATER PROJECT AQUEDUCT EXTENSION TABLE "A" WATER (Deduct 64 cfs) – (ATTACHMENT F)

	SWP RELIABILITY	
Service Area	63-Percent	80-Percent
SGPWA:	44 cfs	21 cfs
Morongo:	96 cfs	75 cfs
Total:	140 cfs	96 cfs

Should you have any questions, please contact our office.

Sincerely yours,

ALBERT A. WEBB ASSOCIATES

Sinnaro Yos, P. E.
Associate Engineer

SY:rl

Enclosures

cc: Jeff Davis, SGPWA w/enclosures
Sam Gershon, Webb Associates w/enclosures

APPENDIX C

EXISTING EAST BRANCH EXTENSION

LITTLE SAN GORGONIO CREEK SPREADING GROUNDS

SINGLETON

POTENTIAL PIPELINE CORRIDOR

SOUTH NOBLE CREEK SPREADING GROUNDS

POTENTIAL TUNNEL

POTENTIAL RECHARGE BASIN (MATCH S-I-G)

BEAUMONT

BANNING BENCH

CABAZON

BANNING

SOUTH BEAUMONT

POTENTIAL ALTERNATE CORRIDOR

MORONGO INDIAN RESERVATION

4000 2000 0 4000 8000
SCALE IN FEET

GJH

10/03/02

BILL HAHN

BOYLE ENGINEERING CORPORATION

GeoPentech

SAN GORGONIO PASS WATER AGENCY

CABAZON GROUNDWATER RECHARGE PROJECT

DR-527-606-01

1

APPENDIX D

ALBERT A. WEBB ASSOCIATES

3788 McCray Street • Riverside, CA 92506
Phone: 951.686.1070 • Fax: 951.788.1256
www.webbassociates.com

Project No.: 2008-0250
File No. 5137.0005

March 11, 2009

Mr. Jeff Davis, General Manager and Chief Engineer
San Gorgonio Pass Water Agency
1210 Beaumont Avenue
Beaumont, CA 92223

RE: Cost Evaluation for Upsizing the Proposed Banning Pipeline and Cabazon Pipeline to Potential Future Recharge Basin at Existing Gravel Pit (currently site of Robertson's Ready Mix)

Dear Mr. Davis:

Based on our March 9, 2009 phone conversation, Webb has prepared reconnaissance level project cost estimates for the above mentioned facilities. The basis for these costs was derived from evaluation of previous letters to the Water Agency establishing pipeline diameters and alignments.

This letter will discuss the following:

- Banning Pipeline Upsizing – Extending from Department of Water Resources East Branch Extension to Proposed Groundwater Basin at Pardee Homes Development (see **Plate 1**)

- Cabazon Pipeline Extension – Extending a pipeline from the Banning Pipeline to potential Future Recharge Basin at Existing Gravel Pit, currently site of Robertson's Ready Mix (see **Plate 1**)

Banning Pipeline Upsizing

The proposed project to extend the East Branch Extension pipeline was evaluated in the January 8, 2008 letter report "Hydraulic and Sizing Review of City of Banning's Proposed Pipeline Extended from Department of Water Resources East Branch Extension". This letter report recommended upsizing of the proposed Banning pipeline from 24-inch diameter to 54-inch diameter. Subsequent to this letter, at the request of the Water Agency, the upsizing was re-evaluated, resulting in the preparation of the January 30, 2009 Update to the January 8, 2008 Letter Report. The January 30, 2009 update provided recommendations for upsizing of the Banning pipeline from 24-inch diameter to 36-inch diameter, therefore establishing a cost basis for this portion of the extension. The cost of this project would be shared as the Water Agency would be responsible for the upsizing only. Refer to **Table 1** for a summary of costs.

Table 1: Project Cost Estimates Banning Pipeline[1, 2]

Diameter (in)	Cost per ft.[3]	Total Costs	Cost of Increase for Upsizing
36	$576	$7,084,800	$2,361,600

Cabazon Pipeline Extension

As a supplement to the cost evaluation for the Proposed Banning Upsizing, the Water Agency requested an evaluation of the cost of extending the East Branch Extension from the Paradee Homes Development to a potential future Re-Charge Basing at an existing gravel pit, currently Robertson's Ready Mix. This would provide for delivery of water to the Cabazon ground water basin. The conceptual alignment traverses southerly on Highland Springs Avenue and then crosses the 10 Freeway and traverses westerly on Lincoln Street and northerly, crossing the 10 Freeway on Hathaway Street to the gravel pits (see **Plate 1**). This alignment is approximately 31,000 feet and, as an extension from the Banning pipeline, the sizing would be consistent with the Banning pipeline of 36-inch diameter. The cost for this portion would be the Water Agency's responsibility. **Table 2** provides for a summary of cost for this portion of the extension.

Table 2: Project Cost Estimates Cabazon Pipeline[2, 4]

Diameter (in)	Cost per ft.[3]	Total Costs
36	$576	$17,856,000

[1] Estimated project cost for the proposed Banning pipeline alignment based on a total length of 12,300 feet (Refer to **Plate 1** for proposed alignment.

[2] Estimated Project Cost which would typically include: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report, engineering contract administration; field inspection and basic environmental documentation. **Escalation, financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.**

[3] Cost per foot of pipeline was determined using a unit cost factor of $16 per diameter inch (January 2009 ENR Index: 9,810.94/ March 2009 ENR Index: 9,799.19).

[4] Based on the proposed 31,000 linear feet of Banning raw water pipeline

The total cost associated with the upsizing of the Banning pipeline and Cabazon Pipeline Extension to the Cabazon Basin that would be borne by the Water Agency is summarized in **Table 3** below.

Table 3: Total Project Cost

Banning Upsizing	$2,361,600
Cabazon Pipeline	$17,856,000
Total for SGPWA	$20,217,600

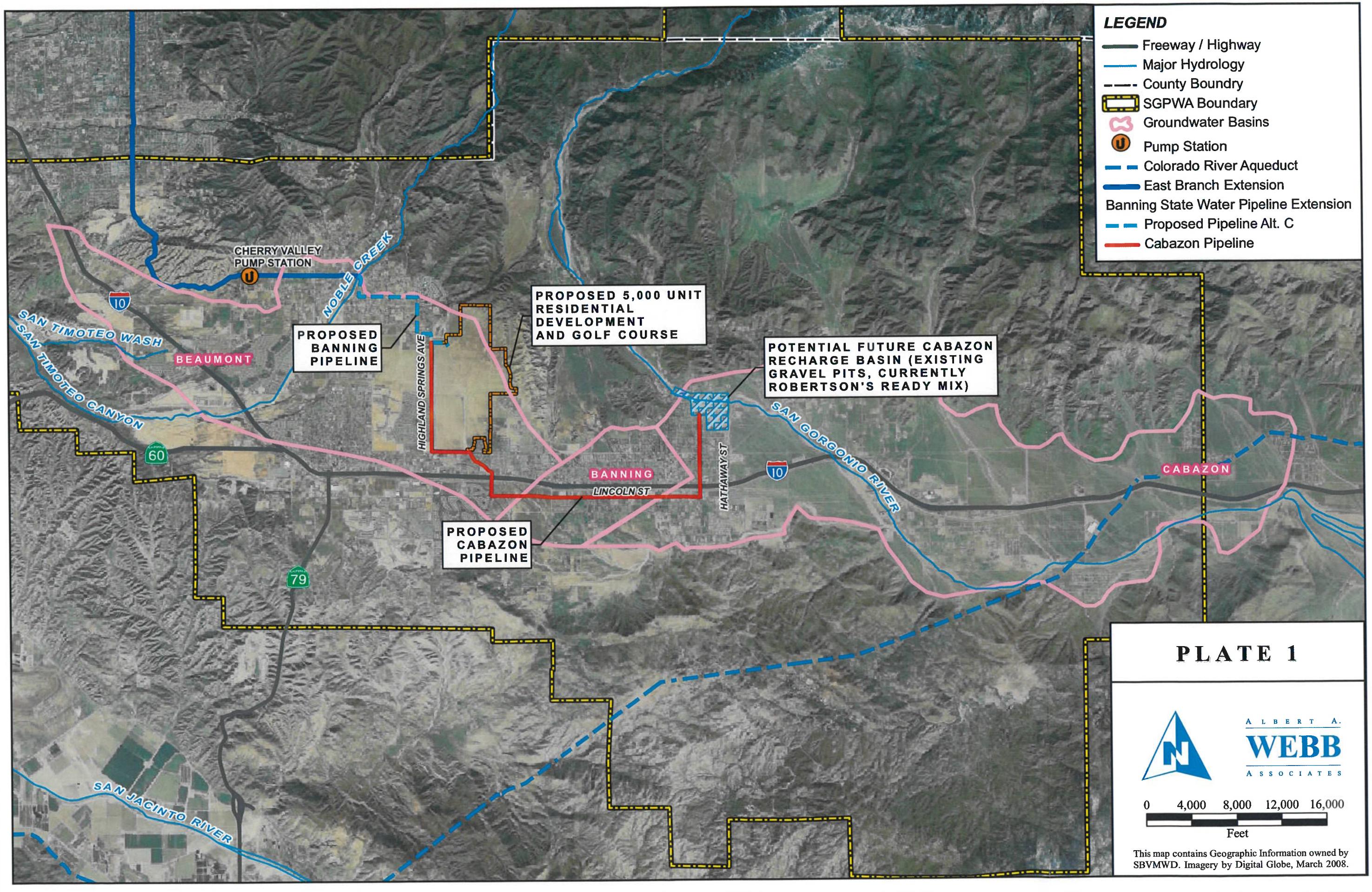
If you have any questions, please contact me at (951) 686-1070.

Sincerely,

ALBERT A. WEBB ASSOCIATES

Sam I. Gershon, RCE
Senior Vice President

SY:yh


LEGEND
Freeway / Highway
Major Hydrology
County Boundry
SGPWA Boundary
Groundwater Basins
Pump Station
Colorado River Aqueduct
East Branch Extension
Banning State Water Pipeline Extension
Proposed Pipeline Alt. C
Cabazon Pipeline
CHERRY VALLEY PUMP STATION
NOBLE CREEK
SAN TIMOTEO WASH
SAN TIMOTEO CANYON
BEAUMONT
PROPOSED BANNING PIPELINE
HIGHLAND SPRINGS AVE
PROPOSED 5,000 UNIT RESIDENTIAL DEVELOPMENT AND GOLF COURSE
POTENTIAL FUTURE CABAZON RECHARGE BASIN (EXISTING GRAVEL PITS, CURRENTLY ROBERTSON'S READY MIX)
HATHAWAY ST
SAN GORGONIO RIVER
CABAZON
BANNING
LINCOLN ST
PROPOSED CABAZON PIPELINE
SAN JACINTO RIVER
10
60
79
PLATE 1
ALBERT A. WEBB ASSOCIATES
0 4,000 8,000 12,000 16,000
Feet
This map contains Geographic Information owned by SBVMWD. Imagery by Digital Globe, March 2008.
Map revised March 12, 2009. G:\2009\09-0033\GIS\Banning_Pipe_2000.mxd

APPENDIX E

ALBERT A. WEBB ASSOCIATES

3788 McCray Street • Riverside, CA 92506
Phone: 951.686.1070 • Fax: 951.788.1256
www.webbassociates.com

Project No.: 2008-0250
Phase No.: 4000

August 15, 2008

Mr. Jeff Davis, General Manager and Chief Engineer
San Gorgonio Pass Water Agency
1210 Beaumont Avenue
Beaumont, CA 92223

RE: Cost Evaluation for Upsizing the Proposed Banning Pipeline Extending from the Department of Water Recourses East Branch Extension to Proposed Ground Water Recharge Basin at Pardee Homes Development and Construction of Recharge Facilities

Dear Mr. Davis:

Based on our meeting on August 13, 2008, Webb has prepared reconnaissance level project cost estimates for the above mentioned facilities. Per your request at that meeting, this letter has been prepared in advance of the final technical memorandum which will include the necessary text, exhibits, and figures to fully document the basis of the cost estimates provided herein.

East Branch Extension

Webb previously provided San Gorgonio Pass Water Agency (SGPWA) with a letter report, dated January 8, 2008, regarding the "Hydraulic and Sizing Review of City of Banning's Proposed Pipeline Extended from the DWR's EBX" (2008 SGPWA Letter Report). In that report Webb evaluated the possible upsizing criteria for the City of Banning's Proposed Pipeline from the EBX's current termination point at the intersection of Orchard Street and Noble Street to the Pardee Homes Development in Banning. As a result of that study, various pipeline sizing and cost scenarios were developed and a recommended pipeline size increase from 24-inch diameter to 54-inch diameter was derived.

