7

Land Surveying & Mapping

Throughout our history, surveying has been an intrinsic part of our services. JBA has completed large, challenging survey projects throughout the west, including the complete survey of the Chavez Ravine in Los Angeles (the home of the L.A. Dodgers Stadium), a 110-mile boundary retracement survey of Edwards Air Force Base, design and construction surveying for 70 miles of water transmission main lines in the City of Phelan in the High Desert, a hydrographic survey of Los Angeles Harbor for the Department of the Navy, and a two-year surveying contract with the U.S. Army Corps of Engineers for various projects in California, Nevada, and Arizona.

Recently, JBA's survey personnel have completed a handful of unique projects, including a GPS survey of a U.S. Marine Corps base in the High Desert of California, project management for the surveying of two airports in Canada, and surveys of various crossing points along the California Aqueduct. Many of these recent projects have also been assisted with relatively new technologies such as Geographic Information Systems (GIS) spatial data analysis and cataloguing.

JBA is also contracted to provide on-call surveying services for various municipalities, including the **City of San Bernardino**, **City of Loma Linda**, and the **San Bernardino Unified School District (SBUSD)**. These contracts have helped solidify the excellent working relationships JBA already enjoys with these municipalities and have established JBA's reputation as operating some of the most well-respected and competent survey crews in Southern California. This reputation is reflected in our extensive list of repeat residential, industrial/commercial, and public works clients who call upon JBA to provide surveying services for all of their projects.

Our President, **Edward J. Bonadiman, P.L.S.**, is a Licensed California Surveyor and is a Corporate Member and Past President of the California Land Surveyor's Association (San Bernardino/Riverside Chapter). Mr. Bonadiman is the Manager of our Survey Department.

Brief descriptions of the major Land Surveying and GPS services provided by JBA are discussed on the following pages, and include the following:

- Survey Control Networks
- Topographic Surveys
- Boundary Surveys
- Records of Survey
- Design Surveys
- Construction Surveys
- Hydrographic Surveys
- ALTA/ACSM Surveys
- Tentative/Final Parcel/Tract Maps
- Mining Surveys
- Mine Limit Monuments (MLMs)
- Stockpile Quantities
- Aerial Mapping
- Project Management

Primary Land Surveying & GPS Services

- **Survey Control Networks**

Sophisticated control networks are established by JBA to "tie down" a property and provide the backbone for all subsequent survey activities.

- **Topographic Surveys**

JBA uses conventional equipment and GPS to construct topographic maps illustrating the existing characteristics of a site, including topographic contours, natural features, vegetation and trees, buildings, roadways, utilities, and associated elevation and attribute data. These topographic surveys provide the basis for all subsequent project site design and engineering.

- **Boundary Surveys & Records of Survey**

A Boundary Survey is developed to physically locate a client's deed on the ground. If the property has been previously surveyed, JBA retraces the survey, finds existing monuments (property corners) and/or replaces missing monuments, and provides a map of the survey. If the property has not been surveyed previously, JBA establishes property corners and prepares/files a Record of Survey with the appropriate county.

- **Design Surveys**

Design Surveys are prepared to provide a base drawing for use by engineers and architects. They illustrate the physical features and constraints affecting development of a site. Design Surveys generally include boundary re-establishments, easement locations, man-made and natural features, elevations, contours, and utility locations. Specific items can be omitted or added as appropriate for each individual project.

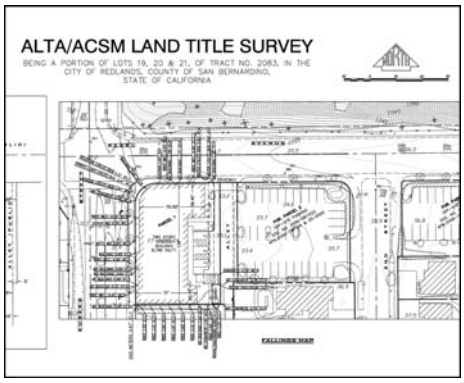
- **Construction Surveys**

JBA has extensive construction survey experience. We provide rough and finish grade staking for all phases of construction and as-builts of completed work. We frequently deploy teams using GPS and total stations for large-scale mass grading and detailed concrete slabs.

