Silver Lake Reservoir Complex Storage Replacement Project Draft Environmental Impact Report Technical Appendixes

Prepared for

City of Los Angeles
Department of Water and Power

July 2005

CH2MHILL

3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707

Contents

Appendixes

Appendix A
Scoping Meeting Transcript and Scoping Comments

To: **Interested Persons, Agencies, and Organizations**

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

Project Title: **Silver Lake Reservoir Complex Storage Replacement Project**

The Los Angeles Department of Water and Power (LADWP) is the Lead Agency and will prepare a Draft Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA) for the Silver Lake Reservoir Complex (SLRC) Storage Replacement Project. LADWP proposes to remove Silver Lake and Ivanhoe Reservoirs from direct service to the LADWP water distribution system. Water storage currently provided by the SLRC would be replaced by a 110 million gallon (MG) underground covered storage reservoir at the former Headworks Spreading Grounds (HWSG site). The new storage reservoir would be accompanied by a 4-megawatt (MW) hydroelectric power generation facility at or near the HWSG site to capture energy from the water pressure coming into the reservoir. The addition of a regulating station and a new bypass pipeline through Silver Lake Reservoir would convey water to existing service areas, and the operation of Silver Lake and Ivanhoe Reservoirs as drinking water storage facilities would change. Construction of the SLRC Storage Replacement Project is anticipated to require up to 6 years to complete.

As a related but separate project, the proposed SLRC Storage Replacement Project would also provide beneficial uses at the HWSG site, potentially including natural space/parkland on top of the reservoir for passive recreation, and establishment of wetlands and/or a natural ecosystem consisting of native vegetation on the remainder of the HWSG site. This project will be initiated by U.S. Army Corps of Engineers, with the City of Los Angeles being the local sponsor. Construction of HWSG site enhancements may be initiated simultaneously to construction of the 110-MG buried reservoir, but will likely be completed following construction of the water and power facilities proposed on the HWSG site.

In conjunction with the development of the proposed project, it is necessary to address the potential adverse effects of the proposed project on the environment. This Notice of Preparation (NOP) serves two purposes: to solicit information on the scope of the environmental analysis for the proposed project and to notify the public that LADWP will prepare a Draft EIR to further assess potential adverse environmental impacts that may result from implementing the proposed project. The Draft EIR will discuss all topical content required by CEQA and will focus, as appropriate, on the environmental impacts determined to be potentially significant through the NOP process.

LADWP invites the views of your agency or organization regarding the scope and content of the environmental information to be included in the EIR, including any information that would be necessary to meet any statutory responsibilities related to the proposed project. If the proposed project has no bearing on you or your organization, no action on your part is necessary. The project location is shown in the attached figure, and a description of the proposed project and potential environmental impacts are in the attached Project Description (Attachment A) and Initial Study (Attachment B).

Comments focusing on your area of expertise, your agency's area of jurisdiction, or issues relative to the environmental analysis should be addressed to Mr. Paul Liu at 111 North Hope Street, Room 1348, Los Angeles, CA 90051. Comments may also be sent by FAX to (213) 367-0928 or by e-mail to paul.liu@LADWP.com. Due to time limits imposed by state law, your response must be received at the above address no later than 5:00 p.m. on September 24, 2003. Please include the name and phone number of the contact person for your agency or organization.

The public is invited to attend a public scoping meeting at the date and time listed below. The scoping process will be used to focus EIR discussion on significant issues. All comments received at this meeting will be considered during the preparation of the EIR.

Date:	September 17, 2003
Time:	7:00 p.m. to 9:00 p.m.
Location:	Friendship Hall 3201 Riverside Drive Los Angeles, California 90027

Date: August 22, 2003

Signature: ______________________

Glenn Singley, Director
Water Planning and Project Management

LOS ANGELES DEPARTMENT OF WATER AND POWER
111 North Hope Street, Room 1348, Los Angeles, California 90051

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT

Project Title:

Silver Lake Reservoir Complex Storage Replacement Project

Project Location:

Headworks Spreading Grounds, located at 6001 West Forest Lawn Drive, Los Angeles, CA 90068, and Silver Lake Reservoir Complex, located at 2700 Tesla Avenue, Silver Lake, CA 90026.

Description of Nature, Purpose, and Beneficiaries of Project:

To meet state and federal water quality regulations, LADWP proposes to remove Silver Lake and Ivanhoe Reservoirs from direct service to the LADWP water distribution system. Water storage currently provided by the SLRC would be replaced by a 110-million-gallon (MG) underground covered storage reservoir at the former Headworks Spreading Grounds (HWSG site). The new storage reservoir would be accompanied by a 4-megawatt (MW) hydroelectric power generating facility at or near the HWSG site to capture energy from the water pressure coming into the reservoir. The addition of a regulating station and a new bypass pipeline through or around Silver Lake Reservoir would convey water to existing service areas, and operation of Silver Lake and Ivanhoe Reservoirs as drinking water storage facilities would change. Construction of the SLRC Storage Replacement Project is anticipated to require up to 6 years to complete.

Lead Agency:	**Division:**
Los Angeles Department of Water and Power	Water Planning and Project Management

Initial Study and All Supporting Documentation Are Available at:	**or by calling:**	**or by accessing:**
LADWP Headquarters 111 North Hope Street, Room 1348 Los Angeles, CA 90051	(213) 367-0761	http://www.ladwp.com/ceqa/

Initial Study Review Period:

August 25, 2003 – September 24, 2003

Contact Person:	**Phone Number:**
Paul Liu	(213) 367-0761

Reference: California Code of Regulations, Title 14, Sections 15082(a), 15103, and 15375

Notice of Preparation Attachment A

Description of the Silver Lake Reservoir Complex Storage Replacement Project

Project Purpose and Need

Several recent state and federal water quality regulations require that Los Angeles Department of Water and Power (LADWP) make changes to its open reservoir system. The two regulations of concern are the Stage 2 Disinfection By-Products Rule (S2DBR) and the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). In order to meet these two regulations along with the previous Surface Water Treatment Rule (1989), LADWP is required to cover or remove from service its 10 open-air distribution reservoirs and covert its system to chloramines. The S2DBR addresses chlorination by-products such as trihalomethanes (THMs) and halo acetic acids (HAAs). Chlorine is effective at treating algae in open reservoirs such as Silver Lake and Ivanhoe, but it also reacts with naturally occurring organic materials that produce THMs and HAAs. The higher the level of algae and other organic material in the reservoirs, the greater the potential of THMs and HAAs. Both compounds are Cancer Group B carcinogens (shown to cause cancer in laboratory animals). The LT2ESWTR requires that all existing open finished water reservoirs be covered or meet 99.99 percent virus kill before the water enters the distribution system. LADWP has investigated several onsite and offsite alternatives to functionally replace the open storage capacity at Silver Lake and Ivanhoe Reservoirs and has determined that the Proposed Project is the best alternative from a cost, construction, and maintenance perspective.

Project Description

The Proposed Project would remove Silver Lake and Ivanhoe Reservoirs from direct service to the LADWP water distribution system. Water storage currently provided by the Silver Lake Reservoir Complex (SLRC) would be replaced by a 110-million-gallon (MG) underground covered storage reservoir at the former Headworks Spreading Grounds (HWSG site). The new storage reservoir would be accompanied by a 4-megawatt (MW) hydroelectric power generating facility at or near the HWSG site to capture energy from the water pressure coming into the reservoir. The addition of a regulating station and a new bypass pipeline through Silver Lake Reservoir would convey water delivery flow to existing service areas. Operation of Silver Lake and Ivanhoe Reservoirs as drinking water storage facilities would change. Construction of the SLRC Storage Replacement Project is anticipated to require up to 6 years to complete. The project location and setting are described below, as is each element of the Proposed Project.

As a related but separate project, the proposed SLRC Storage Replacement Project would also provide beneficial uses at the HWSG site, potentially including natural space/parkland, and establishment of wetlands and/or a natural ecosystem on the remainder of the HWSG site. This project will be initiated by the U.S. Army Corps of Engineers, with the City of Los Angeles being the local sponsor. Construction of HWSG site enhancements may be initiated simultaneously to construction of the 110-MG buried reservoir, but will likely be completed following construction of the water and power facilities proposed on the HWSG site.

Project Location

The Proposed Project would be located at the HWSG and at the SLRC. The HWSG site consists of 43-acres of undeveloped land adjacent to the Los Angeles River and between the City of Burbank and Griffith Park. It is bounded on the north by the Los Angeles River and the 134 Freeway, and on the east and south by Forest Lawn Drive. The property is owned by the City of Los Angeles and LADWP retains an easement over the entire property.

The SLRC is located in the community of Silver Lake and consists of LADWP-owned Silver Lake and Ivanhoe Reservoirs and related facilities. Silver Lake is five miles northwest of downtown Los Angeles and just east of Griffith Park.

General Setting and Surrounding Land Uses

Land use immediately adjacent to the HWSG site is composed of the Los Angeles River (LA River), State Highway 134, parks, and cemeteries. The HWSG site is fronted on the south by the Mount Zion and Forest Lawn Cemeteries. Griffith Park lies to the southeast of the site. Immediately north of the site is the LA River channel, along with the transportation corridor for the 134 Freeway. To the north of the freeway are residential neighborhoods; north and west of the site are the extensive complexes of NBC Studios, Disney Studios, and Warner Brothers Studios. To the northeast of the site is the Los Angeles Equestrian Center, and just east of the site is Traveltown Museum in Griffith Park.