As we review the 2008 SGPWA Letter Report for costing data, we would like to provide some clarification. Webb Associates utilized a unit cost of $15/inch-diameter/LF. A review of the August 6, 2007 Letter Report to Mr. Paul Toor of City of Banning regarding the "City of Banning – Imported Water Pipeline Feasibility Study" prepared by PBS&J (2007 Banning Letter Report) indicates that the unit cost for pipelines is approximately $10/inch-diameter/LF prior to the addition of the engineering, contingency and construction management cost portions or "soft cost". When including "soft cost" to the construction cost (per the 2007 Banning Letter Report), the unit cost increases to $16/inch-diameter/LF. Overall, there is an increase in construction cost by a factor of approximately 1.6 to account for "soft cost". As standard practice, Webb Associates utilizes a project cost factor of 1.4 as this would account for the soft cost as described

above, though typically would exclude certain items[1]. Therefore, the unit cost of $15/inch-diameter/LF utilized in the 2008 SGPWA Letter Report incorporates the project cost factor of 1.4.

The cost estimations provided in the 2008 SGPWA Letter Report were based on the following factors:

- Unit Cost: $15/inch-diameter/LF
- Length of Pipeline: 12,300 LF

The January 2008 costs have been updated for construction cost escalation, the July 2008 ENR Construction Price Index (Los Angeles – July 2008: 9335.69) have been incorporated for the current project cost and are included in **Table 1**:

Table 1 – Project Cost Estimate Differential

Project Cost	24-inch Diameter	54-inch Diameter	Cost Differential for Increase
Total Cost (July 2008)	$4,516,560 ($367/LF)	$10,162,260 ($826/LF)	$5,645,700

Recharge Facility

SGPWA has requested that Webb prepare project cost estimates associated with the construction of recharge facilities at **Site No. 4** as described in the recent "Evaluation of Potential Recharge Site for San Gorgonio Pass Water Agency" (Webb Recharge Study), prepared by Webb Associates in May 28, 2008.

Site No. 4 is located on the southwest corner of the intersection of Beaumont Avenue and Brookside Avenue, directly south of the High School. The total acreage of this site is 54.53 acres. **Site No. 4** is located directly south of a portion of Noble Creek and east of the confluence of the Mountain View Channel and Noble Creek. The cost estimate in **Table 2** is based on the assumption that the Mountain View Channel could be used to convey SWP water to this site, as it lies directly southeast of the Mountain View Channel outfall into the Noble Creek channel and that a temporary earthen berm would be constructed across the Noble Creek channel to convey water across the Noble Creek channel to the recharge site.

[1] Estimated Project Cost which would typically include: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. **Escalation, financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.**

As indicted in the Webb Recharge Study, the area available for spreading is estimated to be 40 percent of the area of the site. The remaining area will be required for access roads, infrastructure, maintenance facilities, hydraulic control structures, and perimeter setbacks.

Table 2 – Recharge Basin - Project Cost Estimate

	Item	Units	Quantity	Unit Cost	Construction Cost
1	Clear Site (entire site)	acre	55	$1,175.00	$64,625
2	Basin Excavation (approx. 22 acres)[1]	yd^3	283,950	$5.00	$1,419,750
3	Dam Embankment	yd^3	2,500	$3.25	$8,125
4	Emergency Spillway	yd^3	50	$590.00	$29,500
5	Inlet Structure	each	1	$12,500.00	$12,500
6	On-site Piping	lf	800	$70.00	$56,000
7	Roadbase (3-inch thick)	sf	653,000	$0.65	$424,450
8	6' Chain Link Fence[2]	lf	5,800	$16.00	$92,800
	Construction Subtotal				$2,107,750
	20% Construction Contingency				$421,550
	Total Construction Cost				$2,529,300
	Total Project Cost[3]				**$3,541,020**

[1] Excavated material to be disposed of on-site. Average basin depth of 8 feet.

[2] Fencing around entire site, not individual recharge basins

[3] Estimated Project Cost factor of 1.4 which would typically include: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. Escalation, financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.

If you have any questions or wish to meet to discuss any of the items herein, please contact me at (951) 686-1070.

Sincerely,

ALBERT A. WEBB ASSOCIATES

Sam I. Gershon, RCE
Senior Vice President

SIG:tj

ALBERT A. WEBB ASSOCIATES

Corporate Headquarters
3788 McCray Street
Riverside, CA 92506
951.686.1070

Palm Desert Office
36-951 Cook Street #103
Palm Desert, CA 92211
760.568.5005

Murrieta Office
41391 Kalmia Street #320
Murrieta, CA 92562

2008-0250

October 2, 2020

Lance Eckhart, PG, CHG
General Manager, Chief Hydrogeologist
San Gorgonio Pass Water Agency
1210 Beaumont Ave.
Beaumont, CA 92223

RE: Update "Backbone Water System"
Project Cost Estimate

Lance:

From 2009 through 2014 Webb Associates prepared a number of project cost estimates of facilities to provide additional supplemental water to San Gorgonio Pass Water Agency. The cost data Webb provided SGPWA was incorporated into the Proposed Implementation Plan for Capacity Fee Nexus Study conducted by David Taussig & Associates.

The project cost estimate presented herein is updated from our letter report submitted to Jeff Davis, General Manager, on December 30, 2014 titled "San Gorgonio Pass Water Agency Capacity Fee Improvement Cost Update".

The purpose of this letter report is to update the San Gorgonio Pass Water Agency (SGPWA) pipeline Reach 1, 2, and 3 and the Cabazon Basin Recharge Facility. Refer to **Plate 1**[1] for the project locations.

SAN GORGONIO PASS WATER AGENCY PIPELINE

The City of Banning has relinquished interest in directly participating in the financing of the construction of the Banning Pipeline. Since there is a need to extend imported water service further east into the Agency's service area, the Agency is evaluating alternative means to finance the entire project. In 2014 we renamed the pipeline project and performed a preliminary review of the pipeline alignment to supplement prior reconnaissance level reviews. The following names are recommended for the Agency's proposed pipeline project in lieu of calling the pipeline Banning and Cabazon Pipelines:

- SGPWA Pipeline Reach 1
- SGPWA Pipeline Reach 2
- SGPWA Pipeline Reach 3

[1] The Plates incorporated herein are from Webb's letter report to Jeff Davis dated December 30, 2014.

A review of the overall pipeline alignment reveals three distinct and definable reaches which were defined by pipeline sizing, overall direction, location of alignments, available right-of-way, and jurisdictional considerations.

A site field visit of the alignments was conducted on August 4, 2014 by Webb Associates in order to provide a better understanding of the project alignment. Please note that the site visit was not a preliminary design review, neither was a constraints analysis conducted, nor was utility research performed. It is recommended as the Agency moves forward with the projects, a more detailed alignment study and analysis be conducted to confirm the alignments.

Reach 1

Reach 1 **(Plate 3)**[1] is the original Banning pipeline alignment as detailed in the August 2007 City of Banning Imported Water Pipeline Feasibility Study which described alternative alignments. During the 2014 field visit, several potholes were observed in the east bound lane of Brookside Avenue and based on various utilities markings, there appeared to be significant evidence of underground facilities as well. Based on the cursory alignment review the following alignment is recommended based upon the 2014 data **(Plate 3)**.

- Connection to existing East Branch Extension Pipeline at Orchard Street and Noble Street (west of Noble Creek)
- Noble Street between Orchard Street and Lincoln Street
- Lincoln Street between Noble Street and Bellflower Avenue
- Bellflower Avenue between Lincoln Street and Brookside Avenue
- Brookside Avenue between Bellflower Avenue and Highland Springs Avenue

Based on cursory review during the 2014 site visit, this reach appears feasible. Reach 1 is within the unincorporated Cherry Valley area of Riverside County. The sizing of Reach 1 is recommended to be 36-inch diameter pipeline in order to deliver 52 cubic feet per second (cfs)[2] at 7.4 feet per second (fps). The total length of Reach 1 is approximately 12,000-feet.

Reach 2

Reach 2 **(Plates 4 and 5)** extends from the end of Reach 1 at Brookside Avenue and Highland Springs Avenue, and southerly along Highland Springs Avenue to Wilson Street, then easterly along Wilson Street to Sunset Avenue. The north-south alignment was assumed to be on south bound Highland Springs Avenue which would place it within the City of Beaumont. If north bound Highland Springs Avenue was selected, the alignment would be placed in the City of Banning. As there is a potential of recharge basin in the City of Banning as well as other potential users, it was assumed that 22 cfs would be utilized within Reach 1 of the pipeline. Therefore, Reach 2 would be 30-inch diameter pipeline, which has a conveyance capacity of 30 cfs at 6.1 fps. The total length of Reach 2 is approximately 22,000-feet.

[1] Plate 2 from December 20, 2014 was not utilized in the letter report.
[2] Cherry Valley Pump Station pumping capacity.

Reach 3

Reach 3 **(Plates 6 and 7)** extends from the end of Reach 2 at Sunset Avenue and Wilson Street, and easterly along Wilson Street, then on Blanchard Street, Hoffer Street, and Hathaway Street. The portion of Hathaway Street appears to be within private property which leads northerly onto the existing gravel pit (proposed to be Cabazon Recharge Facility). During the land acquisition phase, it is recommended that the ownership of this portion of Hathaway Street be determined. Reach 3 is proposed to be a 24-inch diameter pipeline which can convey 22-cfs capacity at 7 fps. The total length of Reaches 3A and 3B is approximately 19,000-feet.

At this level of planning, the cost basis is at a preliminary level. The construction cost estimate of the pipeline is conceptual and includes a 15% contingency factor. The project cost was established by applying the project cost factor which typically includes soft costs such as planning and engineering. The following **Table 1** summarizes the proposed construction and project cost of the SGPWA delivery pipeline.

Table 1
SGPWA Delivery Pipeline

Description	Size (dia.)	Length	Costs[1]
Reach 1 Pipeline	36-inch	12,000-feet	$ 7,146,600
Reach 2 Pipeline	30-inch	22,000-feet	$ 11,108,200
Reach 3 Pipeline	24-inch	19,000-feet	$ 7,651,000
Construction Cost Total			$25,905,800
PROJECT COSTS[2]			**$36,220,000[3]**

Hydraulic Review

A cursory hydraulic review was performed to determine the feasibility of the SGPWA Pipeline to convey imported water. Per the Agency's August 25, 2014 e-mail, a terminal water storage tank with a hydraulic grade of 2,940-feet is planned to feed the SGPWA Pipeline. For planning purposes, the tank location was assumed at the end of the

[1] Cost based upon September, 2020 ENR-Los Angeles Construction Cost Index 12,062.34
[2] Estimated Project Cost factor of 1.4, which typically includes: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environment documentation. Escalation, financing, interest during construction, legal, land, R-O-W agent, and environmental impact reports costs are not included

[3] Rounded to the nearest $10,000

East Branch Extension at Noble Street and Orchard Street. The ground elevations along the SGPWA Pipeline's alignment were estimated utilizing available data from Google Earth mapping software. The friction losses within the pipeline was estimated utilizing Hazen-Williams equation with a friction factor of C = 120. The following **Table 2** summarizes the findings of the cursory hydraulic review.

Table 2
Cursory Hydraulic Review

Reaches	Length	Flow	Headloss	Ground Elevation	Hydraulic Grade
Reach 1	12,000-feet	52 cfs	58-feet	2872-feet	2882-feet
Reach 2	22,000-feet	30 cfs	93-feet	2607-feet	2789-feet
Reach 3	19,000-feet	22 cfs	134 -feet	2400-feet	2655-feet

At the end of Reach 1 (Brookside Avenue and Highland Springs Avenue), the hydraulic grade elevation is close to the ground elevation and a review of Google Earth elevation data shows this location is a high point in the overall alignment resulting in low pressure (approximately 4 psi). Tank elevation fluctuation may have further impact of the conveyance of the water within the pipeline, though it is our preliminary opinion that the SGPWA Pipeline appears capable to convey imported water. As the project further develops, it is recommended the Agency perform a detailed hydraulic analysis to confirm the pipeline's conveyance feasibility, taking into consideration the terminal water storage tank location, sizing and elevation as well as potential turnouts and water deliveries along the pipeline's alignment and review of other alternate alignments to mitigate high points.

CABAZON BASIN RECHARGE FACILITY

Webb's April 9, 2009 e-mail (Appendix A) to the Agency provided for a concept level costing for the Cabazon Basin Recharge Facility which was based upon the SGPWA March 2005 "Cabazon Groundwater Recharge Project Feasibility Investigation Draft Report" prepared by Boyle Engineering. As the Agency has expressed interest in further developing the existing gravel pit to a recharge facility, the Agency has requested Webb to provide a concept level cost estimate for partial basin improvements such as 25% to 33% of the site **(Plate 7)**. Additionally, further review and analysis was conducted to provide a preliminary feasibility review of the site as well as recommendations.

The area of the "proposed developed" area (Plate 7) is 54 acres or about 30 percent of the total excavated site.

At this level of planning, the cost basis is at a preliminary level. Upon further review of this site, as the gravel pit has been significantly excavated during the materials mining process, nominal earth work would be required. Proposed improvements would include separation berms, site access roads, onsite piping, and onsite facilities. The construction cost is conceptual and includes a 20% contingency. The project cost was estimated by applying the project cost factor which typically includes soft costs such as planning and engineering. The land cost was based upon purchasing the entire 181 acres at $50,000 per acre, which would result in a purchase price of $9,000,000. This amount ($9,000,000) is only used for planning and budgeting purposes, and is not to be considered the real value of the land. It is recommended that the Agency have an appraisal performed to determine a more realistic value for the subject property as the project moves forward. The following Table 3 summarizes these costs.