- **Hydrographic Surveys**

JBA utilizes GPS with sophisticated sonar sounding equipment to measure the bottom of water bodies. Mining quarries that have been excavated below the water table are also surveyed using this method.

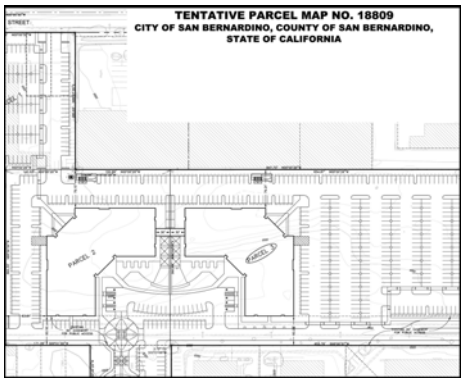
- **ALTA/ACSM Surveys**



The *ALTA/ACSM Land Title Survey Standards* have been jointly adopted by the *American Land Title Association (ALTA)* and the *American Congress on Surveying and Mapping (ACSM)*. These standards were developed as a collective effort in order to create an accepted and recognized legal document that presents particular information in detail and exactness for acceptance by title insurance companies. ALTA/ACSM

Land Title Surveys are recommended for commercial transactions in which extended coverage is required and/or where extremely detailed information is needed.

- **Tract & Parcel Maps**



Various methods are used for the subdivision of real property, including Tract Maps, Parcel Maps, Parcel Map Waivers, Lot Line Adjustments, and Gift Deeds. JBA provides surveys to locate existing improvements for the preparation of these subdivisions and associated documentation.

- **Mining Surveys**

Mining Surveys are used to establish the surface locations and boundaries of mining claims. During mining or tunneling operations, the Mining Survey helps to establish the location of underground operations horizontally and vertically, lay out shaft connections, and guide tunneling. This is three-dimensional traversing, not essentially different from surface surveying.

- **Mine Limit Monuments (MLMs)**

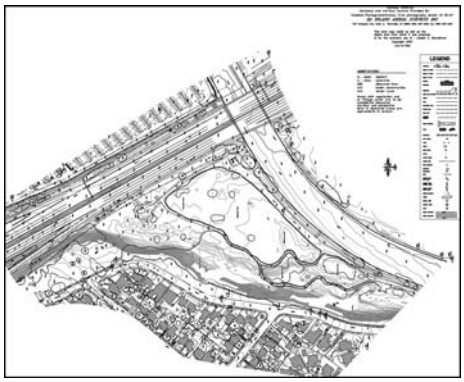
JBA has developed a monumentation process to assist plant managers in controlling the mining limits of their respective plant sites:

1. The plant boundary is established in the field and drawn in AutoCAD. Once the boundary is completed, the project mining limit is calculated and inserted into the AutoCAD drawing. Major angle points and specific distances along the curves and straight lines are then monumented.
2. Temporary points are set and "tied out", and the final monuments are set.
3. Once the concrete has dried, the survey crew will return and locate final positions. These positions are read electronically into a custom database that provides the client with a detailed report on their particular mining operation.

- **Stockpile Quantities**

Stockpile quantities in the mining industry equate to significant bottom-line dollars. JBA relies on proven methods for obtaining necessary field measurements and building complicated, detailed Digital Terrain Models (DTMs) to assist in quantifying and managing stockpiles.

- **Aerial Mapping**



A significant amount of topographic mapping is done by means of aerial photogrammetry, which uses stereoscopic pairs of photographs taken from aircraft and, more recently, from artificial earth satellites. Horizontal and vertical ground surveys must appear in the photographs. These photos are then reconstituted into stereo models for drafting true-scale maps. Precise cameras are required, and precision-

mapping equipment is used to depict natural and artificial objects in true position and to show true elevations for all points in the mapped area.