The community of Silver Lake surrounding the SLRC is generally bordered by Interstate 5 to the north, the Glendale Freeway and Glendale Boulevard to the east, Sunset Boulevard to the south, and Griffith Park Boulevard to the west. Land use immediately surrounding SLRC is almost exclusively residential. Commercial uses in the immediate vicinity are primarily limited to the major cross streets, including Silver Lake, Sunset, and Glendale Boulevards, and Rowena Avenue.

110-MG Underground Storage Reservoir

To replace the operational storage from Silver Lake and Ivanhoe Reservoirs, LADWP would construct a 110-MG buried reservoir at the HWSG site. The reservoir would occupy approximately 15.5-acres and would be located on the east side of the HWSG site. Following construction, a 15-acre natural space or park would be created on top of the reservoir for passive recreation and a scenic overlook into the remaining portion of the HWSG site.

4-MW Hydroelectric Power Generating Facility

To capitalize on a green power opportunity and reduce the water pressure coming into the new storage reservoir, LADWP would construct a 4-MW hydroelectric power generating facility at or near the HWSG site. The hydroelectric facility would require an above- or below-ground powerhouse to house the turbine/generator and associated controls and instrumentation. The facility would also require an outdoor substation and backup emergency generator, and would be connected to the existing 35-kilovolt (kV) LADWP distribution system.

Regulating Station and Bypass Pipeline at SLRC

A regulating station to control water pressure would be located at the SLRC just south of the Silver Lake Reservoir dam on West Silver Lake Drive. The station would be approximately 45-feet long by 25-feet wide, buried, with top access.

A bypass line is also needed to convey the water through the Silver Lake Complex to the rest of the system. This line would be approximately 3,200 feet of 72-inch diameter pipe installed at the bottom of Silver Lake Reservoir, connecting to an existing 60-inch diameter pipeline in the reservoir. Silver Lake Reservoir would be drained during installation and refilled afterwards. In addition, 850 feet of 72-inch diameter pipeline would be installed to connect the new bypass pipeline with the new River Supply Conduit (RSC) at Tesla Avenue; this portion of pipeline would be installed by tunneling methods.

Changed Operation of Silver Lake and Ivanhoe Reservoirs

Because Silver Lake and Ivanhoe Reservoirs at SLRC would no longer be used for water supply, day-to-day operations would change. Specifically, the water currently flowing into Silver Lake and Ivanhoe Reservoirs would bypass SLRC as described in the above paragraphs.

The SLRC facility and property would be maintained consistent with the appearance and condition that LADWP has provided at this facility for several years. No other significant changes at the SLRC facility are being anticipated by LADWP at this time.

Attachment B

CITY OF LOS ANGELES
OFFICE OF THE CITY CLERK
ROOM 395, CITY HALL
LOS ANGELES, CALIFORNIA 90012

CALIFORNIA ENVIRONMENTAL QUALITY ACT
INITIAL STUDY AND CHECKLIST
(Article IV – City CEQA Guidelines)

LEAD CITY AGENCY	COUNCIL DISTRICT	DATE
City of Los Angeles, Department of Water and Power 111 North Hope Street, Room 1044 Los Angeles, CA 90012	IV and XIII	August 22, 2003

PROJECT TITLE/NO.	CASE NO.
Silver Lake Reservoir Complex Storage Replacement Project	YYMMDD-X

PREVIOUS ACTIONS CASE NO.	
NA	☐ DOES have significant changes from previous actions. ☒ DOES NOT have significant changes from previous actions

PROJECT DESCRIPTION

In order to meet State and federal water quality regulations, LADWP proposes to remove Silver Lake and Ivanhoe Reservoirs from direct service to the LADWP water distribution system. Water storage currently provided by the SLRC would be replaced by a 110 million gallon (MG) buried storage reservoir at the former Headworks Spreading Grounds (HWSG site). The new storage reservoir would be accompanied by a 4-megawatt (MW) hydroelectric power generating facility at or near the HWSG site to capture energy from the water pressure coming into the reservoir. The addition of a regulating station and a new bypass pipeline through Silver Lake Reservoir would convey water delivery flow to existing service areas, and operation of Silver Lake and Ivanhoe Reservoirs as drinking water storage facilities would change. Construction of the SLRC Storage Replacement Project is anticipated to require up to six years to complete. Please refer to Attachment A for more information.

PROJECT LOCATION

The Proposed Project would be located at the Headworks Spreading Grounds (HWSG) and at the Silver Lake Reservoir Complex (SLRC). The HWSG site consists of 43 acres of undeveloped land adjacent to the Los Angeles River and between the City of Burbank and Griffith Park. It is bounded on the north by the Los Angeles River and the 134 Freeway, and on the east and south by Forest Lawn Drive. The property is owned by the City of Los Angeles and the LADWP retains an easement over the entire property. The SLRC is located in the community of Silver Lake and consists of LADWP-owned Silver Lake and Ivanhoe Reservoirs. Silver Lake is five miles northwest of downtown Los Angeles and just east of Griffith Park.

PLANNING DISTRICT	STATUS
SLRC – Silver Lake-Echo Park Headworks - Hollywood	☐ PRELIMINARY ☒ PROPOSED ______________ ☐ ADOPTED date

EXISTING ZONING SLRC – [Q] OS-1XL HWSG - OS-1XL	MAX. DENSITY ZONING SLRC – Open Space HWSG – Open Space	☒ DOES conform to plan
PLANNED LAND USE & ZONE SLRC – Open Space HWSG – Open Space	MAX. DENSITY PLAN SLRC – Open Space HWSG – Open Space	☐ DOES NOT conform to plan
SURROUNDING LAND USES Recreation, water course, transportation corridor, commercial, residential.	PROJECT DENSITY SLRC – Open Space HWSG – Open Space	☐ No district plan

Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☒ Aesthetics	☐ Agriculture Resources	☒ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Hazards & Hazardous Materials	☐ Hydrology/Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☒ Noise	☐ Population/Housing
☐ Public Services	☐ Recreation	☒ Transportation/Traffic
☐ Utilities/Service Systems	☐ Mandatory Findings of Significance	

Determination: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature	Date
Glenn C. Singley	Los Angeles Dept. of Water and Power
Printed Name	For

Evaluation of Environmental Impacts:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including offsite as well as onsite, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the Lead Agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporation" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The Lead Agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

a) Earlier Analysis Used. Identify and state where they are available for review.

b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Incorporation," describe the mitigation measures that were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

a) the significance criteria or threshold, if any, used to evaluate each question; and

b) the mitigation measure identified, if any, to reduce the impact to less than significance.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
I. AESTHETICS – Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

The HWSG site is not a scenic vista or located in the vicinity of a state scenic highway. While LADWP holds an all-encompassing easement for the construction and operation of water facilities at the site, the property is bounded by the Los Angeles River on the north and extensive parkland in Griffith Park to the southeast. In addition, Mount Zion and Forest Lawn Cemeteries are located to the south and southwest of the site, respectively. State Highway 134 also provides views of the HWSG site. The nature of these surrounding land uses are associated with frequent public use and views of the HWSG site from these areas would potentially be impacted through the introduction of project facilities (primarily the proposed buried storage reservoir). Potential impacts to the existing visual character of the HWSG site could be mitigated through the use of vegetative screening.

The SLRC is considered a local scenic resource and adverse changes resulting from construction activities for the regulating station and/or bypass pipeline or changed operation of Silver Lake and Ivanhoe Reservoirs would be considered significant. The Draft EIR for the Proposed Project will include a detailed evaluation of potential aesthetics impacts.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☒

The HWSG site is located in a highly developed portion of Los Angeles County adjacent to the cities of Burbank, Glendale, and Universal City, with little open space for cultivation. Surrounding land uses include a major transportation corridor (State Highway 134 and associated on-ramps), Griffith Park, Mount Zion and Forest Lawn Cemeteries. No impacts to agricultural lands including Prime Farmland, Unique Farmland, or Farmland of Statewide Importance would occur. The SLRC is owned by LADWP and does not contain any agricultural lands. Adjacent land is highly urbanized.

III. AIR QUALITY: Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☒	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☒	☐	☐

The Draft EIR will include an air quality analysis to determine the significance of short-term air quality impacts associated with project construction.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES – Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Vegetation on the HWSG site consists of native and non-native grasses and trees. Wildlife species onsite consists of native and exotic species adapted to urban habitats. Vegetation at the SLRC consists of primarily landscaped and ornamental vegetation. Wildlife at the site consists of species adapted to an urban environment. The Proposed Project would not conflict with local policies or ordinances protecting biological resources or conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

The Draft EIR will include a biological resources survey to determine if sensitive resources will be adversely affected by the Proposed Project.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
V. CULTURAL RESOURCES – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

The SLRC and HWSG sites have been previously disturbed by substantial landform and grading improvements associated with existing water resource facilities. The Draft EIR will include an archaeological resources survey to determine if sensitive resources will be adversely affected by the Proposed Project. Mitigation, if needed, will be implemented to reduce impacts to a less than significant level.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
VI. GEOLOGY AND SOILS – Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☒	☐	☐
ii) Strong seismic ground shaking?	☐	☒	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☒	☐	☐
iv) Landslides?	☐	☒	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

The SLRC and HWSG sites have been previously disturbed by substantial landform and grading improvements associated with existing water resource facilities. The Draft EIR will include a geotechnical analysis to determine if the Proposed Project elements would be subject to faulting or other geotechnical hazards. Appropriate mitigation, if needed, will be implemented to reduce impacts to a less than significant level.