Table 3
Cabazon Recharge Basin Costs

Description	**Costs**
Concept Level Construction Costs	$ 3,080,000[1]
20% Contingency	$ 616,000
Subtotal	**$ 3,696,000**
Total Project Costs[2]	$ 5,170,000
Land Purchase	$ 9,000,000
TOTAL COST[3]	**$ 14,170,000**

[1] ENR Construction Cost Index Los Angeles September 2020, 12,063.34.
[2] Estimated Project Cost factor of 1.4 which typically includes: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping, geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. Escalation, financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.
[3] Rounded to the nearest $10,000

PROJECT COST SUMMARY

Table 4 summarizes the updated cost project cost for the two proposed projects.

Table 4
San Gorgonio Pass Water Agency
Updated Project Costs

Description	Costs[1]
SGPWA Pipeline Reach 1, 2 and 3	$ 36,270,000
Cabazon Basin Recharge Facility	$14,170,000
TOTAL PROJECT COST	**$50,440,000[2]**

Should you have any questions, please feel free to contact our office at 951-686-1070.

Sincerely,

ALBERT A. WEBB ASSOCIATES

Sam I. Gershon, RCE
Senior Vice President

Enclosures

[1] Rounded to the nearest $10,000

[2] AACE International has developed a Recommended Practice 56R-08 Cost Estimate Classification system as applied in engineering, procurement, and construction for the building and general construction industries. The Recommended Practice provides expected accuracy range of cost estimates for water and sewer civil projects. Based on AACE 56R-08 the Classification Matrix we would define the maturity level of the project defined herein at between 0 and 2%. This would define the cost estimate as Class 5. The expected Accuracy Range of the cost estimate would range from minus 30% to plus 50% at an 80% confidence range.

APPENDIX A

APRIL 9, 2009 E-MAIL TO JEFF DAVIS

REGARDING CAPACITY FEE STUDY

(RECONNAISSANCE LEVEL PROJECT COST ESTIMATE TO CONSTRUCT

RECHARGE FACILITIES AT THE CABAZON RECHARGE SITE)

Sinnaro Yos

From: Sam Gershon
Sent: Thursday, April 09, 2009 5:16 PM
To: Jeff Davis; Russell Behrens; Andrea Roess; Steve Runk
Cc: Nanette Pratini; Sinnaro Yos; Shane Bloomfield; Mo Faghihi; Flo Smith
Subject: Capacity Fee Study for SGPWA
Attachments: Jeff Davis-SGPWA 8-15-08.pdf; Plate3-4.pdf; Cabazon Basin.xls; aerial.pdf

I previously transmitted a letter report titled " Data Collection for Proposed Connection Fee Study" March 17, 2009. As we previously discussed we did not include the cost of acquiring water rights in our study. Jeff has some unit cost estimates to acquire water rights that should be incorporated into Taussig's cost analysis.

We also did not include the cost of recharge basins in our report. Attached to this email are the cost of two recharge basins ,one in the Beaumont Basin and the other in the in Cabazon Basin. The estimated project cost for the proposed Site 4 Recharge Basin in the Beaumont Basin is $3,541,020.

The other recharge basin proposed to be in the Cabazon Basin assumes acquiring the 181 acre Robinson Ready Mix gravel pit area. The estimated cost of improvements is $14,065,556.

Both of these cost estimates of the proposed recharge basins are very preliminary estimates. In addition the cost of land is not included in any of Webb's cost estimates.

Webb has been in contact with Beaumont Cheery Valley Water District and have received information on development fees collected for the last couple of years. We have very good information from the City of Banning. We will have an internal meeting early next week to further understand the status of outstanding homes that have paid fees but have not constructed facilities.

A further issue has arisen with regard to how the cities within SGPWA and the County of Riverside address residential density in their respective General Plans. For example if the City Of Banning General Plan has a residential area that has a density ranging from 2 to 5 dwelling units per acre, the City of Banning assumes the land will fully develop at 5 unit per acre for that general plan land use category. The County of Riverside takes a midpoint value for the general plan land use category. For the residential category shown, the County would assume development would occur at 3.5 unit per acre. This has a significant impact on how Taussig would estimate the connection fee per unit of development.

Our water demand analysis is based on a water duty for each class of residential and commercial/ industrial development. For a General Plan residential area, for the one noted above, Webb's water duty would be the same for the County or City general plan residential area.

Some discussion should be undertaken between SGPWA, Taussig, and Webb as to how we determine the projected number of future residential units based on the different methodologies of the County and Cities.

Sam I. Gershon RCE
Senior Vice President

ALBERT A. WEBB ASSOCIATES

Albert A. Webb Associates
3788 McCray St | Riverside, CA 92506
T. 951.686.1070 | F. 951.788.1256
sam.gershon@webbassociates.com | www.webbassociates.com

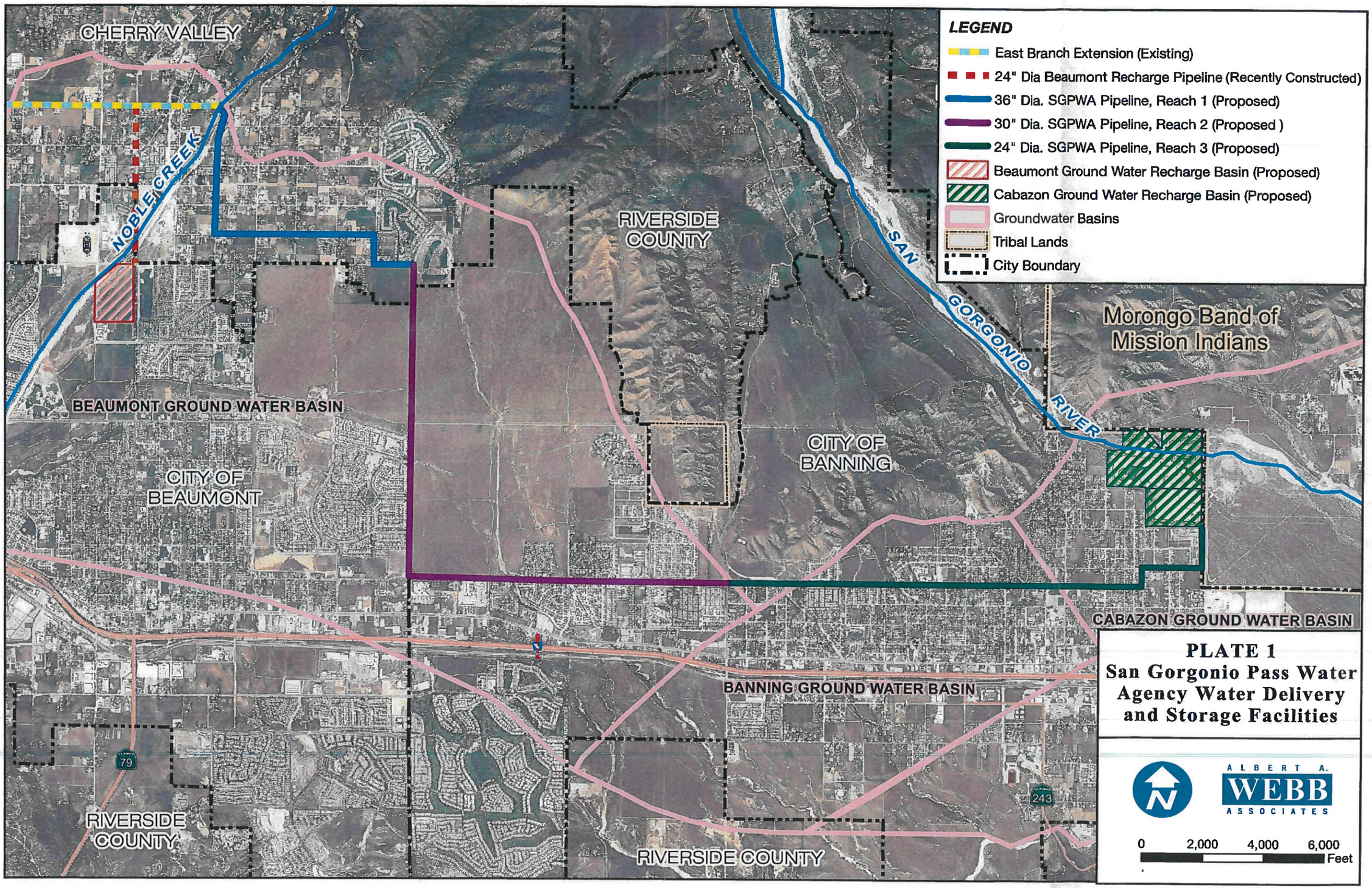
Reconnaissance Level Project Cost Estimate to Construct Recharge Facilties at the Cabazon Recharge Site (Robertson's Ready Mix)

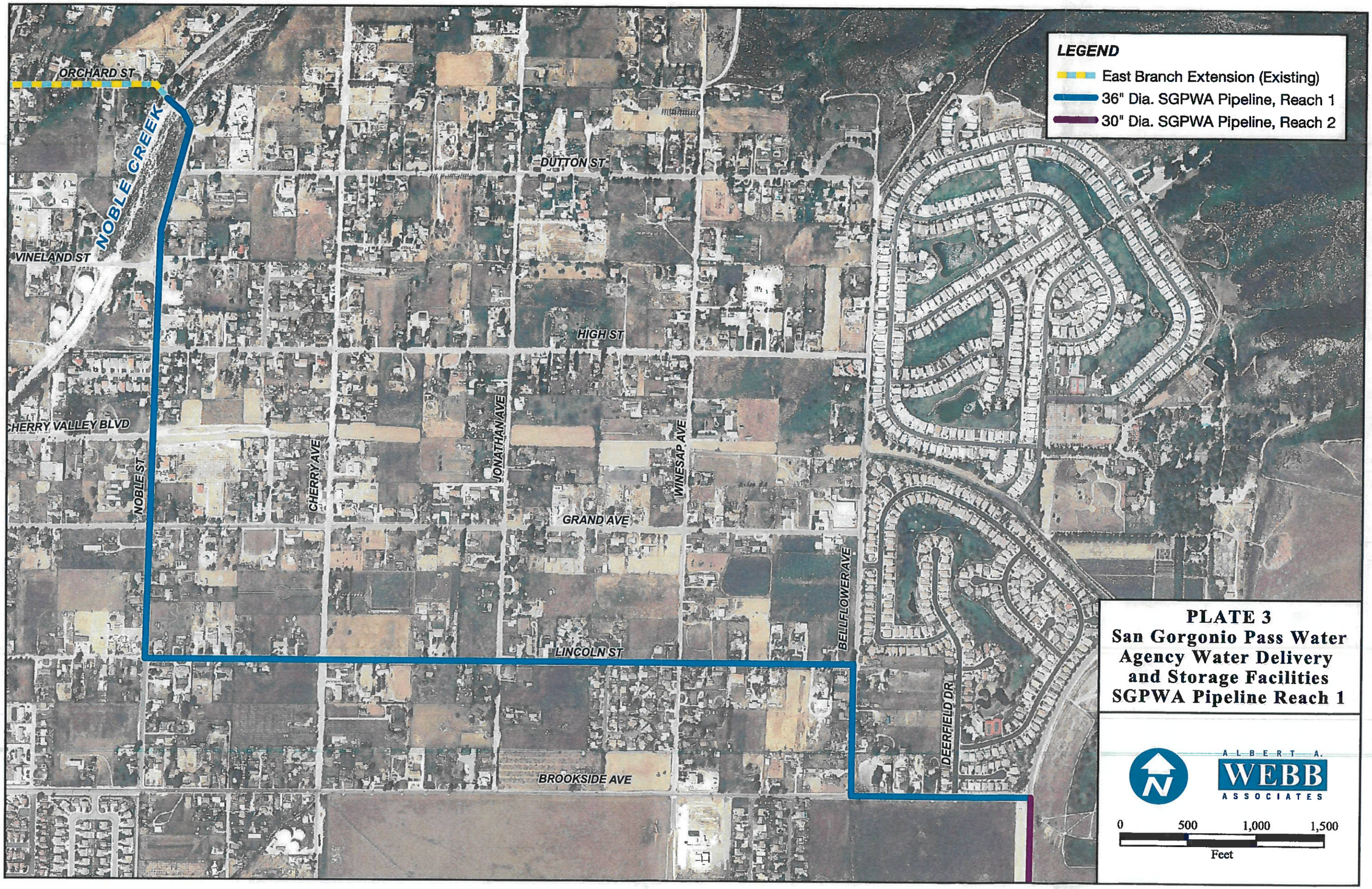
	Item	Units	Quantity	Unit Cost	Construction Cost
1	Clear Site (entire site)	acre	181	$1,175.00	$212,675
2	Basin Excavation (approx. 72 acres)[1]	yd^3	929,283	$5.00	$4,646,415
3	Dam Embankment	yd^3	7,200	$3.25	$23,400
4	Emergency Spillway	yd^3	100	$590.00	$59,000
5	Inlet Structure	each	2	$12,500.00	$25,000
6	On-site Piping	lf	2,000	$70.00	$140,000
7	Roadbase (3-inch thick)	sf	4,748,100	$0.65	$3,086,265
8	6' Chain Link Fence[2]	lf	11,225	$16.00	$179,600
	Construction Subtotal				$8,372,355
	20% Construction Contingency				$1,674,471
	Total Construction Cost				$10,046,826
	Professional Services and Contingencies[3]				$4,018,730
	Total Project Cost				**$14,065,556**

[1] Excavated material to be disposed of on-site. Average basin depth of 8 feet. Estimated Recharge Capacity of **32,580 AF/Y** (usable site area x 3 feet/day x 150 days per year).