JBA incorporates sophisticated network designs to ensure accurate aerial target positions for aerial survey projects.

Client References (Partial List)

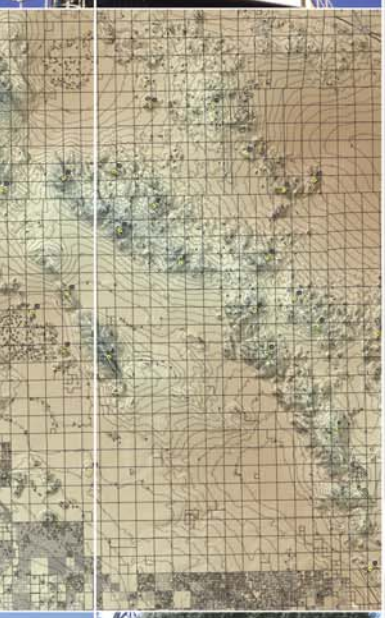
We invite you to contact the following clients, or others referenced in our project abstracts, regarding our Land Surveying and GPS capabilities and technical expertise:

Client/Address	Contact
City of Loma Linda 25541 Barton Road Loma Linda, CA 92354	**T. Jarb Thaipejr, P.E.** Public Works Director 909 / 799-4401
City of San Bernardino 300 North "D" Street San Bernardino, CA 92418	**Michael Grubbs, P.E.** City Engineer 909 / 384-5057, x3305
San Bernardino Unified School District 777 North "F" Street San Bernardino, CA 92410	**Jorge C. Mendez** Assistant Director 909 / 381-1238, x4913
San Bernardino Valley Municipal Water District (SBVMWD) 1350 South "E" Street San Bernardino, CA 92408	**Robert Tincher, P.E.** Manager of Engineering 909 / 384-5057, x3305
East Valley Municipal Water District (EVMWD) 3654 East Highland Avenue, Suite 18 Highland, CA 92346-2607	**Robert Martin** General Manager 909 / 888-8986
DMC Design Group 140 North Maple Street, Suite 104 Corona, CA 92880	**David M. Cosper, P.E.** Owner & President 951 / 549-8100
Joseph Nicholas Homes 341 West 2nd Street San Bernardino, CA 92401	**Nicholas Coussoulis** Owner & President 909 / 381-0868
Victory Homes 25 North Santa Anita Avenue, Suite A Arcadia, CA 91006	**Austin Richey** Project Manager 626 / 574-9453
Harwood Homes, Inc. 26635 Agoura Road, Suite 205 Calabasas, CA 91302	**Jeff Hirsch** President 818 / 999-3730
Dynamic Homes 1050 Lake Drive, Suite 150 West Covina, CA 91790	**Henry Melendez** Owner & President 626 / 931-1411

Project Experience (Partial List)

The select projects listed below are indicative of JBA's Land Surveying and GPS experience. Select example projects are also discussed in greater detail in the abstracts following this section.