VII. HAZARDS AND HAZARDOUS MATERIALS – Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b) Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☒	☐	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

No known contamination is present on the HWSG site, and contamination is unlikely considering the historic land use of the site for infiltration and well pumping. The only present-day source of contamination on the site may be from fertilizer and pesticide application on the upslope cemetery sites. However, any compounds draining onto HWSG from these sites would be expected to be water soluble, and would be transported off the HWSG site with surface flows. The HWSG site is located over the San Fernando Basin (SFB) groundwater basin. Groundwater contamination in the SFB is reported, and the SFB has wells contaminated with TCE and PCE at the Headworks Well Field in the Los Angeles Equestrian Center, which is 762-m (2,500 feet) northeast of HWSG site.

No known contamination is present at the SLRC.

The appropriate records search and field reconnaissance will be conducted for the Draft EIR to confirm the potential for hazardous materials impacts and appropriate mitigation, if needed, will be implemented to reduce impacts to a less than significant level.

VIII. HYDROLOGY AND WATER QUALITY – Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☒	☐	☐

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☒	☐	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☒	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☒	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

The project purpose is to comply with increasingly more stringent state and federal water quality regulations and specifically addresses protection of drinking water quality by providing a covered drinking water reservoir(s). In this light, the project will have a direct beneficial impact on LADWP drinking water quality.

Potential hydrology/water quality/flooding impacts associated with the project at both the HWSG site and the SLRC will be considered in the design of project facilities. Mitigation, if needed, will be proposed to reduce potential impacts to a less than significant level.

IX. LAND USE AND PLANNING – Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

The HWSG site is owned by the Los Angeles Department of Recreation and Parks, however LADWP holds an all-encompassing easement for the construction and operation of water facilities at the site. Therefore, the proposed project would be consistent with intended uses of the site and not conflict with any applicable land use plan or policy or applicable conservation plan. The site does not contain residences and the project would therefore not divide an established community. The SLRC is owned by LADWP; proposed activities at the SLRC would be consistent with intended uses of the site.

X. MINERAL RESOURCES – Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☒	☐	☐
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☒	☐	☐

The Draft EIR will include an analysis to determine the mineral composition of the HWSG site and potential for the occurrence of important mineral resources. Potential impacts to mineral resources contained within the site would be mitigated, if necessary, to a less than significant level. The SLRC contains no known mineral resources.

XI. NOISE – Would the project result in:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☒	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

The Draft EIR will include a noise analysis to establish existing noise conditions and determine the significance of short-term noise impacts associated with project construction. Mitigation, if needed, will be proposed to reduce potential impacts to a less than significant level.

XII. POPULATION AND HOUSING – Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

The project provides additional protection of existing drinking water supplies in accordance with increasingly more stringent state and federal regulations, through the construction of covered reservoir(s) and does not involve the acquisition of additional water supplies or higher quality water. Therefore, no direct or indirect impact to population growth would occur. The project does not involve the displacement of existing housing or populations and would not require construction of replacement housing.

XIII. PUBLIC SERVICES

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☒	☐
Schools?	☐	☐	☒	☐
Parks?	☐	☐	☒	☐
Other public facilities?	☐	☐	☐	☒

The project provides additional protection of existing drinking water supplies in accordance with increasingly more stringent state and federal regulations, through the construction of covered reservoir(s) and does not involve the acquisition of additional water supplies or higher quality water. Therefore no significant direct or indirect impact to population growth would occur and increases in public services including fire and police protection, schools, parks, and other public facilities would not occur. The permanent increase in staff required to operate the proposed facilities would total less than 20 people and would not significantly affect public services.

XIV. RECREATION

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☒	☐	☐

Recreation areas adjacent to the HWSG site include the extensive parkland in Griffith Park to the southeast. Other recreational facilities in the area include the Los Angeles Equestrian Center to the northeast of the site across the LA River and the 134 Freeway, and the Traveltown Museum to the east. The Proposed Project would not be anticipated to increase use of these recreational facilities. Following construction of the buried storage reservoir at the HWSG site, a 15-acre natural space or park would be created on top of the reservoir for passive recreation and a scenic overlook into the remaining portion of the HWSG site. This recreational enhancements would not be considered to have an adverse effect on the environment or result in substantial physical deterioration of existing or future recreational facilities, however this will be further discussed in the Draft EIR.

The SLRC is not used for public recreation, and the Proposed Project would not be anticipated to result in increased use of neighborhood parks in the vicinity.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
XV. TRANSPORTATION/TRAFFIC – Would the project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☒	☐	☐	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Result in inadequate parking capacity?	☐	☐	☐	☒
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒

The Proposed Project is not anticipated to result in a substantial long-term increase in traffic, however, temporary significant impacts to transportation and traffic in the vicinity of the HWSG site and SLRC may occur during project construction. The Draft EIR will include a traffic analysis to determine the significance of short-term traffic impacts associated with project construction.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
XVI. UTILITIES AND SERVICE SYSTEMS – Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☒	☐	☐

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which would cause significant environmental effects?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

The project is intended to provide additional protection of existing drinking water supplies in accordance with increasingly more stringent state and federal regulations, through the construction of covered reservoir(s), and does not involve the acquisition of additional water supplies or higher quality water. Therefore, no direct or indirect impact to population growth would occur and increased utilities or service systems would not be required.

Construction of the project is not anticipated to produce construction debris or solid waste in excess of existing landfill capacities and disposal of these materials will comply with all applicable federal, state, and local policies and regulations.

XVII. MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probably future projects)	☐	☒	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

LOS ANGELES DEPARTMENT OF WATER AND POWER

PUBLIC SCOPING MEETING

In the Matter of the
Public Hearing re:

SILVER LAKE RESERVOIR COMPLEX
STORAGE REPLACEMENT PROJECT

CERTIFIED
COPY

TRANSCRIPT OF PROCEEDINGS

Los Angeles, California

Wednesday, September 17, 2003

Reported by:

CARRIANNE M. TRIGG
CSR No. 11955

JOB No.:
CODS405

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THE LOS ANGELES DEPARTMENT OF WATER AND POWER

PUBLIC SCOPING MEETING

In the Matter of the
Public Hearing re:

SILVER LAKE RESERVOIR COMPLEX
STORAGE REPLACEMENT PROJECT

TRANSCRIPT OF PROCEEDINGS, taken at 3201 Riverside Drive, Los Angeles, California, commencing at 7:30 p.m., on Wednesday, September 17, 2003, reported by CARRIANNE M. TRIGG, CSR No. 11955, a Certified Shorthand Reporter in and for the State of California.

APPEARANCES:

COUNCIL MEMBER:	TOM LABONGE
COUNCIL MEMBER:	ERIC GARCETTI
LADWP:	GLENN SINGLEY PAUL LIU
CH2M HILL:	JIM HUNTER

I N D E X

Los Angeles, California, Wednesday, September 17, 2003
7:30 p.m.

MR. SINGLEY: Well, I'd like to formally welcome you to this public meeting. And we are going to talk a lot of exciting things and some projects that are very important to us as Department of Water & Power and the communities, that have certainly affected all of you for any kind of certain projects that go on.

We think we have some plans for projects that will be a real win for all the groups involved. We're going to take some time to describe them a little bit tonight. First, I'd like to welcome all of you here and introduce a few people that we're grateful are here.

Besides our own staff, that's on the tables, and I won't go through each one, but I appreciate their support in getting this pulled together, and all the information materials pulled and especially Lynn Phan, for putting all of these things together and keeping it straight.

I would like to, before we get started, and too far into this meeting, introduce our councilmen Tom LaBonge from the 4th District; and Eric Garcetti, from the 13th District. We appreciate their support and being here.

Tom would you like to say a few words?

MR. LABONGE: Was that a question, I mean, silly question. I've never met a microphone I didn't like, never. But good evening. And now I'm joined by Eric Garcetti, my colleague.

Recently, some months ago, there was re-districting and we met, and Eric is a beautiful man. And he understood my passion for the neighborhood I grew up in. And in re-districting we divided it straight from the corner of Armstrong and Silver Lake Boulevard, diagonally across to the west end of the damn there. So, we both share Silver Lake, which allowed me to get a little more involved in this particular project.

And what is great about growing up in a neighborhood and going to local schools and being involved here you constantly have your mind on ideas. And this particular project we were being briefed on in City Council. And at the same time I have a concept about Griffith Park, and some parcels within Griffith Park. And at that time, I believe Marty and Glenn were in the meeting there. Marty, why don't you step up here, because I know you were at that meeting.

MR. GARCETTI: I can vouch.

MR. LA BONGE: I said could you first look in the area of Park Central, because there is an area in the central part of the park that I wanted to see if they could put a covered reservoir. And yes, I did work for water and power for a year and a half. So I knew of the main lines that come in from the valley. And I said look at the spreading basins in valley gateway to Griffith Park and if it works, come back and tell us if it works.

And they did extensive study and extensive research, and it does work. And that's why the Department has this program tonight to share with you what are concepts that could possibly solve the water quality requirement that Los Angeles Department of Water & Power has to meet in this, without having the impact of a multi-year, three, four, five-year construction project in Silver Lake with both reservoirs of Ivanhoe and of Silver Lake being drained.

I do want to say, I and Eric are absolutely positively committed always, and we'll make sure that there's city legislation that the Department of Water & Power holds this property, Silver Lake is real important to us.

Now, you may not agree with that, Glenn. But, I think it's real important. And I saw this because I did work at Water & Power for a year and a half, and they are great stewards of land, from the Owens Valley, 281 miles away, all the way through the aqueduct system throughout the San Fernando Valley, old Chatsworth reservoir. And several of the reservoirs are being taken out of the service and changed and transformed.

So that is a commitment that we're going to come back to. We want to see a great connection between this Headwork project and Silver Lake and have those questions answered. But more importantly tonight is we want you to learn a little about what this concept and idea is, and if you all support it, if you all feel that we should go forward with it.