[2] Fencing around entire site, not individual recharge basins

[3] Estimated Project Cost factor of 1.4, which typically inlcudes: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. Escalation, financing, interest during construction, legal, land, R-O-W agent, and environmental impact reports costs are not included.


CHERRY VALLEY
NOBLE CREEK
RIVERSIDE COUNTY
SAN GORGONIO RIVER
Morongo Band of Mission Indians
BEAUMONT GROUND WATER BASIN
CITY OF BEAUMONT
CITY OF BANNING
CABAZON GROUND WATER BASIN
BANNING GROUND WATER BASIN
RIVERSIDE COUNTY
RIVERSIDE COUNTY
79
243
LEGEND
East Branch Extension (Existing)
24" Dia Beaumont Recharge Pipeline (Recently Constructed)
36" Dia. SGPWA Pipeline, Reach 1 (Proposed)
30" Dia. SGPWA Pipeline, Reach 2 (Proposed)
24" Dia. SGPWA Pipeline, Reach 3 (Proposed)
Beaumont Ground Water Recharge Basin (Proposed)
Cabazon Ground Water Recharge Basin (Proposed)
Groundwater Basins
Tribal Lands
City Boundary
PLATE 1
San Gorgonio Pass Water Agency Water Delivery and Storage Facilities
ALBERT A. WEBB ASSOCIATES
0 2,000 4,000 6,000
Feet
Map revised Sept. 5, 2014. G:\2009\09-0033\GIS\Plate1_PropFacilities_11x17.mxd


LEGEND
East Branch Extension (Existing)
36" Dia. SGPWA Pipeline, Reach 1
30" Dia. SGPWA Pipeline, Reach 2
ORCHARD ST
NOBLE CREEK
VINELAND ST
DUTTON ST
HIGH ST
CHERRY VALLEY BLVD
NOBLE ST
CHERRY AVE
JONATHAN AVE
WINESAP AVE
GRAND AVE
BELLFLOWER AVE
LINCOLN ST
DEERFIELD DR
BROOKSIDE AVE
PLATE 3
San Gorgonio Pass Water Agency Water Delivery and Storage Facilities
SGPWA Pipeline Reach 1
ALBERT A. WEBB ASSOCIATES
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Map revised Sept.. 5, 2014. G:\2009\09-0033\GIS\Plate3_Reach1.mxd

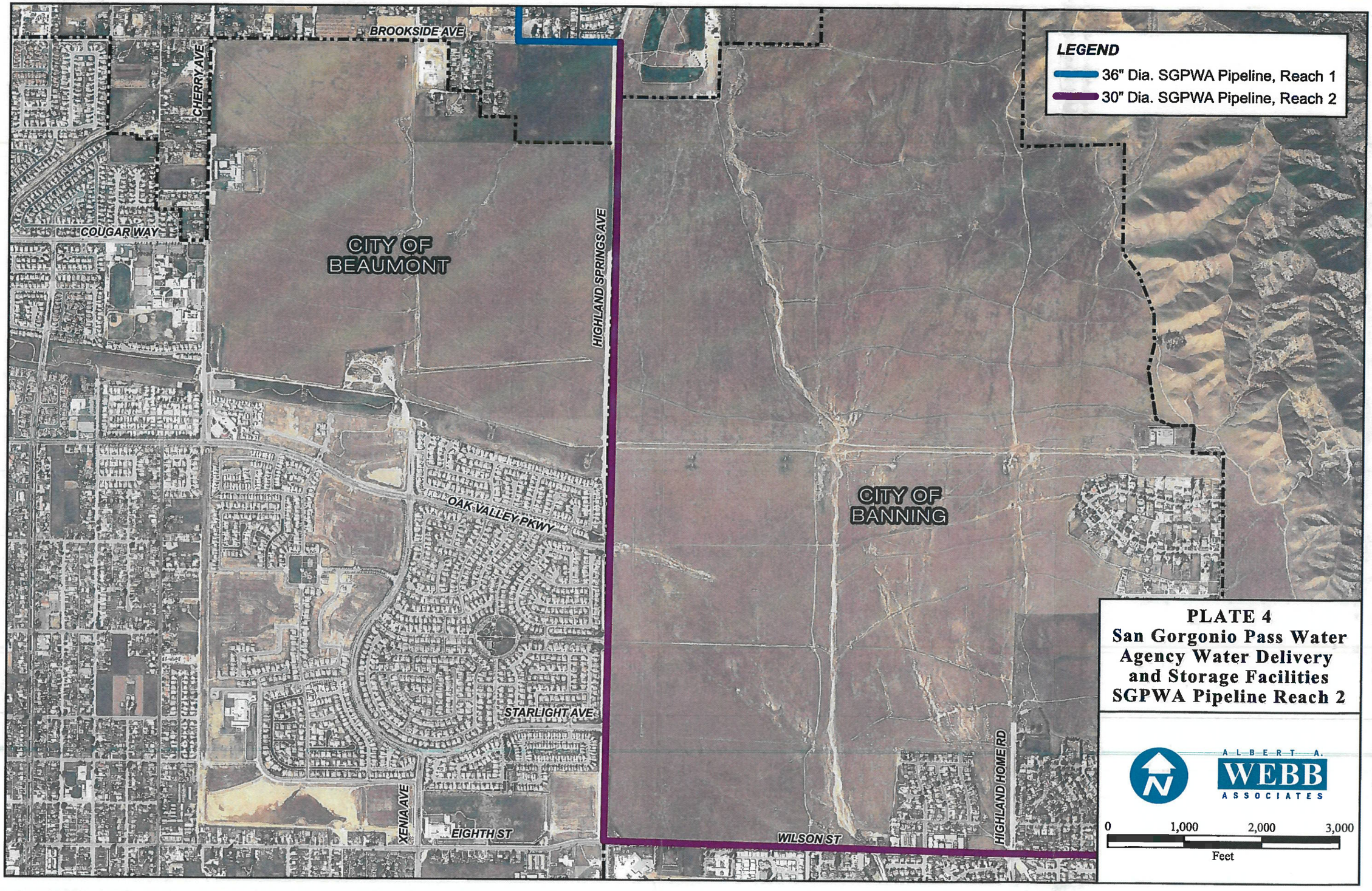

PLATE 4
San Gorgonio Pass Water Agency Water Delivery and Storage Facilities
SGPWA Pipeline Reach 2

ALBERT A. WEBB ASSOCIATES

Map revised Sept. 5, 2014. G:\2009\09-0033\GIS\Plate4_Reach2.mxd

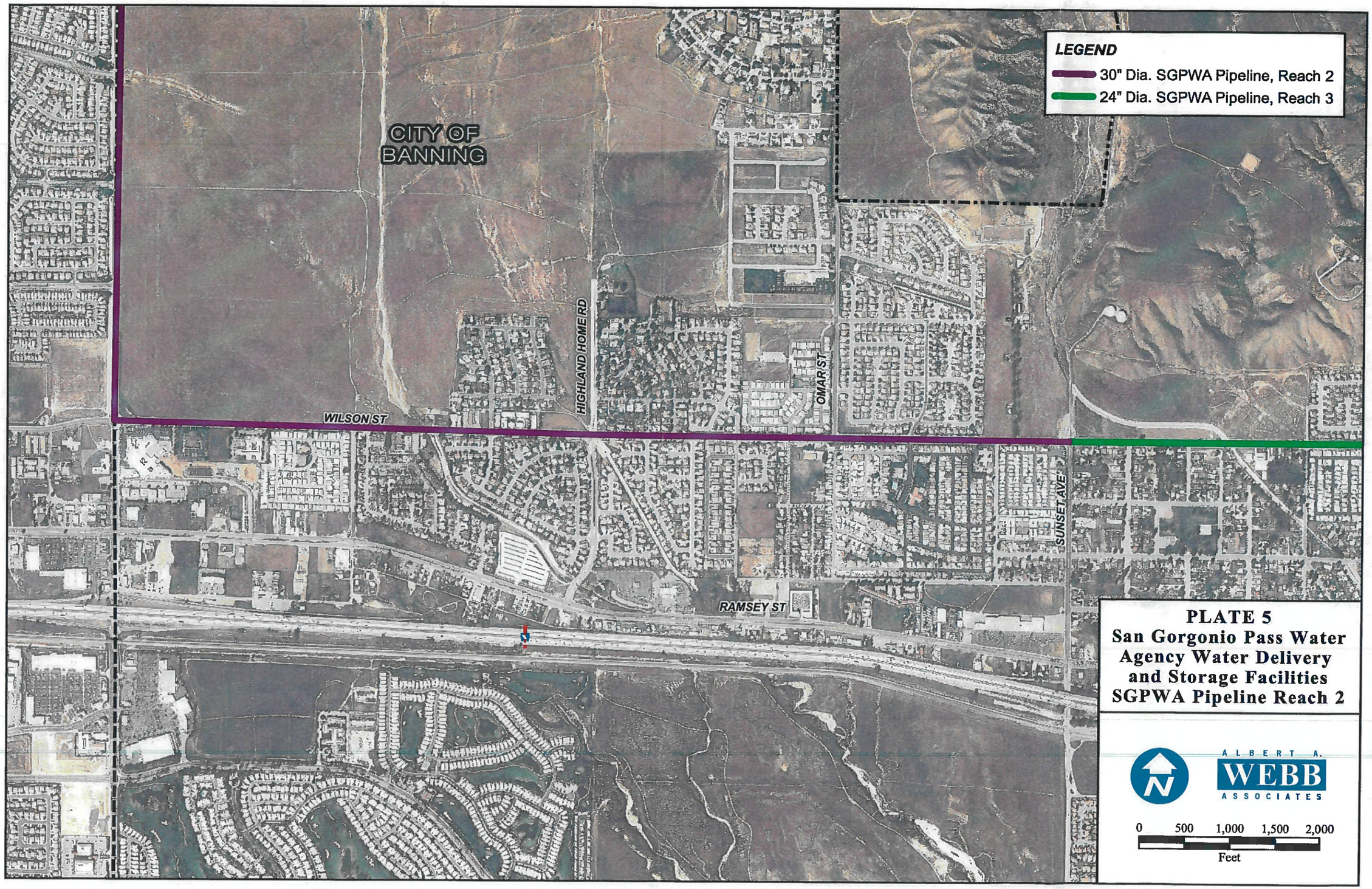

PLATE 5
San Gorgonio Pass Water Agency Water Delivery and Storage Facilities
SGPWA Pipeline Reach 2

ALBERT A. WEBB ASSOCIATES

Map revised Sept. 5, 2014. G:\2009\09-0033\GIS\Plate5_Reach2.mxd

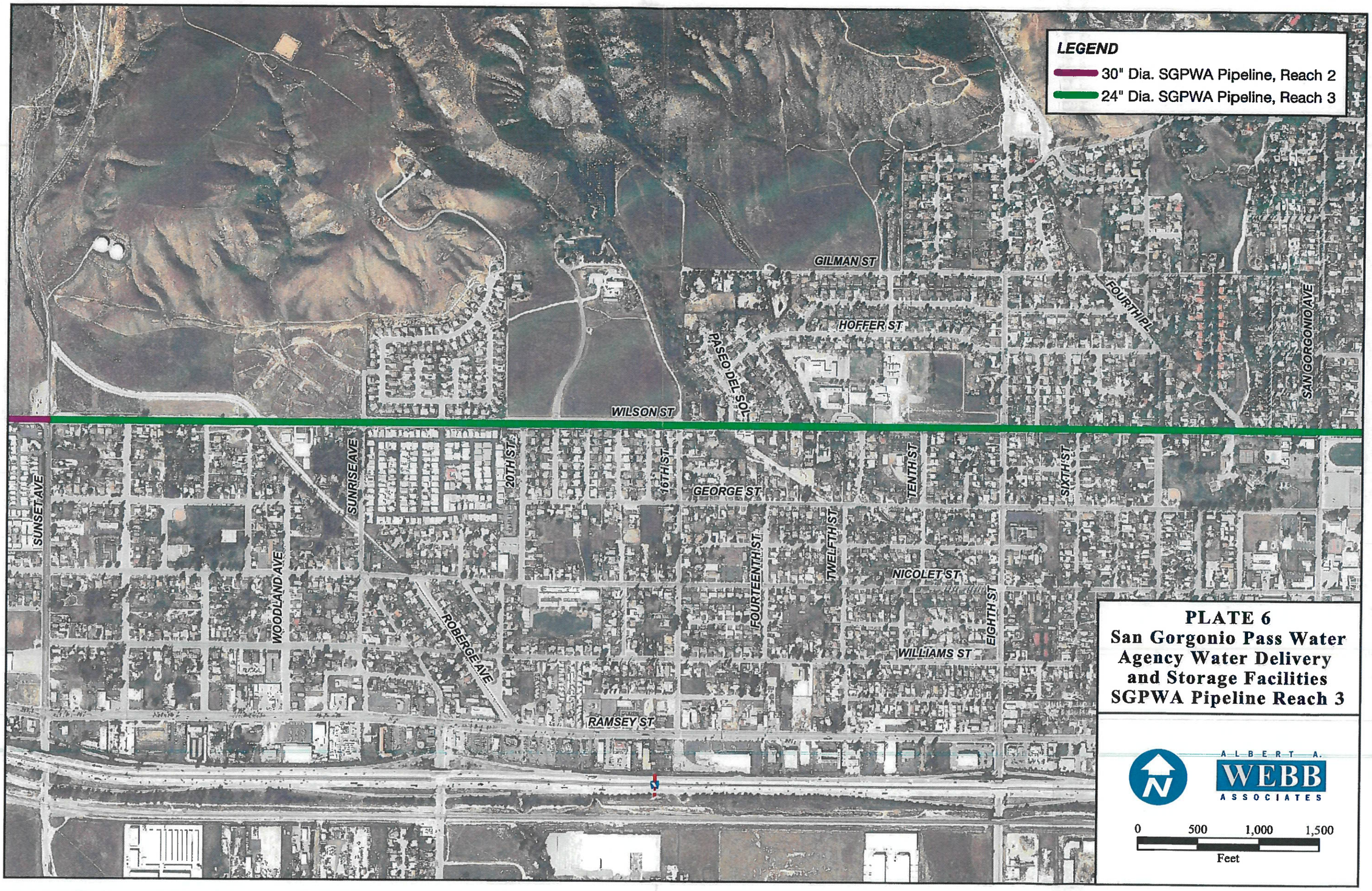

PLATE 6
San Gorgonio Pass Water Agency Water Delivery and Storage Facilities SGPWA Pipeline Reach 3