Project Description*	Project Location	Client
Ongoing Contract to Provide Topographic Survey Services	San Bernardino, CA	San Bernardino Unified School District (SBUSD)
Ongoing Contract to Provide Survey Services for Various Improvement Projects	San Bernardino, CA	City of San Bernardino
Ongoing Contract to Provide Survey Services for Various Improvement Projects	Loma Linda, CA	City of Loma Linda
GPS Survey for Marine Corps Base	San Bernardino County, CA	Sensis Corporation
Aerial Survey for 660-Acre Lakes & Streams Project	San Bernardino County, CA	San Bernardino Valley Municipal Water District (SBVMWD)
Boundary Survey, Mapping & Construction Staking for Metrolink Blue Line Extension	Los Angeles County, CA	Los Angeles Metropolitan Transit Authority
Boundary Survey & Construction Staking for Metrolink Blue Line Extension	Los Angeles County, CA	Los Angeles Metropolitan Transit Authority
On-Site Control & Design/Construction for Sewer Main Line & Sewer Treatment Plant Leech Fields	Baker, CA	Baker Community Services District
Mariano Rancho Boundary Survey (3,400 Acres)	Ventura, CA	Southbay Engineers
Cadiz Valley Agricultural Project (2,240 Acres) Vertical/Aerial Control, Boundary Survey, Subsidence Survey, & Construction Staking	Cadiz, CA	Cadiz Incorporated
Preliminary Control & Construction Staking for New Highland City Hall	Highland, CA	City of Highland
Preliminary Topographic Survey for Timber Creek Channel	San Bernardino, CA	San Bernardino County Flood Control District (SBCFCD)
Construction Staking for Pilot Spreading Basins Along the Colorado River Aqueduct	Chuckwalla Valley, CA	Geopen/Metropolitan Water District (MWD)
Construction Staking for New K-Mart Distribution Center	Ontario, CA	Canyon Ridge Contractors
Aerial Survey Control for 2,000-Acre Future Black Bench Mountain Residential Development	Banning, CA	Proactive Engineering Consultants
Aerial Survey Control & Boundary Survey for 500-Acre Future Anderson Ranch Residential Development	Moreno Valley, CA	Highland Fairview Properties
Preliminary Topographic Cross Sections & Delineations of Future Heacock Street Right-of-Way	Moreno Valley, CA	DMC Design Group
Construction Staking for All On-Site & Off-Site Improvements for New Apple Valley Plaza	Apple Valley, CA	Apple Valley Consultants



Project Description*	Project Location	Client
Construction Staking for All On-Site & Off-Site Improvements for Tremont Ranch Residential Subdivision (19 Lots)	Redlands, CA	Dynamic Homes
Construction Staking for All On-Site & Off-Site Improvements for Vista Chino Apartments	Desert Hot Springs, CA	Adolfson-Peterson Construction
Construction Staking for All On-Site Improvements for Mission Hills Community Church	Rancho Santa Margarita, CA	Diffenbaugh Contractors
Construction Staking for All On-Site & Off-Site Improvements for Rosedale Estates Residential Subdivision (36 Lots)	Colton, CA	Victoria Homes
Construction Staking for All On-Site & Off-Site Improvements for Tract 13630 Residential Subdivision (34 Lots)	San Bernardino, CA	Harwood Homes
Construction Staking for All On-Site & Off-Site Improvements for Mockingbird Canyon Estates Residential Subdivision (31 Lots)	County of Riverside, CA	Joseph Nicholas Homes
Construction Staking for All On-Site & Off-Site Improvements for Tract 12712 Residential Subdivision (54 Lots, Four Phases)	Victorville, CA	Joseph Nicholas Homes
Construction Staking for All On-Site & Off-Site Improvements for Tracts 16777 & 16778 Residential Subdivision (107 Lots Combined)	Victorville, CA	Victory Homes
Construction Staking for All On-Site & Off-Site Improvements for Tract 29168 (Orange Grove Estates) Residential Subdivision (32 Lots)	Highgrove, CA	Victoria Homes
Construction Staking for All On-Site & Off-Site Improvements for Tract 16436 Residential Subdivision (17 Lots)	Chino, CA	JWDA Architecture

***Note:** Project Descriptions are summaries only and do not necessarily list all services provided.*

Technical Capabilities & Equipment

Our Survey Department's extensive technical capabilities and equipment include:

- Currently use two full-time field survey crews with the ability to use up to six as-needed
- Three fully stocked full-time survey rigs
- One full-time dedicated Field Supporter
- Trimble GPS 4700 Base Receiver with 5800 Rover & Trimark III 25-Watt Base Radio
- Sokkia Radian GPS Static & RTK System with Pac-Crest Radios
- Two Nikon 531 Total Station
- Leica 600-Series Total Station
- Wild Electronic Level

MSHA Certification

JBA's survey personnel are certified with the Mining Safety Hazard Association (MSHA), **Number A952**. Three eight-hour classes are required to become MSHA Certified. Classes are designed to educate the individuals in job site safety, CPR and specific mine hazard training.