Because we all know we have to improve our water quality. And it's how we do that. And this may solve a lot of challenges in our individual neighborhood, but also at the same time it may enhance what has been a dormant area of Griffith Park and the spreading basins and really turn it into a wonderful joint use project with our Army Corps of Engineers as it relates to the Los Angeles River. So there are a lot of good things that I believe is in it.

And also I'm just telling you, you know I feel good, awful, many, many times in my job as a councilmember, and like Eric. And sometimes I'm so lucky to come out of a community meeting, or a successful event and turn on K-EARTH and they're playing "I love L.A." by

Randy Newman, and I feel real, real good. But tonight I want to say I feel, real, real good, with my community I think we've come up with a concept and an idea that will work for the benefit of all of us, not just here in Silver Lake, but in Griffith Park and all over.

I'm also pleased to introduce Jeannie Chang my deputy for the area, and Adam Moncell, special projects coordinator.

And at this time I'd like to call on Eric Garcetti -- and I think it comes back to Silver Lake, he in our great fight -- and it was a great fight to keep our city together, which was so important. In the discussion Eric came up with the line that we work "seamless together." We do have boundaries that run right through neighborhoods, but we work often very close together.

He and I share a difference on just a few things. He's just a little more liberal than I. But I think a lot of people like that, you know. But that's just a little. And he's a wonderful guy. And he's a road scholar. And I kid him, he's from San Fernando Road. Okay, here you go.

MR. GARCETTI: Thank you very much. Tom's, a tough act to follow, it's like following a tornado or a hurricane. But it is wonderful, truly wonderful to serve with Tom. He's become a great friend, and somebody who -- we fought cessation together; we were able to work together here.

And as he shared with you, when it came time to re-districting for demographic reasons and court ordered reasons, I lost kind of the population on the west side of the lake, still retained all of the reservoir, but really wanted to share that with Tom, because that would double the clout, double the input, and more than double the passion. With Tom LaBonge I knew that it would be a great thing for the neighbors. And I want to thank you for your friendship and for your continued advocacy on behalf of this community.

When you look at this area of Los Angeles, and bodies of water define who we are, Echo Park Lake, the Los Angeles River, and of course, Silver Lake, the reservoir. And the passion that people have brought for decades now to making sure that this remains the jewel that it is, is the same passion that is reflected here with the outpouring of support in terms of looking at all of you tonight.

From my perspective, Tom and I looked a lot at different options and thought about what sort of things were out there, as DWP moves, as you'll be hearing towards taking this out of our water system, it's actually the lowest of all of our reservoirs in terms of altitude.

MR. LABONGE: Elevation.

MR. GARCETTI: Elevation, the dirtiest water, although it still meets "clean water standards" but a good reason for us to be passing that out, none of us drink it, it actually goes further south in our city. But when we looked at that, the options that we had about what to do with the reservoir, whether or not we should be putting tanks underneath the meadow, and whether or not we could sustain that sort of a construction project right here in the neighborhood. I think we felt and heard from a lot of people, and we'll hear a lot more from you, and that's why you're all here tonight, that maybe a construction project which wouldn't yield anything directly to the community, wasn't worth doing and we should look elsewhere. And I want to thank Tom for being as creative in looking around the city, and the DWP for their good work as well.

Let me make a couple of introductions as well. I think many of you know Glenn Dak who used to serve on the community Save Silver Lake's Reservoirs. He is my environmental deputy, also known as "green deputy." And, although I won't tell you which house, he lives steps away from the reservoir himself. And is Jim Omahan who is a resident of Atwater Village, but is my deputy for Silver Lake and Atwater Village. Thank you Jim as well for your advocacy.

And feel free to talk to the two of them as well. I always have my Saturday office hours, which you can come down to Sunset Boulevard, meet with me. I do them on Thursdays now and I walk neighborhoods. So just feel free to call the office if you ever want to schedule an appointment face-to-face with me.

But I want to thank the Department again. Thank Tom for his work. We both serve on the L.A. River committee as well, and I think it's a really defining moment for revitalizing the Los Angeles River.

And because I can never take -- miss the opportunity with a crowd to talk about something that's coming down the pipeline -- no pun intended -- let me say one other thing, which is, we're facing about 65 different requirements, called TMDLs; which are essentially to clean up our water, in our lakes, in our river, in our bay. You might have read good news last week about the City settling two lawsuits we had brought against the Regional Water Quality Board in one case, saying that we can't do this. We can't completely clean up the L.A. River. We can't clean up the bay.

And I'm glad to see the City has shifted its position because of the advocacy of many of you in the community, and a lot of us on the council, to make sure that we start spending money on actually cleaning the water up, instead of fighting against these requirements. The Bush Administration, EPA was telling us that we were being too conservative on the environment. And they were one of the parties to the lawsuit, to give you a perspective of where L.A. was.

We are now again a leader in making sure we clean up that water. But make no mistake, it's going to be extensive; it's going to be something that we can all save money on if we simply -- and you've probably been hearing the public service announcement -- take care of our dogs, our motor oil, and our trash. Anything that you see on the street, Tom LaBonge is the best trash picker-upper in this city. If you see him walking the street he won't let a single piece of trash stay on the streets. And that's great because that goes immediately into the storm drain, that goes to the L.A. River, that goes into our bay, and that's why you can't swim in the ocean on rainy days. So do your part as well, and we'll continue to do ours.

Thank you all for coming tonight, appreciate it.

MR. LA BONGE: Thank you. Before both of us depart to other locations in the city, I just wanted to take a moment to introduce the 2003, alumnus of the year, a neighbor of yours from John Marshall High, Lavow Lund. Lavow. Give Lavow a big hand. Stand up. How many people are alumni of the year of their high school. What high school?

UNIDENTIFIED SPEAKER: Marshall.

MR. LA BONGE: Marshall, you were alumni of the year, both of you?

UNIDENTIFIED SPEAKER: '47.

MR. LA BONGE: But next year you are going to be alumni of the year.

MR. SINGLEY: Thank you. It really wouldn't, really be a public meeting without you guys here. It's great. I'm -- let me just take a few minutes -- and I don't know if I even introduced myself, I'm Glenn Singley. I'm the director of water engineering and technical services at Water & Power. So we get to dream up all these projects and try to make sense of them. And it was -- has been really a pleasure to work with community folks and everybody else to come up with something that really will work well.

Let me talk a little bit about what we're going to do tonight, and what this meeting is about. This actually is a formal scoping meeting. I think all of you got a little sheet to fill out a card if you would like to make a formal statement, but before we do that we're going to do a number of things. We're going to have a brief project description. We are going to have a little question-and-answer period. If there were some questions that were generated on the boards, or a couple of simple questions that we can talk about tonight.

And, then we'll go into the formal statement period where we won't be responding to your statements, but if you have a statement to make and you want to get up and speak for a minute or two to express your -- things, the ideas that you would like us to address in a draft environmental impact report. And we actually have a court reporter that will be recording each and all of those things, as well as audio tapes so we have double coverage of your statements. And we will be using those statements in formulating this draft EIR.

Then there are other processes. Once that draft is completed we will have another public meeting where you will have had a chance to review that draft and comment on that draft to include in the final Environmental Impact Report. So there are several opportunities for the community to be involved.

Let me make sure that I cover all the points about a formal scoping. So we are planning to prepare an Environmental Impact Report for this project, which is called the Silver Lake Complex Storage Replacement

Project, which is a big word -- are big words for the fact that we have to replace the water that's now in Silver Lake because it will no longer meet water quality standards that have come down from EPA and State Health.

Again, this scoping meeting is an opportunity for the public to provide input for the preparation of the Draft Environmental Impact Report. We sent out a notice of preparation to the State clearinghouse and all the state agencies that have to be notified, according to the California Environment Quality Act on August 22nd. The formal period ends on September 24th to have the initial comments that we need to gather before we can formally start to prepare the Draft Environmental Impact Report.

So all the comments, again, that are spoken verbally tonight, anything that you would like to write down and e-mail to us or send us, we'll also include those in consideration as we prepare the Draft Environmental Impact Report.

Okay. So I think I've gone over the agenda and the purpose of the meeting. I would like to just kind of go over the history of this project. We've got several projects that have been kind of going on simultaneously here. And it's all come together in this project that's going to replace the storage of Silver Lake.

About 13 years ago we heard that the EPA was going to come up with some of these additional more restrictive water quality regulations. And we saw the writing on the wall at that time that we have all of these big open storage reservoirs in the middle of the city that are open to the atmosphere. We've got birds flying over. We've got people that throw things in them, other things, ways for that water to be contaminated.

We dealt with that by chlorinating the water after it goes out of those reservoirs. And so the water that we've been drinking has been, you know, no bacteria and we've been -- safe to drink, but as the analysis gets better and better for water quality they see that some of these by-products that are created by chlorinating water are, you know, potentially cancer-causing and that's why these regulations have been brought forward.

So there are several water quality regulations that are working here. So we understood at that time that we were going to either have to cover these reservoirs, or in the case where these reservoirs are very big, we'd have to find additional storage somewhere else and bypass those reservoirs. We wouldn't be able eventually to be able to serve that water directly from these open reservoirs.

So that led, finally, after these many years to the realization that we have to do something at

Silver Lake. And we have started looking at alternatives and over the past two or three years now, we've looked at many alternatives. And you've seen those listed on our displays back there, from storage right on site, to covers, various covers on Ivanhoe, bigger cover on a new damn part way across Silver Lake and covering another portion of Silver Lake, or putting big tanks in the meadow area and partially into the reservoir. And last November we had several plans that we showed the community for doing that.