ALBERT A. WEBB ASSOCIATES

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Map revised Sept. 5, 2014, G:\2009\09-0033\GIS\Plate6_Reach3.mxd

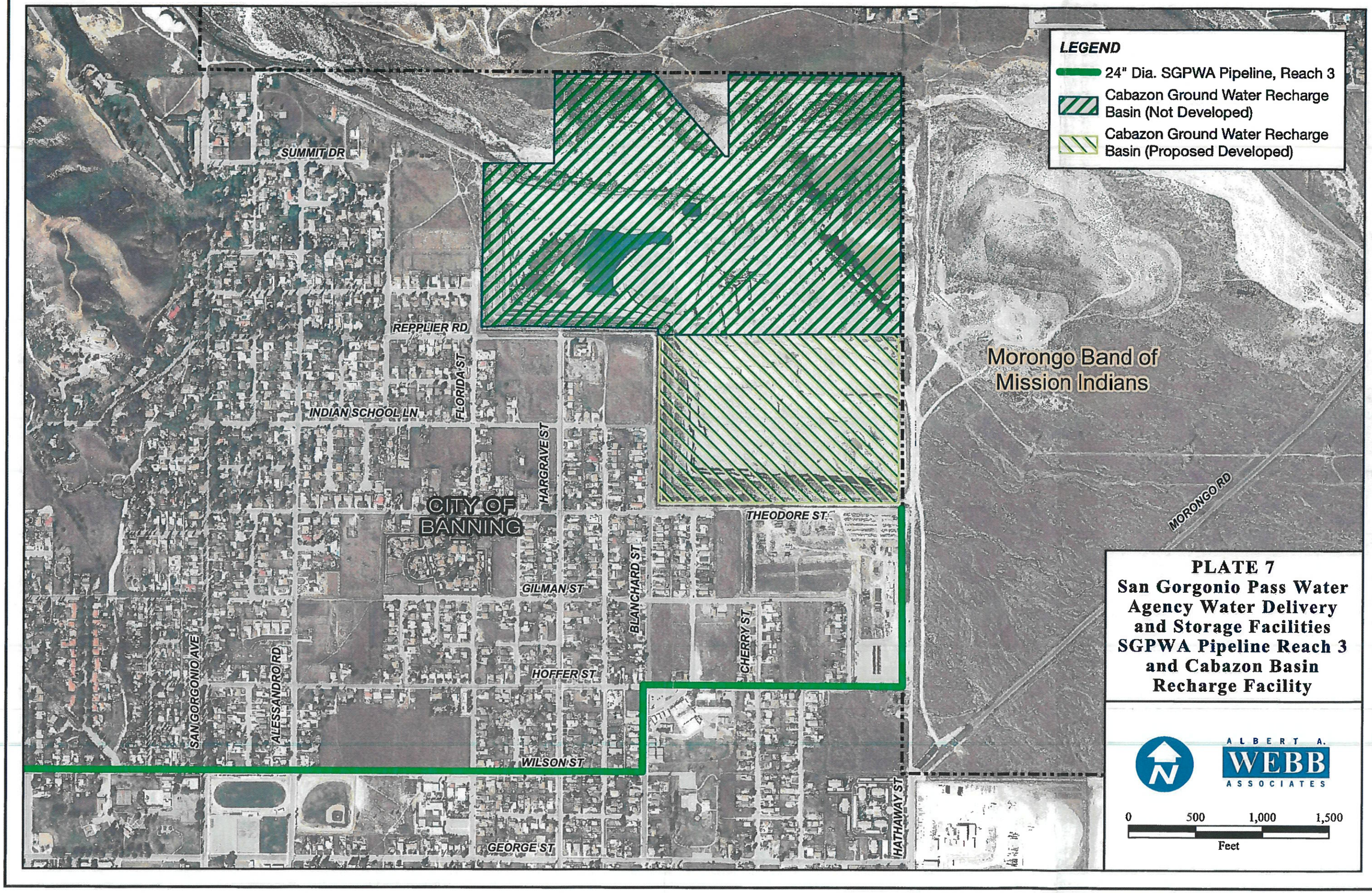


PLATE 7
San Gorgonio Pass Water Agency Water Delivery and Storage Facilities SGPWA Pipeline Reach 3 and Cabazon Basin Recharge Facility

ALBERT A. WEBB ASSOCIATES

0 500 1,000 1,500
Feet

Map revised Sept. 5, 2014. G:\2009\09-0033\GIS\Plate7_CabazonBasin.mxd

ALBERT A. WEBB ASSOCIATES

BACKBONE WATER SYSTEM FEASIBILITY STUDY

Prepared for

SAN GORGONIO PASS WATER AGENCY
Established 1961

OCTOBER 2021

www.webbassociates.com

ALBERT A. WEBB ASSOCIATES

Corporate Headquarters
3788 McCray Street
Riverside, CA 92506
951.686.1070

Palm Desert Office
74967 Sheryl Avenue
Palm Desert, CA 92260
951.686.1070

Murrieta Office
41870 Kalmia Street #160
Murrieta, CA 92562
T: 951.686.1070

WEBB Proposal: 014950

October 21, 2021

Lance Eckhart, PG, CHG
General Manager/Chief Hydrogeologist
SAN GORGONIO PASS WATER AGENCY
1210 Beaumont Ave.
Beaumont, CA 92223

RE: Proposal for the Feasibility Study for San Gorgonio Pass Water Agency Backbone Water System

Dear Mr. Eckhart:

Enclosed is Albert A. Webb Associates (WEBB) response to begin work on the Feasibility Study portion of the San Gorgonio Pass Water Agency (the Agency) Backbone Water System. Per our previous discussions, this Scope of Work is intended to begin the necessary engineering research, alignment analysis, groundwater basin site evaluation, and environmental constraints review. WEBB has consistently provided engineering support services to public sector clients throughout California since 1945. WEBB will commit the level of resources and expertise to provide a quality, responsive, and effectively managed project to meet the Agency's expectations.

We have assembled a project team of highly experienced engineers and hydrogeologist selected for this project. The proposal includes our project understanding, detailed Scope of Work, project team, and manpower and fee estimate. We are confident that we can leverage our past experience and knowledge of the Backbone Water System, which will help us in meeting the Agency's needs.

If you need to talk to me at any time or have any questions or require additional information, please call me at 951-686-1070.

Sincerely,

ALBERT A. WEBB ASSOCIATES

Sam I. Gershon, RCE
Senior Vice President

Table of Contents

SECTION 1 - PROJECT UNDERSTANDING

San Gorgonio Pass Water Agency (the Agency) is proposing to construct a Backbone Water System (Figure 1-1) consisting of four reaches to convey imported water to potential recharge facilities within the Banning and Cabazon Groundwater Basins. The conceptual locations of recharge facilities are the site of the Robertson's Ready Mix gravel pit in the Cabazon Groundwater Basin and a 20-acre parcel at an area southwest of the intersection of Sunset Avenue and Westward Avenue in the Banning Recharge Basin. The following is a description of the proposed alignments, facilities and other considerations affecting this project.

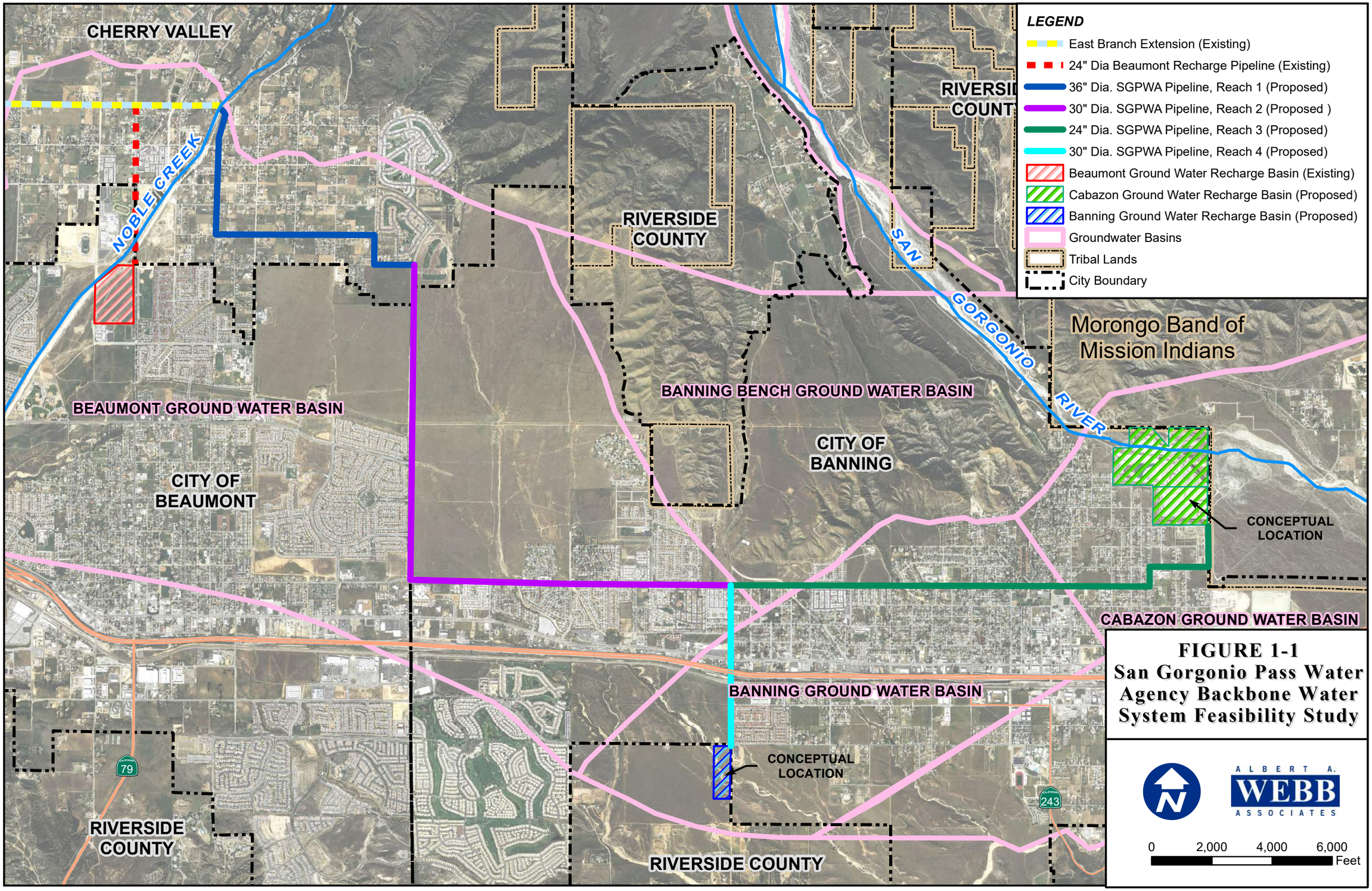
FACILITIES

Reach 1 Pipeline would be constructed entirely within the incorporated limits of Cherry Valley and consist of an approximately 12,000-feet, 36-inch pipeline to be connected to the existing East Branch Extension Pipeline at Orchard Street and Noble Street (west of Noble Creek). The pipeline would extend southward along Noble Street to Lincoln Street, and then eastward along Lincoln Street to Bellflower Avenue, where it would turn eastward to Brookside Avenue, where it turns eastward again to its terminus at N. Highland Springs Avenue.

Reach 2 Pipeline would be an approximately 22,000-feet, 30-inch pipeline that would be connected to the proposed Reach 1 at Brookside Avenue and N. Highland Springs Avenue. Reach 2 would extend southerly along N. Highland Springs Avenue to Wilson Street, then easterly along Wilson Street to its terminus at Sunset Avenue. The north-south alignment was assumed to be on southbound Highland Springs Avenue, which would place in in the City of Beaumont. If northbound Highland Springs Avenue were to be selected, the alignment would be placed in the City of Banning. There is a potential for a recharge facility in the City of Banning south of Interstate 10 southerly on Sunset Avenue within the Banning Groundwater Basin that could be supplied by Reach 2 through an extension southerly along Sunset Avenue (Reach 4 Pipeline).

Reach 3 Pipeline would be an approximately 19,000-feet, 24-inch pipeline that would be constructed mostly within the City of Banning and would extend from the eastern end of Reach 2 along Wilson Street at Sunset Avenue, and continue easterly along Wilson Street, then on Blanchard Street, Hoffer Street, and Hathaway Street. The portion of Hathaway Street appears to be within private property, which leads northerly onto the existing gravel pit, proposed to be Cabazon Recharge Facility.

Reach 4 Pipeline would be an approximately 5,300-feet, 24-inch pipeline that would be constructed within the City of Banning and would extend from the southern end of Reach 2 along Sunset Avenue at Wilson Street and continue southerly along Sunset Avenue to its terminus at Westward Avenue at a conceptual recharge basin.



Map revised Sept. 5, 2014. G:\2009\09-0033\GIS\Plate1_PropFacilities_11x17.mxd

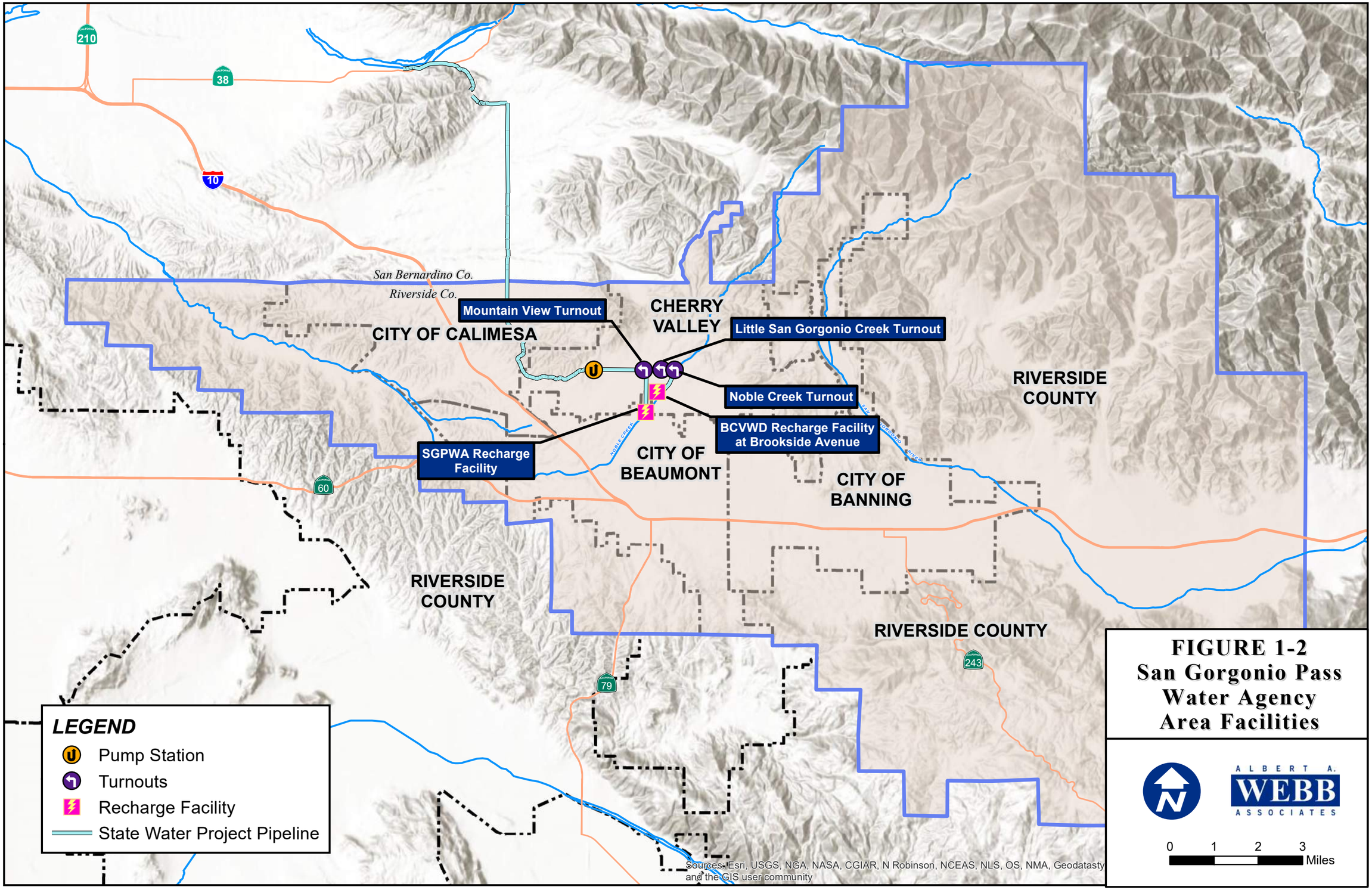
RECHARGE FACILITIES

The Cabazon Basin Recharge Facility concept was based on the SGPWA March 2005 "Cabazon Groundwater Recharge Project Feasibility Investigation Draft Report" prepared by Boyle Engineering. The "proposed developed" area is 54-acres or about 30 percent of the total excavated site. The gravel pit has been significantly excavated during the materials mining process, so nominal earth work would be required. Proposed improvements would include separation berms, site access roads, onsite piping, and onsite facilities. As this facility and location is conceptual, further hydrogeological evaluation will be performed.

The Banning Basin Recharge Facility concept was developed by Provost & Pritchard Consulting Group. For planning purposes, the recharge facility was conceptually located within a 20-acre undeveloped parcel located at the southwest area of the intersection of Sunset Avenue and Westward Avenue. Proposed improvements would include earthwork, separation berms, site access roads, onsite piping, and onsite facilities. Other factors, such as Montgomery Creek, which runs through the area, will need to be considered. If this area is not feasible due to Montgomery Creek, areas farther to the west should be considered. As this facility and location is conceptual, further hydrogeological evaluation will be performed.

HYDRAULICS

With pipeline reaches as far as Cabazon, proper water conveyance capacity is critical to the success of this project. Through the East Branch Extension (EBX), State Water Project (SWP) water is delivered to the Cherry Valley Pump Station, which then distributes the water to various turnout and recharge facilities (Figure 1-2). As this conveyance system terminates at the Noble Creek Turnout at Orchard Street and Noble Street, the Agency envisions constructing a 2- to 3-million-gallon tank east of Little San Gorgonio Ponds to allow the Agency operational flexibility, improved hydraulic control, more efficient operations of the Cherry Valley Pump Station, and to provide constant pressure at the turnout and future line extension, such as the "Backbone Water System." Therefore, a hydraulic understanding of the Agency's existing and planned systems is a key component to ensure the system has the proper conveyance capacities.



Last Saved: 10/12/2021 3:49:37 PM G:\Proposals\FORMAL PROPOSALS\San Gorgonio Pass Water Agency\014950 - Backbone Water System\GIS\Figure 1-2 SGPWA Facilities.mxd

INTERSTATE 10 BYPASS

At the request of the Agency WEBB conducted a cursory review of the Riverside County Transportation/Caltrans Interstate 10 (I-10) Bypass Project. Caltrans and the County of Riverside (County) proposed to construct a new two-lane roadway extending approximately 3.3 miles from the intersection of Hathaway Street and Westward Avenue in the City of Banning (City) east to the intersection of Bonita Avenue and Apache Trail in the unincorporated community of Cabazon, California (Figure 1-3). The Proposed I-10 Bypass is located partially within the jurisdiction of the County, the City, and the Tribal Lands. The new roadway and bridges would cross undeveloped land south of Interstate 10. Two alternative alignments (5 and 12) were under consideration, along with a No Action/No Project Alternative. The designation of a Locally Preferred Alternative is intended to convey the County's preferred alternative based on the information available prior to public review, including consideration of potential impacts and reasonable mitigation measures. After comparing and weighing the benefits and impacts of all feasible alternatives, the Lead Agency for CEQA (the County of Riverside) has identified Alternative 12 as the Locally Preferred Alternative. This project is much farther east of Reach 3 and the Cabazon Recharge Basin and provides little benefit to the Agency; therefore, the Agency should consider foregoing participation in the I-10 Bypass Project.

REPURPOSING EXISTING GAS MAINS

There may be potential conveyance facilities owned by energy companies that are in the abandonment or liquidation stage within the study area. An example of such a facility is a reported abandoned 12-inch diameter steel gas main within the Interstate 10 (I-10) and Oak Valley Parkway area. There may be an opportunity for the Agency to acquire this facility for a minimal cost and repurpose it for water transmission. Additionally, there are other potential pipeline facilities of similar characteristics that may be acquired and repurposed by the Agency. The advantages of repurposing, if feasible and strategic to the Agency's needs, are reducing environmental and construction impact, cost savings, as well as potential sustainable reuse of existing facilities which would have otherwise remained unused.

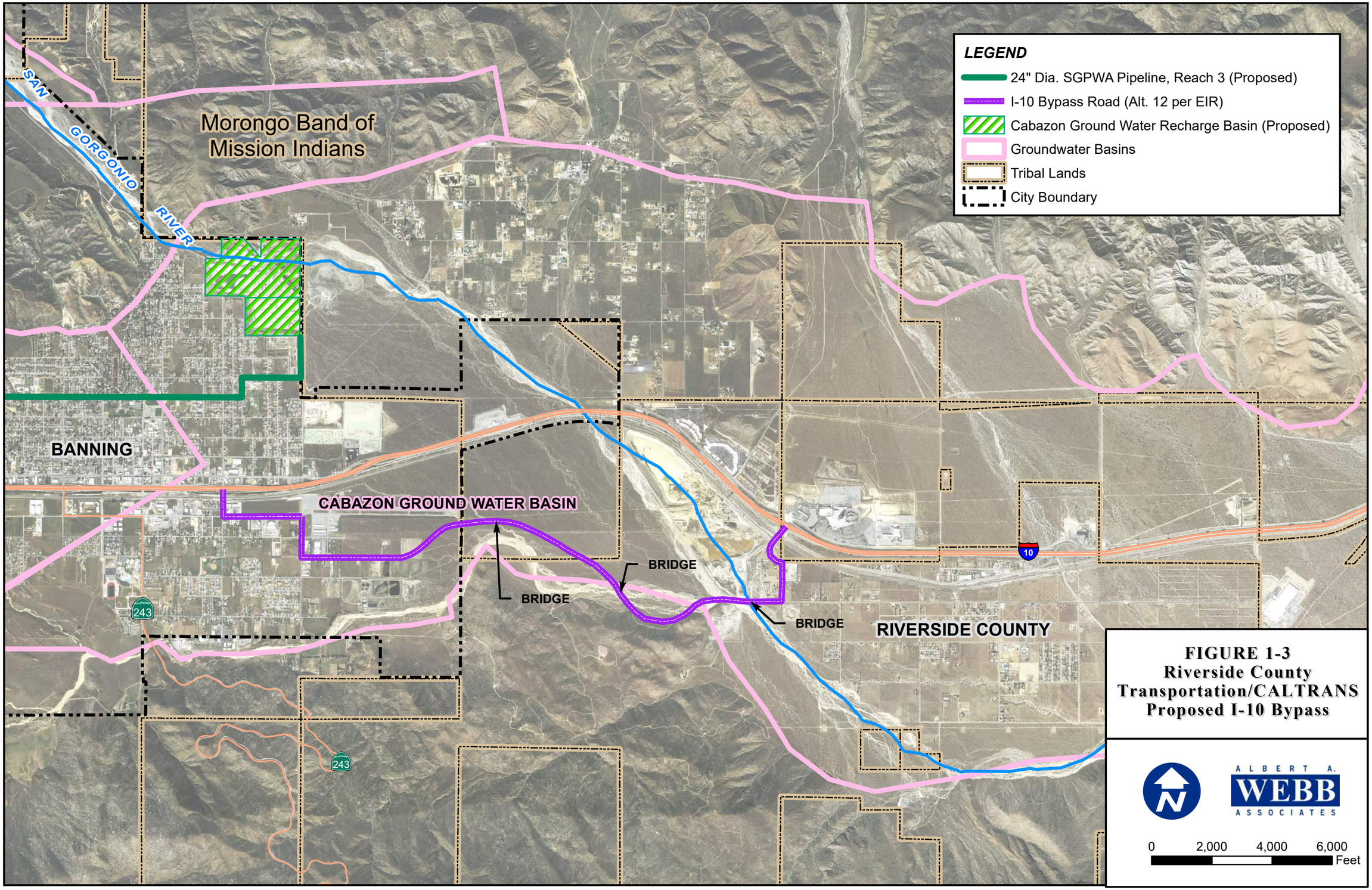


FIGURE 1-3
Riverside County Transportation/CALTRANS Proposed I-10 Bypass

ALBERT A. WEBB ASSOCIATES

0 2,000 4,000 6,000 Feet

Last Saved: 10/12/2021 1:29:20 PM G:\Proposals\FORMAL PROPOSALS\San Gorgonio Pass Water Agency\014950 - Backbone Water System\GIS\Figure 1-3 Proposed I-10 Bypass.mxd

SECTION 2 - SCOPE OF WORK

GENERAL

The purpose of this first Scope of Work, hereafter referred to as Feasibility Study for the Backbone Water System, is to begin the necessary engineering research, alignment analysis, groundwater basin site evaluation and environmental constraints analysis for the Backbone Water System. The ultimate aim of the Feasibility Study is to provide rationale to position the project for future Federal and State grant funding within a two- to five-year timeframe. Webb Associates (WEBB) and Provost & Pritchard will leverage and build on their previous work product on the project produced over more than a decade to ensure accurate and timely preparation of the Feasibility Study.