As Tom stated, he requested that we take another look. We had looked off site and didn't find anything that really worked well; take another look at the spreading grounds, the Headwork spreading grounds and see just if it would work hydraulically. It's a long ways away. And we found that after careful evaluation, found that it actually does work, and works well.

I'd like to turn some time over to my associate, Paul. He will describe the current project that we have and give you a little background of what we're looking at and where we're headed.

MR. LIU: I'd like to first of all thank everybody for coming tonight. And thank you for all the good questions that have been generated so far through the poster session. I'll try to do my best to try to answer all your questions within the project description.

If I could focus first on the proposed project, which is to build a 110 million-gallon underground reservoir at the Headwork spreading grounds that you see behind me here. Let's actually look at the engineering drawing first. I know it might be hard for some of you to see in the back, but they're also posted on the sides in the back. Basically what this concept includes is to build the reservoir on the eastern most end of the site that we have an easement of 43 acres on.

Basically the reservoir will cover about 15-and-a-half acres of total land on the Headwork site. Once that reservoir is constructed it will allow us to bypass Silver Lake Reservoir, and basically take it off line as a drinking water supply. Now the way the water is going to travel now, once we construct the reservoir is, it's going to come through our Sylmar Treatment Plant through closed pipelines into the tank, out of the tank, down a pipeline, into the Silver Lake Complex. Now, when it hits the Silver Lake Complex it no longer will exit into the reservoir, since the reservoir will no longer be used as drinking water supply.

What we also need to do at Silver Lake, in terms of construction, is to build a pipeline at the bottom of the reservoir. Now, this question kept coming up during the poster session, we will have to drain the reservoir for up to a year to construct this bypass line, that hopefully you can see up here in the red, the red dash line.

And that will enable us now to carry all the water from the Headwork Reservoir through the pipeline, out of the dam to our customers in the downtown and the South Central Los Angeles areas. It serves approximately 26-square miles. I think we estimated about half-a-million residents is what Silver Lake currently serves and hopefully will be served by Headwork in the future.

Going back to basically the Headwork proposal, I'm sorry, I'm having a hard time pointing back here, it will also feature a four-mega watt-hydroelectric facility. We hope to be able to tuck that off in the corner of the site. So the reason why we have a hydroelectric facility is, now because we moved the storage from Silver Lake, which is at a lower elevation up to this site, we're going to have a lot more water pressure from the pipeline coming into this tank.

And normally what we would do to reduce that pressure is to basically force that water to go through valves so we can break the pressure. Gosh, we'll we figured why not build a hydroelectric plant and get some green power credit out of that. And so basically we hope to be able to generate about four-megawatts-worth of power from that facility. It will be quiet. Talking to our power design people, it will be up to 50 decibels or less, and just for reference point a car driving by is about 85 decibels. So it will be very quiet. It will be contained within sound-proof walls. And it will occupy a footprint of approximately 110 feet-by-70 feet. So that's one of the benefits of this project.

Now, what I want to make very clear is, Ms. Kathy Shoeman is here from the U.S. Army Corps of Engineers. I want to draw a very clear distinction as to what our project is what our environmental document will cover and what the Corps will be heading up as a partnership with us.

Our EIR will address the reservoir itself, the hydroelectric facility, and the pipeline that needs to be installed to connect up within Forest Lawn Drive. Now, the nice rendering that you guys see behind you that was done by Mildrad (phonetic), basically what the Corps is going to partner with us on is to develop I guess what I call the skin of the facility or the site.

Basically, we have a conceptual drawing here that includes wetlands, habitat restoration, we have -- basically addressing open space on top of the reservoir that we're building with trails, with native vegetation, you name it. This is what we're hoping to work through in the parallel process with the Corps. They will be heading up what's called the NEPA process, which is the Federal EIR. And they will be holding meetings, and public scoping meetings, to get your input, those of you who are interested, on what you would like to see the final site look like.

So in a nutshell, that's pretty much all the main components, I believe. Oh, one thing I forgot. There will be a regulating station that we will have to install near the dam of lower -- near the dam of Silver Lake reservoir at the bottom. Basically it's going to be an underground box that's going to be buried that has valves, similar to the hydroelectric plant. We do still have to break some pressure before we can put that water to our downtown customers. And so that will be approximately 45-by-25 feet, about a quarter to a third the size of a full size -- full-length basketball court. But it will definitely be buried with top access.

And so I think at this point that addresses the overall, main concepts of the project. And at this point I'd like to turn it back to Glenn.

MR. SINGLEY: Thank you. Thanks Paul.

At this time I'd like to kind of open it up to general questions and we'll try from our distinguished panel up here, we'll try to briefly answer some of these questions. We may not have all the answers now, because we're just starting this process as far as the environmental process. And trying to describe the impact -- the potential impacts.

But after some brief answers to questions we do want to take your formal statements. So if you do have cards, that you would like to speak, we would like to have you pass those along into the inside aisle, and we'll come around and pick those up. And as we're asking and answering these questions, maybe you can start feeding them to the inside aisle, and once we are through with the informal questions we'll pick those up and then have you come up and speak and give your statements. Would you like to ask a question?

UNIDENTIFIED SPEAKER: Yes. Two-part question, first, why couldn't you just bury the pipeline along the street and not empty the reservoir? And second, is there any point in this process where the DWP might give up the control of the land to the City Parks Department, or any other agency? Is that something that DWP would like to do, or is that something that they are against doing?

MR. SINGLEY: Well, that's interesting. Let me take the first question first.

UNIDENTIFIED SPEAKER: What was the question?

MR. SINGLEY: Okay. I'll repeat the question. Boy, this is going to test me. Two parts to the question, first was about the pipeline that we're planning to construct in the middle of the reservoir, could we not put that in the street rather than putting it in the reservoir. Couple of responses to that, we -- we have looked at that and there is a possibility of -- you know, it is technically feasible, but because the pipeline has to be so deep, because of the pressures we can't keep it up next to the surface. We need to keep it deep. We would actually have to tunnel that about 40 feet deep. So we can't open trench that and go that deep.

If we tunnel that it would cost about twice as much as what it would cost to put the pipe in the reservoir. And to do that, of course, you have a large excavation for the tunneling machine that would have to be situated at the south end. We would probably have to go underneath some private property, so underneath maybe a few of your homes, to go through that to make a straight shot for the tunneling machine up to the north to connect where we need to connect. So it just looks more feasible, plus the interruption of traffic and whatever by having to construct in the street. A more feasible option is to do it in the reservoir. So that is a trade off, but it's about twice as expensive to do that.

The second part of the question is, what are we going to do with the reservoir once the project is completed, won't we just turn it over to Recreation and Parks to do that? Well, that's a good question. I think we heard from councilman LaBonge what he would like to do. And he would like to have Department of Water and Power maintain all these properties of all of our reservoirs. That's a little bit -- you know, extra to our main mission, which is serving water. So we kind of scratch our heads and say, why are we in the land preservation business versus than to focus on what we're meant to do, which is serve water and power. So there is some question as to whether, you know who -- which part of the city should be responsible for -- ultimately, for that area. So, that kind of remains to be -- that question remains to be answered.

For this project what we are prepared to do is to say, okay we are going to fill the lake back up, basically and maintain it in the same as -- as close to the same esthetic condition that we have today. It's not going to look the same exactly, because it's not going to be chlorinated, so there will be a little more growth, there will be a little more biology working to balance the system, which has been very successful at Hollywood

Reservoir so far. We've -- that's no longer part of the water system, but we're keeping water -- keeping that full basically, and it's working on its own. We -- and actually doing quite well. We've got some additional aeration facilities in the reservoir itself that are putting -- that's putting air in there and mixing that around, and keeping that fresh. So, we have lots of -- several biologists and we will get some additional consultants along that we'll determine just what we'll need to do to keep the reservoir fresh.

And again, he just wanted me to make sure that you understood that the reservoir is not going to go away, that it will be there. And, again, we are a City -- you know, City agency, the council has a lot of impact on the direction that we take. So, you know, that remains to be worked out eventually who is going to be responsible in maintaining the property in the future.

Go ahead.

UNIDENTIFIED SPEAKER: I was writing down a lot of questions, but I realized most of them should go to the Army Corps. I still have two questions.

MR. SINGLEY: It's not on --

UNIDENTIFIED SPEAKER: The first question is, at the Headwork site when you complete the skin there, will you still be administering that, or will that be

Recreation and Parks, that wasn't addressed by Councilman LaBonge.

MR. SINGLEY: Right, it wasn't.

UNIDENTIFIED SPEAKER: And the second question is the hydroelectric facility, are we going to end up with power lines?

MR. SINGLEY: Well, you've already got power lines there. And there are power lines very close. So it's convenient in that way, because we've got several lines going in different directions there. So it will be a very easy hookup to the hydroelectric plant from that site.

UNIDENTIFIED SPEAKER: How far? I mean --

MR. SINGLEY: I mean right next to it. It's right on Forest Lawn Drive. So that's where they'll be doing it. And that will be right off Forest Lawn Drive in the property. Actually the spreading grounds are owned by Rec and Parks.

UNIDENTIFIED SPEAKER: You have an easement from Rec and Parks.

MR. SINGLEY: Right. We have an easement from Rec and Parks. It was originally DWP property. We sold it to Rec and Parks in 1927 for $1, but retained an easement over the whole property. So we've basically been able to control the property from then.

If we put this facility on, and then we make the improvements, Rec and Parks does have an interest in maintaining the Headwork Spreading Ground as part of Griffith Parks, and as a new and unique use for part of Griffith Parks. And it is part of their master plan to make some improvements at that site. So this is just coming together, I think, in kind of a win/win, for our project and then to be able to add to that with, you know, the restoration there.