The Backbone Feasibility Study will focus on the initial tasks that need to begin right away in order for the project to be completed on time. This Feasibility Study Scope of Work is not intended to produce final deliverables but rather is intended to get certain project tasks moving while the final Preliminary Design scope and budget are worked out and approved. The proposed Preliminary Design Report will build off the work completed as part of this Feasibility Study and will produce a future Preliminary Design Report (PDR) and 20-30% design plans. The Scope of Work for the Feasibility Study is as follows:

PROJECT TASKS

The initial phase of the project will consist of commencement of the project and performing the preliminary design including review of the Agency's planning documents, hydraulic review, necessary utility research, easement and right-of-way research, field survey, and most importantly the practical construction methodology alternatives evaluation and establishment of the project design parameters.

Task 1. Coordination and Meetings

WEBB has budgeted time for meetings for the project with the Agency as well as coordination with other public entities affected by the project. WEBB will coordinate with City of Beaumont and Banning regarding pipeline placement within their respective right-of-ways. Caltrans and Union Pacific Railroad (UPRR) crossings will be identified and addressed. Additionally, WEBB will work with the Morongo Band of Mission Indians and Cabazon Water District for potential benefit of this project. In unincorporated areas, WEBB will coordinate with Riverside County. We have budgeted eight (8), two-hour meetings and additional meetings would require an increase in the budget.

Task 2. Utility Research and Survey

Project is a Backbone Water System consisting of four reaches, totaling approximately 58,300 feet of pipeline to convey imported water from the existing East Branch Extension Pipeline at Orchard Street and Noble Street (west of Noble Creek) to potential recharge facilities within the Banning and Cabazon Groundwater Basins. The conceptual locations of recharge facilities are the site of the Robertson's Ready Mix gravel pit in the Cabazon Groundwater Basin and a 20-acre parcel at an area southwest of the intersection of Sunset Avenue and Westward Avenue in the Banning Recharge Basin. Reach 1 (12,000 feet) will be constructed of 36-inch diameter pipe, Reach 1 (22,000 feet) will be constructed of 30-inch diameter pipe, Reach 3 (19,000 feet) will be constructed of 24-inch diameter pipe, and Reach 4 (5,300 feet) will be constructed of 24-inch diameter pipe.

The initial phase of the project will consist of commencement of the project and performing the necessary utility and right-of-way research and field survey within the project boundaries and most importantly establishment of the project design parameters.

a. **Utility Research –** WEBB will perform utility research in the project area to ascertain and summarize the various utilities and facilities potentially impacting the project. This data will be utilized for utility strip mapping for a future PDR; however, utilities will be plotted on typical street cross sections of key pipe segments for alignment evaluation purposes. WEBB will contact Underground Service Alert (USA) for a list of utility companies with facilities in the general project area through WEBB's internet connection with USA.

In addition to utility companies, WEBB will contact public agencies to obtain their atlas maps of their facilities, locations, size and depth within the project area. WEBB will review the project area in detail looking for additional evidence of underground utilities, such as pavement cuts and risers. Though not within the scope of the feasibility study, field verification and potholing of the utilities to verify the alignment corridor and confirm the final alignment will be conducted in the future Preliminary Design Report. Additionally, for the future construction phase, the contractor will be required to field verify utilities prior to trenching so that any conflict resolutions can be developed.

b. **Field Survey to Confirm Critical Crossings** – The survey will involve obtaining cross-section configurations at critical locations of crossings for determining the horizontal and vertical constraints of the pipeline reaches within the public right-of-way and or easements. Our survey team will provide field survey at critical locations of possible crossings, horizontal and vertical configurations. For this feasibility phase of the project, we have assumed 16 hours of field survey effort and associated office time. Additional survey will be

performed in the preliminary design phase for the PDR, which is beyond the Scope of Work of this proposal.

c. **Site Visit** – WEBB will perform a combination of Google Earth search and field visit to identify critical visible site features, such as utilities, streetlights, utilities, storm drains, catch basins, etc. that would impact pipeline design and construction. WEBB will document our findings with a photographic log.

d. **Coordination and Permitting –** WEBB will begin coordination efforts with agencies impacted regarding the requirements for encroachment permits for the applicable alignments. WEBB will get preliminary conditions such that cost estimates can be prepared. WEBB will list the anticipated permits necessary for the project.

Task 3. Alignment Study and Technical Memorandum

WEBB will assemble available plans and collected data along the alternative alignment. WEBB will begin evaluating the alternative alignments focusing on the critical crossings such as freeways, railroad, channels, and major street crossings. WEBB will be evaluating each practical construction corridor. The critical issues to be addressed during the Feasibility Study and construction are:

a. **Preliminary Alignment –** This task will focus on determining the alignment of the raw water pipeline reaches. WEBB will evaluate a few alternative alignments with criteria such as estimated construction costs, traffic impacts, major crossings, and permitting etc.

b. **Cost Estimates and Assessment Matrix –** WEBB will prepare a construction cost estimate for each reach of the alignment. WEBB will prepare an assessment matrix for other issues associated with each segment, such as traffic control, ROW acquisition, impact to the public, etc. Costs for each possible alignment will be totaled and a recommended alignment will be determined based on constructability and lowest cost. The cost of acquiring the proposed recharge basins is not part of this study however, preliminary cost basis of property will be estimated based on prior property acquisitions for recharge facilities as well as current Riverside County property assessments. The project's cost estimation efforts will be developed for a feasibility level review pursuant to AACE Recommended Practices, 56R-08, Cost Estimation Classification Matrix for Building and General Construction Industries, Estimate Class 4, which recommends 1% to 15% maturity level of project definition deliverables and a -20% (low) to +30% (high) expected accuracy range.

Task 4. Conveyance System Hydraulic Evaluation

WEBB will review and assemble available Agency record drawings and planning documents as they relate to the facilities' capacities as well as the Agency's delivery goals. WEBB will evaluate existing and future pumping capacity and head conditions, system hydraulic grades of the current and future system, site review of the tank site, as well as analysis of the need for future facilities and upgrades to existing facilities. The critical issues to be addressed are:

a. **Cherry Valley Pump Station –** This task will focus on evaluating the pump station's hydraulics for adequate capacity, hydraulic head conditions, and determining whether additional pumping capacity is needed

b. **Hydraulic Grade Line –** This task will focus on developing Backbone Water System preliminary pipeline grades, and compressed pipeline profile based on available data such as Google Earth. This data will be utilized to establish the hydraulic grade line of the Backbone Water System under various delivery scenarios, thus establishing the necessary hydraulic grade at the connection at Noble Creek (Reach 1).

c. **Tank Site Location –** To provide for constant pressure for the Agency's various turnout and recharge facilities, the Agency envisioned a 2- to 3-million-gallon storage tank close to the Noble Creek turnout. WEBB will review and reference available prior studies prepared by the Agency and incorporate the findings into this project.

Task 5. Project Formulation Assistance (Provost & Pritchard)

To assist in formulating project facilities, Provost & Pritchard (P&P) will provide advice on project needs and facility locations. This effort will include remote meetings with SGPWA, City of Banning and Cabazon Water District staff to discuss potential groundwater rechange basin development. Additionally, a field trip with SGPWA and USGS staff will be conducted to consider hydrogeologic factors that would affect future groundwater supplies. The assumptions identified will be reviewed with WEBB and SGPWA and documented in a technical report. The efforts by P&P will be on a time and material basis based on the project findings and direction. Critical issues to be addressed by P&P include:

a. **Project Sizing –** The Project sizing will depend on the quantities of additional demands forecast and facilities available for their use. General locations for additional supplies will be derived from available UWMP water demand projections and discussions with local retail water agencies. Local agency plans for additional facilities will be reviewed and the general locations of water supply shortfalls identified. The primary known potential local pinch-point is the Banning Storage Unit; however, the Cabazon Storage Unit is the

largest local area of potential development. Although no development was identified in recent UWMPs, the potential for future development will be discussed with local water agencies. In addition, this analysis will be conducted to evaluate sizing and lengths of pipeline reaches with the understanding that logical breaks may affect the analysis and findings.

b. **Climate Change Sensitivity –** The sensitivity of local groundwater sustainable yield to climate change will be considered along with the quantity of additional demand potentially required to offset any supply shortfalls.

c. **Effectiveness of Groundwater Recharge –** Data on soil characteristics will be reviewed to identify areas that are capable of effective groundwater recharge. Both conservative and more optimistic water demand projections will be developed that will indicate potential use beyond the current UWMP 2045 planning horizon.

d. **Hydrogeologic Evaluation –** Based on the needs evaluation performed by P&P, groundwater model projections will be prepared for multiple assumptions of facility location and future water use. It is assumed that eight groundwater model projections will be prepared that project the changes to groundwater from different project formulations at different locations. The projections will be based on additional water supplies from the East Branch Extension, that will be assumed to be available based on SWP operations studies or other studies (e.g., Sites Reservoir) of other supply sources. The projections will also consider the benefits of different amounts of recharge at different locations. It is expected that recharge from a new facility would occur at sites previously identified in reconnaissance studies (Banning Storage Unit and Robertson Gravel operation adjacent to the San Gorgonio River), along with other potential locations farther east in the Cabazon Storage Unit. The benefits of recharge at a more westerly versus a more easterly location in the Cabazon Storage Unit will be evaluated. Additionally, recharge from the Colorado River Aqueduct adjacent to the San Jacinto Tunnel East Portal will be considered for evaluation. The groundwater model projections will indicate projected groundwater levels relative to SGMA sustainable management criteria and identify their overall SGMA sustainability. The results of these studies will be presented to SGPWA and WEBB Associates for review and documented in a technical report.

Task 6. Groundwater Modeling

INTERA Geoscience & Engineering Solutions (INTERA) will be performing the following Groundwater Modeling Scope of Work in support of Provost & Pritchard in evaluating project alternatives for the San Gorgonio Pass Water Agency

Backbone Water System. INTERA has previously developed predictive scenarios for the San Gorgonio Pass Groundwater Sustainability Plan, that included a 2030s baseline scenario. Projected recharge volumes at the Noble Creek recharge facility for 2030s were provided by P&P which were used to estimate underflows from the model western boundary. Return flows and pumping data were updated based on data provided by P&P accordingly. Head values for boundary condition at the eastern boundary were estimated using the correlation between boundary heads and measured heads at the Whitewater River Recharge Facility. For the new project alternatives, all the packages except WEL and MNW will remain same as 2030s baseline scenario. The efforts by INTERA will be on a time and material basis based on the project findings and direction. Critical issues to be addressed by INTERA include:

a. **PMA-1: Noble Creek Additional Recharge –** This task will entail simulating additional recharge at the Noble Creek Facility and computing the model water budget and groundwater levels. Data provided by P&P will be processed for input to the MODFLOW WEL package and used to update the underflow boundary condition with the Beaumont Basin. For this task it is assumed that all other MODFLOW packages will not change and remain the same as 2030s Baseline Scenario.

b. **PMA2: Additional MBMI Pumping and Recharge –** This task will entail simulating additional Morongo Band of Mission Indians (MBMI) pumping and recharge and computing the model water budget and groundwater levels. Data provided by P&P will be processed for input to the MODFLOW MNW and WEL package. If needed, adjustment for underflow boundary condition with the Beaumont Basin will be made in WEL package as well. For this task it is assumed that all other MODFLOW packages will not change and remain the same as 2030s Baseline Scenario.

c. **PMA 3: New Banning Basin Recharge –** This task will entail simulating additional recharge at new Banning Basin Recharge Facility and computing the model water budget and groundwater levels. Data provided by P&P will be processed for input to the MODFLOW WEL package. If needed, adjustment for underflow boundary condition with the Beaumont Basin will be made in WEL package as well. For this task it is assumed that all other MODFLOW packages will not change and remain the same as 2030s Baseline Scenario.

d. **Cabazon Storage Unit Recharge from Colorado River Aqueduct –** This task will entail simulating additional Cabazon Storage Unit recharge off of Colorado River Aqueduct and computing the model water budget and groundwater levels. Data provided by P&P will be processed for input to the MODFLOW WEL package. If needed, adjustment for underflow boundary condition with the Beaumont Basin will be made in WEL package as well. For this task it is

assumed that all other MODFLOW packages will not change and remain the same as 2030s Baseline Scenario.

e. **Additional Cabazon Storage Unit Development and New Recharge –** This task will entail simulating additional Cabazon Storage Unit development and new recharge and computing the model water budget and groundwater levels. Data provided by P&P will be processed for input to the MODFLOW WEL package. If needed, adjustment for underflow boundary condition with the Beaumont Basin will be made in WEL package as well. For this task it is assumed that all other MODFLOW packages will not change and remain the same as 2030s Baseline Scenario.

f. **Additional Scenarios –** This task includes up to three additional scenarios, which may be modifications of the scenarios in Tasks 1-5. For each additional scenarios data which will provided by P&P will be processed for input to the MODFLOW WEL/MNW package. If needed, adjustment for underflow boundary condition with the Beaumont Basin will be made in WEL package as well. For this task it is assumed that all other MODFLOW packages will not change and remain the same as 2030s Baseline Scenario.

g. **Technical Memorandum –** Modeling approach and results for INTERA's Tasks above will be documented in a Technical Memorandum. INTERA will provide a draft technical memorandum for review and incorporate one round of review/revisions.