UNIDENTIFIED SPEAKER: So one last question then. When they start having meetings that are conducted by the Army Corps, will Recreation and Parks people be at those meetings?

MR. SINGLEY: They will be at those meetings as well as us. We will be -- we will continue to be involved.

UNIDENTIFIED SPEAKER: Thank you.

MR. SINGLEY: Did you all hear that question?

UNIDENTIFIED SPEAKER: No.

MR. SINGLEY: Okay. He was just wondering when this project is -- when the Army Corps starts discussing this project and how it's going to be developed, will Rec and Parks be sitting at that table looking at the future uses, and will we be, as Department of Water and Power, be there also? We are looking at this as a City project, so we will be there, as well as Rec and Parks.

UNIDENTIFIED SPEAKER: Hollywood Reservoir is no longer a drinking water facility but it's off limits to the public. Would that still be the case here as well, or would it be more public access, or would it be wetlands, or what?

MR. SINGLEY: The question was Hollywood reservoir is still off limits to the public in general, will that be the case at Silver Lake Reservoir? Right now, what we are prepared to say -- what we're prepared to do right now is basically maintain the property as we've got it right now. I know there is a master plan that envisions additional -- you know, passive recreation trails along the meadow area, and different things.

And we're actually moving forward with parts of that master plan as we speak. We're re-designing some improvements on West Silver Lake Drive right now. That will be some improvements because we got some additional state money for the commissioning and managing of that. We are not precluding that idea of moving forward with the master plan, but any other additional use besides that -- any kind of -- anything else I think will have to go through the community and through another process to make sure that we're in sync with the community.

Not to say that in several years, other uses may be overwhelming the desire of the community to open that body of water somehow to stick your toe in. I'm not sure, but for right now we are not planning to do that. We will still maintain the fence around it, and there would be no immediate access to the reservoir property.

UNIDENTIFIED SPEAKER: What's your best guess about the time line?

MR. SINGLEY: We do have time lines over here. And there are several around. We've got -- because of these different water quality rules, we've got between 2009 and 2012 to meet all of those rules. We hope to be done within that time frame. We're looking at about a six-year construction for the Headwork part of that and getting started with that and -- in 2005 or 2006. And hopefully we can even compress that time frame as we fine-tune the engineering finally, and shave some time off of that. But it's out there in 2009 to 2012 time frame.

Yes.

UNIDENTIFIED SPEAKER: Is that when the reservoir would be drained? Is that far out?

MR. SINGLEY: The reservoir draining needs to come in the latter part of the project, probably in the 2006, or 7, or 8 time frame. We have to -- again, we've just got real preliminary ideas and calculations on this. We need to fine-tune the sequencing of all these plans, because we've got several other larger pipe lines to build throughout the city to supply that area before we can take the main reservoir out of service. And in the intermediate time, when that's drained will be serving water from Ivanhoe only for a period of time, so we have to have this -- other systems built up so we can -- so we can survive that construction time.

Yes. Oh, I'm sorry. Let's go over here.

UNIDENTIFIED SPEAKER: I want to preface my question, just a simple question doesn't do the job. I want to place a storage tank on the reservoir property, because it's obvious that the storage tanks are next to or under the present lakes, does the DWP -- will be obligated to protect the property from vandalism and terrorists. So it's better to have them where they are.

The argument is it going to be more construction whatever way you go. You're going to do a lot of construction whether on site or off site. You are still going to have to deal with the -- so placing the storage tank on Silver Lake property is less expensive and better for security.

No, the question I want to ask you, I know there was a lot of lies about water, if I were a terrorist I would go after the water supply, because that's the best way you can knock people out. You could kill millions of people and they don't even know what the hell is going on.

And it doesn't make much to do it. So even those storage tanks they need to be protected.

Other countries protect their water supply. I know down in Central America, you go down there and they have those guards, police guards on their reservoirs. So what is the DWP going to do about protecting us from these people? You know, they say, "Well, it would take a lot of poison." No, it don't. Not really. They got deadly poison, and let's face it, sooner or later they're going to come after us, unless they're dumb. I don't know why they haven't come after us before. So what are you going to do to protect our water supply?

MR. SINGLEY: The question was, what are we going to do to protect our water supply from terrorists, and as well as keeping some of the storage on Silver Lake property so we have an incentive to be there and protect that water supply.

As far as the security concern, we acknowledge that. That we do have security concerns on our water supply. And we have increased our surveillance of all of our water supplies. I know it's difficult to be everywhere all at once, but we have increased the security there, even at Silver Lake we have full-time -- full-time security there, as well as our other main water supplies. But that is a concern, and we have been taking steps to design additional fencing and security cameras and other things that will be there to help us, and those are being designed and implemented as we can.

We have considered, certainly, storage on site, and in -- we will be considering that in the Draft Environmental Impact Report. I would encourage you to make that formal statement. And we certainly have heard you tonight, and we will analyze that as part of the evaluation with the EIR, as far as where to place that storage.

UNIDENTIFIED SPEAKER: Don't be afraid to disagree with your councilman. I'm disagreeing with what is -- my what is right for Silver Lake, not what is right for everybody else, what is right for Silver Lake, because Silver Lake has been good to us, and we have to be good to Silver Lake. And we have to protect it. Thank you.

MR. SINGLEY: Back there -- there you go.

UNIDENTIFIED SPEAKER: Is this a capital expenditure and how are you going to finance it?

MR. SINGLEY: It certainly is a capital expenditure and we have a very large program, because of all these reservoirs that we are having to deal with. Basically they are paid by rates, by water rates. They are not paid by taxpayer money. We've had to get additional financing that stretches out those payments through our -- through our rates. I'm not allowed to say something about increasing rates or anything. But basically they are handled through our capital improvement program and those are all paid by water rates.

Yes.

UNIDENTIFIED SPEAKER: Since the construction phase is scheduled to start maybe three to four years still from now, this will affect, definitely the master plan implementation, and do you have any close relationship with the design firm who prepares the master plan?

MR. SINGLEY: Very close. No, we worked hand in hand, both with the citizen's committee, and the design firm that did that. In fact, we paid for that master plan. You know, it was our funding that got that done. So that's a complete document. And we've stated in our subcommittee meetings with the group that's been promoting the master plan, that we will allow -- Okay. Are you talking about the Griffith Park master plan or the Silver Lake?

UNIDENTIFIED SPEAKER: Silver Lake master plan.

MR. SINGLEY: I thought so. But we have already stated that if -- if there are -- you know, the master plan is based on the idea that we were open to the idea of having additional outside funding for improvements on the property. If those funding -- if that funding becomes available, we'd work with the community to try to implement some of that. We're already doing that on West Silver Lake Drive. If additional money becomes available for additional work to implement the master plan we're not opposed to moving forward with that. That could happen in the interim, you know, as well as before and after the plan. So I think it just -- it's still a valid document and we move forward with that.

Okay. Just a couple more and then I'd like to get into our formal comments.

Sure.

UNIDENTIFIED SPEAKER: Yeah, I'm very concerned about where you're going with the master plan. I understand what they're planning on the west side, on West Silver Lake Drive, like making the street 14 feet narrower. And I know people who live on West Silver Lake and they don't like it at all. And it seems to me that your are spearheading this and you really haven't had community input.

And to me any monies we get should be spent for the whole reservoir, to make it safer for all the people that walk around it, the children and families and, even the joggers. And to take that money and spend it on West Silver Lake Drive, making it narrower, putting in a median, which is only going to be a hazard to me, is all wrong. And if that's part of the master plan, then that part of the master plan needs to be discussed with the community.

MR. SINGLEY: Thank you. The question was, there was a concern -- there's a concern on what we're planning to do at West Silver Lake Drive. Let me just describe that just briefly, what the plan is. And basically, it is -- I think the number one feature of that is for safety, because you know that -- absolutely -- there's going to be a raised -- raised curb. And, basically there's 14 feet of availability for walking, jogging, whatever along that area, which is now just a series of stripes and open to car traffic and whatever else. So that -- the initial thought was, that was the priority that's -- that illustrated in the master plan, is that safety was the first concern. So that was one project that was specifically for safety as well as the esthetics there.

UNIDENTIFIED SPEAKER: It's really not, for a couple million dollars. For a couple million dollars we could paint that fencing to look really descent. And all we need is a couple of yellow stripes all the way around the reservoir. But that is hazardous, what you are talking about, putting a median there.

MR. SINGLEY: No, there's no median in the middle of the road it's just -- that becomes the new curb.

UNIDENTIFIED SPEAKER: No. It's 14-feet, that's not safer. That's hazardous. You should have a discussion with the community before you allow that to happen.

MR. SINGLEY: Thank you.

UNIDENTIFIED SPEAKER: May I just add to that. I don't understand why the concentration is on the west side of the lake, which already has sidewalk, and people do walk back and worth freely. While we walk around the east side of the lake, and that is really, really, really dangerous crossing the street with the raised areas there and no sidewalk around the dog park there. And I don't understand why that east side is being neglected.

MR. SINGLEY: Okay. We -- we chose to start in one area by recommendation of the subcommittee that's been implementing this master plan. I think we need to move on. The question was, why not sidewalks in other areas? Well, we had to start somewhere, and that became the part that we decided as a group that would make the most sense.

UNIDENTIFIED SPEAKER: I didn't say sidewalk; I said safety. There's a big difference there, too, sidewalks and safety.

MR. SINGLEY: For safety.

Is there a final question?

UNIDENTIFIED SPEAKER: A couple comments. One is I find it really disturbing that our two councilpeople aren't even here for such an important meeting. And I'm kind of upset about that.

The second thing is, I as a citizen of Silver Lake, need to be convinced that draining the lake is the only way to go. I understand why not building something on the street underneath is not feasible, but I'm not convinced that you've explored every other possibility. Because for us that lake, that water is a way of surviving an otherwise chaotic environment, and take that away from us, is a problematic.

MR. SINGLEY: That kind of statement is what we need to have, you know, formalized and we will certainly -- we've heard that. And something that we need to evaluate in the Draft Environmental Impact Report. Because that's exactly what the impact report should address, those kind of comments, is those kind of statements.

So I would encourage you to put that in writing and let us evaluate that as we prepare the Environmental Impact Report. And that's a very good comment. Thank you.

Yes. Right now what I would like to do is have everybody, again, pass your comment cards to the middle, and we'll collect those. And if you've got some statements of things that you would like us to address in the EIR if we haven't covered those, or things that you would like to have us cover, specifically about this project.

The master plan, of course, is a little bit beyond the scope of this specific project, because it's -- it's something that's ongoing and outside the construction of the Headwork project, and the construction project of the Silver Lake itself. It's independent of the actual construction project.

But we would like to hear those statements. So if you'd -- and I think we've collected those. And what we will do is, I will turn the time over to Jim Hunter, who will be instrumental in working and drafting this Environmental Impact Report along with the CH2M Hill firm. And he will facilitate the statement portion of the meeting tonight.

MR. SINGLEY: Jim.

MR. HUNTER: Thank you, Glenn.

Marty just wanted me to remind you all that the purpose of this portion is not to get into an interactive discussion with you all about your comments, but really just to give you the opportunity to stand up and voice what the comments are for the public record, so that they can be entered into the transcript that we're taking tonight. And that we can have them fully at our disposal to address in the draft EIR. So, with that I'd like to go ahead and call the first speaker up to make their comments.

The first speaker card I have here is Mr. Dennis Nutter.

MR. NUTTER: I just spoke. I got ahead of you. Sorry about that. I just got mixed up.

MR. HUNTER: Great. Thank you, Dennis.

Dave Keitel.

MR. KEITEL: My name is Dave Keitel. I'm the president of the Committee to Save Silver Lake Reservoirs. The CSSLR, as many of you know have -- has been working for this community for about 15 years. And we see our charge as seeing that nothing destroys or interferes or unduly restricts this community's use of the reservoir, which is a Los Angeles City Historic Natural Monument, and whose name we share.

The 17-member board of directors has actively participated in the citywide mediation between the DWP and the City's reservoir neighborhoods, known as The Coalition to Preserve Open Water Reservoirs. Over the last few years we've sought and gathered this community's input during the master plan process.

We've obtained funding for the first stages of that process, and we are currently working with the DWP and the two council offices to implement those improvements. And there's more than just West Silver Lake involved there. There's an Armstrong project, there's -- it has to be phased based on where the money is.

CSSLR acknowledges the benefits of avoiding many years of construction in the Silver Lake bowl, in the reservoir area, but it's very concerned that the notice of preparation that's been issued by the DWP for this process, does not adequately address the future care and management of the reservoir property, both the water and the surrounding land.

Specifically the NOP says, "that the operation of the Silver Lake reservoirs would change." It offers no hint of what that means.

While the described project appears to be at the Headwork site, it really is one project, but it's at two locations, one cannot work without the other. Taking the Silver Lake reservoirs off line, in itself, carries significant impacts to this community that must be addressed in this EIR process.

Being short-sighted and not addressing those long-term impacts in a holistic manner would not only violate CEQA, but it would ultimately be a much bigger problem for the DWP, as it surely must know from its experiences in the Owens Valley. We look forward to working within this process to ensure the project includes a comprehensive management plan for the reservoirs and the surrounding property and for the completion of all of the master plan improvements. This community was created and grew up with the reservoirs as its focal point, that will not change as a result of this project. And we will submit a more detailed written response within the comment period. Thank you.

MR. HUNTER: Next speaker, Wes Joe.

MR. JOE: Hi, I'm a resident of Silver Lake, and I think Silver Lake is a real resource to our community. I know that as part of this project, seems like you're considering draining the reservoir, and basically changing it's use from water storage to who knows what. So I'd like to just propose that as part of the scope of review, the reconfiguration of the reservoir itself for the optimal consideration for recreation be considered. That perhaps some water habitat recreation.

If we are going to have this thing drained, I think that perhaps, if we want to have recreational uses for this big body of water, that would be the time to look into that, or at least find out what the concerns are with that type of consideration. Thank you.

MR. HUNTER: Next speaker, Maryann Kuk.

MS. KUK: Good evening. I'm Maryann Kuk, and I serve as president of the Silver Lake Residents Association. This Association was formed 35 years ago over yet another reservoir issue. And while SLRA has other issues our 900 members continue to consider the reservoir our primary concern. We have participated in the ongoing mediations with the DWP and the coalition to preserve open reservoirs since the very beginning. Others have already pointed out that the project disposition needs to add and needs to include the ultimate fate of the Silver Lake property.

This project, Headwork storage, and the Silver Lake bypass line and regulating station, they will operate together. Silver Lake was presented with the project of a huge construction project in order for the DWP to meet more stringent water storage requirements. None of the options presented were in line with the enhancement of the master plan, with a short-term plan, long-term plan, in that the project would begin with the mitigation that there would be the full implementation of the master plan.

Earlier this year we learned the good news/bad news. The DWP was seriously encouraging an off-site storage, which would mean no major construction project in this densely populated neighborhood. But the bad news was the uncertainly as to the long-term care and management of the property. We, in Silver Lake, didn't want it to be hoisted on another community and wherever we support the Headwork development we want the area to be fully described in the environmental impact on what was to be the spreading grounds. Its use will be precluded by the proposed project. We want to know what is the impact of the future of the river, the L.A. River and further along towards reconstruction. Right now, it's further developed than any of us would have imagined 15 years ago. And we in Silver Lake applaud and support what is being done to turn this blossoming treasure into an asset to the City and community.

In addition it should be emergency water storage, just as it is in Hollywood. A hundred years ago Mulhullands agreed on reliable and safe water which was secured by reservoirs on the city side of the San Andreas fault, and the San Gabriel mountains. It was good redundancy in engineering then, why not now?

Thank you.

MR. HUNTER: Thank you.

The next speaker is Robert Levonan.

MR. LEVONAN: I'm here on behalf of Sinai Temple going to Mount Sinai Memorial Park. If you look at the areal photo up there, you will know that Mount Sinai Memorial Park is probably the one and only private property that is directly adjacent to this, the proposed development. I want to state for the record that we are in support of this project, and we do look forward to the EIR documents.

There are a couple of items that we would like to make sure that are addressed within the EIR documents at this stage and they are as follows:

We have concerns regarding so-called passive recreation on top of an 11-million-gallon reservoir, exactly what will that passive recreation be, and how would that impact us? I want to point out that Mount Sinai Memorial Park is 84 acres and 74 percent of that property looks down on this property, and it's 12 to 15 percent grades all the way down. So those kinds of issues do concern us.

Another issue that we're going to ask is what the major implications with that four-megawatt hydroelectric generation plant will be, because I understand that is going to be above ground. And finally this project, as you indicated will take six years or more, and what will it take during the construction phase, the traffic particularly on Forest Lawn Drive, and how it affects our operations.

Again, as I stated, we do support this project. And we look forward to the EIR documents that we can review that will hopefully mitigate some of these concerns.

Thank you very much.

MR. HUNTER: Thank you.

Next speaker is Jeff Carr.

MR. CARR: A little bit smaller in scope than many of the other issues that have been addressed. But on that small issue of having the main machine there at the south of the reservoir and having -- albeit not a huge regulating station, but something of a footprint, something of an esthetic impact, could we be looking at ways to minimize that to the greatest extent possible, including, if feasible, having something added with the existing tower, have -- somehow having it so it doesn't impact on the very limited green space that's open to the public that is there surrounding the reservoir at the present time.

MR. HUNTER: Thank you.

And L. Jenks.

MR. JENKS: There's no way to know at this time what everything is going to be when it's completed. But I would suggest keeping water in the reservoir in the event of fire, it's a place for water dropping helicopters to load.

Thank you.

MR. HUNTER: Thank you.

Did we miss anyone else that would like to speak on the draft EIR?

MR. SINGLEY: Would you --

UNIDENTIFIED SPEAKER: Yes, 2023 Kennelworth in L.A., 90039. Next year marks the 100th year since the LAWP excavated the land for the Silver Lake Reservoir Complex. If DWP plans on taking the reservoir out of service on completion of the Headwork portion of the project, and they have indicated they may not be supporting the nonpotable phase, in the past LAWP was also in the -- directly in the business of supporting a beautiful body of water, supporting a city cultural monument, the reservoir, supporting recreation, supporting a long-range master plan, supporting animal habitats, supporting open use, and unique homes and historic architecture, and most of all supporting one of the City's most unique.

They need to -- the DWP needs to follow the CEQA guidelines which they haven't done in the NOP, by revising the NOP to long-and-short-term environmental impact, and now within this EIR.

MR. HUNTER: Anyone else wish to speak?

MR. SINGLEY: Well, I thank you all for the comments. Good questions. We will be, as you know, start marking up these thing we will certainly be available to answer any additional questions that you have and be around here for a few more minutes. Again, Paul Liu, is basically our project manager. And he will be completing additional comments, you will see that his e-mail address is on the back of your handout. It's not? Okay. He's going to give you his e-mail address. And let me have him do that right now.

MR. LIU: Thank you, Jim.