Task 7. Groundwater Modeling by Area Wastermaster

The Banning Area Watermaster has their own groundwater model. As there are potential recharge locations within the Banning Ground Water Basin, it is recommended to coordinate with the Banning Watermaster's consulting engineer to request modeling a recharge basin within the Banning Groundwater Basin. The cost associated with the additional modeling efforts by the Banning Area Wastermaster is not included in this proposal and would be directly contracted with the Agency.

Task 8. Repurposing Gas Mains

WEBB will coordinate with the owner of the 12-inch diameter steel gas main at the I-10 and Oak Valley Parkway area for the potential acquisition by the Agency and evaluate the feasibility to repurpose this pipeline for use by the Agency for water transmission. Additionally, WEBB will review CalGEM (California Geologic Energy Management Division, formerly DOGGR) for other facilities for potential reuse by the Agency. The critical issues to be addressed are:

a. **Strategic Facilities –** This task will focus on locating facilities strategically located and sized to benefit the Agency's needs for water transmission within their service area.

b. **Conversion to Water Transmission Pipeline –** WEBB will evaluate the feasibility and methodology for repurposing these facilities for water transmission such as cleaning, disinfection, lining, etc.

c. **Reconnaissance Level Project Summary –** WEBB will summarize the findings and potential project costs and feasibility at a reconnaissance level report for the Agency's review and consideration. The availability of these pipeline facilities is unknown, and the facilities, if identified, will be in varying states of salvageability. The efforts and budget for this task of the proposal is limited to a reconnaissance level review and further detailed evaluation may be required to attain a proof-of-concept level, which is beyond the scope of this proposal.

Task 9. Environmental Constraints Overview

WEBB's Planning and Environmental Services (PES) staff will prepare an environmental constraints overview to identify potential issues that may inform the location and design of the water pipeline.

a. **Review of Potential Areas of Concern –** PES staff will review existing references, including the General Plans and General Plan environmental impact reports (EIRs) for the cities of Beaumont, Banning, and County of Riverside, the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) survey area maps, National Wetlands Inventory, and California Department of Toxic Substances Control EnviroStor database to identify and map potential areas of environmental concern.

b. **Field Investigation –** PES staff will work collaboratively with the Design Team and SGPWA to help determine the most feasible alignment for this project. They will drive/walk the desired alignments to look for potential problems that could affect project construction, permitting, and cost.

c. **Report and Recommendations –** Based on the PES Team findings, WEBB will make a recommendation regarding the likely CEQA document for the project. The results of this effort will be summarized with accompanying maps and included as part of the feasibility study.

d. **Limitations –** This scope does not include preparation of any technical studies, cultural resources records searches, surveys for biological or cultural resources, or preparation of a CEQA document.

SECTION 3 - PROJECT TEAM

The WEBB project team is anticipated to be as follows:

NAME	PROJECT ROLE
Sam Gershon, R.C.E	Principal-in-Charge
Sinnaro Yos, P.E.	Project Manager
Stephanie Standerfer	Environmental Constraints
Michael Johnson, LLS	Land Survey & Mapping

SUBCONSULTANT	
Provost & Pritchard	Hydrogeologic Evaluation
INTERA Geoscience & Engineering	Groundwater Flow Modeling

SECTION 4 - MANPOWER AND FEE ESTIMATE

FEE SUMMARY

WEBB is committed to providing the highest quality service to the Agency and to provide quality engineering services for the Agency's Backbone Water System Feasibility Study. After preparing a detailed Scope of Work for this project, we have included all the necessary items required to successfully complete it and believe our team experience will generate an efficient processing of the project deliverables. Based upon the project's Scope of Work a summary of our engineering services budget is as follows:

ENGINEERING SERVICES TASK	TOTAL ESTIMATED[1] SERVICES BUDGET
Task 1 – Coordination and Meetings	$ 14,140
Task 2 – Utility Research and Survey	$ 25,036
Task 3 – Alignment Study	$ 15,620
Task 4 – Conveyance System Hydraulics	$ 9,060
Task 5 – Hydrogeologic Evaluation	$ 36,295
Task 6 – Groundwater Modeling	$ 43,793
Task 7 – Banning Watermaster Groundwater Modeling	$ 0[2]
Task 8 – Repurposing Gas Mains	$ 9,210
Task 9 – Environmental Constraints Overview	$ 9,510
Task 10 – Feasibility Report	$ 19,620
Task 11 – Expenses	$ 3,716
Total Fee Engineering Services	**$ 186,000**

A detailed man-hour breakdown of the engineering services budget is included.

[1] Tasks 1 through 11 will be on a time and material basis.

[2] San Gorgonio Pass Water Agency will contract directly with the Banning Watermaster with regards to Task 7.

ALBERT A. WEBB ASSOCIATES

Backbone Water System Feasibility Study
San Gorgonio Pass Water Agency

Item	Description	Sam Gershon	Joseph Caldwell	Bradley Sackett	Sinnaro Yos	Sean Chotikasatien	William Stewart	Teresa DeShazer	Stephanie Standerfer	Cheryl DeGano	Autumn DeWoody	Chandler Drachslin	Michael Johnson	Jon Ros	Jordan Moretti	Matthew Sievers	Total Hours	Subtotal - Labor	Sub-consultant budget	Expenses	Total/task[1]
Task 1	**Coordination and Meetings**	**16**	**8**	**4**	**20**	**4**		**8**									**60**	**$ 14,140**	**$ -**	**$ -**	**$ 14,140**
1.1	Coordination and Meetings	16	8	4	20	4		8									**60**	$ 14,140	$ -		**$ 14,140**
Task 2	**Utility Research and Survey**	**14**	**4**	**4**	**28**	**16**	**8**	**18**					**2**	**2**	**6**	**16**	**118**	**$ 25,036**	**$ -**	**$ -**	**$ 25,036**
2.1	Utility Research & Data Collection	2			4	8	8	8									**30**	$ 4,880	$ -		**$ 4,880**
2.2	Field Survey and Mapping	2			4			2					2	2	6	16	**34**	$ 8,236	$ -		**$ 8,236**
2.3	Preliminary Field Walk	2			8	8											**18**	$ 3,700	$ -		**$ 3,700**
2.4	Coordination and Permitting	8	4	4	12			8									**36**	$ 8,220	$ -		**$ 8,220**
Task 3	**Alignment Study**	**8**	**6**	**8**	**18**	**12**	**16**	**8**									**76**	**$ 15,620**	**$ -**	**$ -**	**$ 15,620**
3.1	Preliminary Alignment	4	3	4	10	6	16	4									**47**	$ 9,285	$ -		**$ 9,285**
3.2	Cost Estimate and Assessment Matrix	4	3	4	8	6		4									**29**	$ 6,335	$ -		**$ 6,335**
Task 4	**Conveyance System Hydraulics**	**3**		**6**	**12**	**12**	**12**										**45**	**$ 9,060**	**$ -**	**$ -**	**$ 9,060**
4.1	Cherry Valley Pump Station Capacity	1		2	4	4											**11**	$ 2,400	$ -		**$ 2,400**
4.2	Hydraulic Grade Evaluation	1		2	4	8	12										**27**	$ 4,880	$ -		**$ 4,880**
4.3	Tank Site Evaluation	1		2	4												**7**	$ 1,780	$ -		**$ 1,780**
Task 5	**Hydrogeologic Evaluation**		**1**		**4**				**2**								**7**	**$ 1,795**	**$ 34,500**	**$ -**	**$ 36,295**
5.1	Hydrogeolgy by Provosit & Pritchard																	$ -	$ 34,500		**$ 34,500**
5.2	Oversee Consultant		1		4				2								**7**	$ 1,795	$ -		**$ 1,795**
Task 6	**Groundwater Modeling**		**1**		**4**				**2**								**7**	**$ 1,795**	**$ 41,998**	**$ -**	**$ 43,793**
6.1	Modeling by Intera Geoscience																	$ -	$ 41,998	$ -	**$ 41,998**
6.2	Oversee Consultant		1		4				2								**7**	$ 1,795	$ -		**$ 1,795**
Task 7	**Area Watermaster Modeling**																	**$ -**	**$ -**	**$ -**	**$ -**
7.1	Area Watermaster Groundwater Modeling																	$ -	$ -	$ -	**$ -**
Task 8	**Repurposing Gas Mains**	**2**	**2**	**4**	**12**	**16**	**8**	**4**									**48**	**$ 9,210**	**$ -**	**$ -**	**$ 9,210**
8.1	Repurposing Gas Mains	2	2	4	12	16	8	4									**48**	$ 9,210	$ -	$ -	**$ 9,210**
Task 9	**Environmental Constraints Overview**	**2**			**2**				**8**	**4**	**16**	**12**					**44**	**$ 9,510**	**$ -**	**$ -**	**$ 9,510**
9.1	Environmental Constraints Overview	2			2				8	4	16	12					**44**	$ 9,510	$ -		**$ 9,510**
Task 10	**Feasibility Report**	**8**	**4**	**12**	**16**	**24**	**12**	**20**				**8**					**104**	**$ 19,620**	**$ -**	**$ -**	**$ 19,620**
10.1	Feasibility Report	8	4	12	16	24	12	20				8					**104**	$ 19,620	$ -		**$ 19,620**
Task 11	**Expenses**																	**$ -**	**$ -**	**$ 3,716**	**$ 3,716**
11.1	Expenses																	$ -	$ -	$ 3,716	**$ 3,716**
Total		**53**	**26**	**38**	**116**	**84**	**56**	**58**	**12**	**4**	**16**	**20**	**2**	**2**	**6**	**16**	**509**	**$ 105,786**	**$ 76,498**	**$ 3,716**	**$ 186,000**

1. Rounded to the nearest $1.

SECTION 5 - PROJECT SCHEDULE
BACKBONE WATER SYSTEM FEASIBILITY STUDY

ID	Task Name	Duration	Start	Finish
1	**SGPWA Backbone Water System Feasibility**	**20 wks**	**12/1/21**	**4/19/22**
2	**Project Authorization**	**0 wks**	**12/1/21**	**12/1/21**
3	**Coordination and Meetings**	**4 wks**	**12/1/21**	**12/28/21**
4	**Pipeline Reach Alignment Study**	**9 wks**	**12/1/21**	**2/1/22**
5	Utility Research and Data Collection	7 wks	12/1/21	1/18/22
6	Alignment Review and Field Visit	1 wk	12/29/21	1/4/22
7	Field Survey and Mapping	2 wks	1/5/22	1/18/22
8	Preliminary Alignment and Cost Estimate	2 wks	1/19/22	2/1/22
9	**Conveyance System Hydraulics**	**3 wks**	**1/5/22**	**1/25/22**
10	Hydraulic and Capacity Evaluation	2 wks	1/5/22	1/18/22
11	Tank Site Evaluation	1 wk	1/19/22	1/25/22
12	**Hydrogeologic Evaluation**	**6 wks**	**12/1/21**	**1/11/22**
13	Recharge Basing Site Evaluation	3 wks	12/1/21	12/21/21
14	Groundwater Modeling	3 wks	12/22/21	1/11/22
15	Area Watermaster Groundwater Modeling	3 wks	12/22/21	1/11/22
16	**Repurposing Gas Mains Evaluation**	**6 wks**	**12/1/21**	**1/11/22**
17	12-inch Gas Main Evaulation	2 wks	12/1/21	12/14/21
18	Identify Potentical Facilities CalGEM	2 wks	12/15/21	12/28/21
19	Reconnaissance Level Summary	2 wks	12/29/21	1/11/22
20	**Environmental Constraints Overview**	**4 wks**	**1/5/22**	**2/1/22**
21	Constraints Analysis	4 wks	1/5/22	2/1/22
22	**Feasiblity Report**	**11 wks**	**2/2/22**	**4/19/22**
23	Draft Report	6 wks	2/2/22	3/15/22
24	Agency Review	3 wks	3/16/22	4/5/22
25	Final Draft	2 wks	4/6/22	4/19/22