Again, I apologize that it's not on the back, it's much easier to e-mail me your comments because they have to be written, the address is, Paul.liu -- L-I-U, like it shows my name on the back -- @LAWD.COM. I'll repeat it, again.

We look forward to your comments, and also I do want to remind you that you can currently go to our website now. Our website now -- and it will have the NOP on there, LAWD.LAWP.com. However within a couple of weeks there will be a separate website for just the Silver Lake project, SilverLakereplacementproject.com.

MR. HUNTER: SilverLakeStorageReplacement.Com.

MR. LIU: That will be the official website for this project. And you can also get there within a couple of weeks by going onto LAWP.com.

So thank you, and I guess this concludes our meeting.

(Hearing concluded at 9:15 p.m.)

REPORTER'S CERTIFICATE

I, CARRIANNE M. TRIGG, CSR NO. 11955, A CERTIFIED SHORTHAND REPORTER FOR THE STATE OF CALIFORNIA, DO HEREBY CERTIFY:

THAT THE FOREGOING TRANSCRIPT OF PROCEEDINGS WAS TAKEN BEFORE ME ON WEDNESDAY, SEPTEMBER 11, 2003, AT THE TIME AND PLACE THEREIN SET FORTH, AND WAS TAKEN DOWN BY ME IN SHORTHAND, AND THEREAFTER TRANSCRIBED INTO TYPEWRITING UNDER MY DIRECTION AND SUPERVISION;

AND I HEREBY CERTIFY THAT THE FOREGOING TRANSCRIPT OF PROCEEDINGS IS A FULL, TRUE AND CORRECT TRANSCRIPT OF MY SHORTHAND NOTES SO TAKEN.

I FURTHER CERTIFY THAT I AM NEITHER COUNSEL FOR NOR RELATED TO ANY PARTY TO SAID ACTION, NOR IN ANYWISE INTERESTED IN THE OUTCOME THEREOF.

IN WITNESS THEREOF, I HAVE HEREUNTO SUBSCRIBED MY NAME THIS 17TH DAY OF OCTOBER, 20 03.

Carrianne M. Trigg

CARRIANNE M. TRIGG, CSR NO. 11955
CERTIFIED SHORTHAND REPORTER
FOR THE STATE OF CALIFORNIA

State of California - The Resources Agency

GRAY DAVIS, *Governor*

DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
4949 Viewridge Avenue
San Diego, CA 92123
(858) 467-4201

Paul E. Liu
SEP 16 2003

September 12, 2003

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Los Angeles, CA 90051

Notice of Preparation for
Silver Lake Reservoir Complex Storage Replacement Project

Dear Mr. Liu:

The Department of Fish and Game (Department) appreciates this opportunity to comment on the above-referenced project, relative to impacts to biological resources. The proposed project involves the removal of the Silver Lake and Ivanhoe Reservoirs (SLRC) located in the community of Silver Lake in the City of Los Angeles, from direct service to the Los Angeles County Department of Water and Power (LADPW) water distribution system and replacing the SLRC water storage by constructing a 110-million gallon underground covered storage reservoir beneath the former Headworks Spreading Grounds near Griffith Park in the City of Los Angeles.

To enable Department staff to adequately review and comment on the proposed project we recommend the following information, where applicable, be included in the Draft Environmental Impact Report:

1. A complete, recent assessment of flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened, and locally unique species and sensitive habitats.

    a. A thorough recent assessment of rare plants and rare natural communities, following the Department's Guidelines for Assessing Impacts to Rare Plants and Rare Natural Communities (Attachment 1).

    b. A complete, recent assessment of sensitive fish, wildlife, reptile, and amphibian species. Seasonal variations in use of the project area should also be addressed. Recent, focused, species-specific surveys, conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with the Department and U.S. Fish and Wildlife Service.

    c. Rare, threatened, and endangered species to be addressed should include all those which meet the California Environmental Quality Act (CEQA) definition (see CEQA Guidelines, Section 15380).

    d. The Department's California Natural Diversity Data Base in Sacramento should be contacted at (916) 327-5960 to obtain current information on any previously reported sensitive species and habitats, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code. Also, any Significant Ecological Areas (SEAs) or Environmentally Sensitive Habitats (ESHs) or any areas that are considered sensitive by the local jurisdiction that are located in or adjacent to the project area must be addressed.

2. A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts. This discussion should focus on maximizing avoidance, and minimizing impacts.

   a. CEQA Guidelines, Section 15125(a), direct that knowledge of the regional setting is critical to an assessment of environmental impacts and that special emphasis should be placed on resources that are rare or unique to the region.

   b. Project impacts should also be analyzed relative to their effects on off-site habitats and populations. Specifically, this should include nearby public lands, open space, adjacent natural habitats, and riparian ecosystems. Impacts to and maintenance of wildlife corridor/movement areas, including access to undisturbed habitat in adjacent areas, should be fully evaluated and provided. The analysis should also include a discussion of the potential for impacts resulting from such effects as increased vehicle traffic and outdoor artificial lighting.

   c. A cumulative effects analysis should be developed as described under CEQA Guidelines, Section 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats.

   d. Impacts to migratory wildlife affected by the project should be fully evaluated. This can include such elements as migratory butterfly roost sites and neo-tropical bird and waterfowl stop-over and staging sites. All migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (50 C.F.R. Section 10.13). Sections 3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of birds and their active nests, including raptors and other migratory nongame birds as listed under the MBTA.

   e. Impacts to all habitats from City or County required Fuel Modification Zones (FMZ). Areas slated as mitigation for loss of habitat shall not occur within the FMZ.

   f. Proposed project activities (including disturbances to vegetation) should take place outside of the breeding bird season (February 1- September 15) to avoid take (including disturbances which would cause abandonment of active nests containing eggs and/or young). If project activities cannot avoid the breeding bird season, nest surveys should be conducted and active nests should be avoided and provided with a minimum buffer as determined by a biological monitor (the Department recommends a minimum 500-foot buffer for all active raptor nests).

3. A range of alternatives should be analyzed to ensure that alternatives to the proposed project are fully considered and evaluated. A range of alternatives which avoid or otherwise minimize impacts to sensitive biological resources including wetlands/riparian habitats, alluvial scrub, coastal sage scrub, native woodlands, etc. should be included.

Specific alternative locations should also be evaluated in areas with lower resource sensitivity where appropriate.

a. Mitigation measures for project impacts to sensitive plants, animals, and habitats should emphasize evaluation and selection of alternatives which avoid or otherwise minimize project impacts. Compensation for unavoidable impacts through acquisition and protection of high quality habitat elsewhere should be addressed.

b. The Department considers Rare Natural Communities as threatened habitats having both regional and local significance. Thus, these communities should be fully avoided and otherwise protected from project-related impacts (Attachment 2).

c. The Department generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species. Department studies have shown that these efforts are experimental in nature and largely unsuccessful.

4. A California Endangered Species Act (CESA) Permit must be obtained, if the project has the potential to result in "take" of species of plants or animals listed under CESA, either during construction or over the life of the project. CESA Permits are issued to conserve, protect, enhance, and restore State-listed threatened or endangered species and their habitats. Early consultation is encouraged, as significant modification to the proposed project and mitigation measures may be required in order to obtain a CESA Permit. Revisions to the Fish and Game Code, effective January 1998, require that the Department issue a separate CEQA document for the issuance of a CESA permit unless the project CEQA document addresses all project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of a CESA permit. For these reasons, the following information is requested:

a. Biological mitigation monitoring and reporting proposals should be of sufficient detail and resolution to satisfy the requirements for a CESA Permit.

b. A Department-approved Mitigation Agreement and Mitigation Plan are required for plants listed as rare under the Native Plant Protection Act.

5. The Department opposes the elimination of watercourses and/or their channelization or conversion to subsurface drains. All wetlands and watercourses, whether intermittent, ephemeral, or perennial, must be retained and provided with substantial setbacks which preserve the riparian and aquatic habitat values and maintain their value to on-site and off-site wildlife populations.

a. The Department requires a Streambed Alteration Agreement (SAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant prior to any direct or indirect impact to a lake or stream bed, bank or channel or associated riparian resources. The Department's issuance of a SAA may be a project that is subject to CEQA. To facilitate our issuance of the Agreement when CEQA applies, the Department as a responsible agency under CEQA may consider the local jurisdiction's (lead agency) document for the project. To minimize additional requirements by the Department under CEQA the document should fully identify the potential impacts to the lake, stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the Agreement. Early consultation is recommended, since modification of the proposed project may be required to avoid or reduce impacts to fish and wildlife resources.

The Department suggests a pre-project or early consultation planning meeting for all projects. To make an appointment, please call Scott Harris, Wildlife Biologist, at (818) 360-8140. Thank you for this opportunity to provide comment.

Sincerely,

Scott Harris for

Morgan Wehtje
Environmental Scientist IV

Attachments

cc: Mr. Scott Harris
Ms. Betty Courtney
Department of Fish & Game

Mr. Scott Morgan
State Clearinghouse

SPH:sph

ATTACHMENT 1

State of California
THE RESOURCES AGENCY
Department of Fish and Game
May 4, 1984

GUIDELINES FOR ASSESSING THE EFFECTS OF PROPOSED DEVELOPMENTS ON RARE AND ENDANGERED PLANTS AND PLANT COMMUNITIES

The following recommendations are intended to help those who prepare and review environmental documents determine when a botanical survey is needed, who should be considered qualified to conduct such surveys, how field surveys should be conducted and what information should be contained in the survey report.

1. Botanical surveys that are conducted to determine the environmental effects of a proposed development should be directed to all rare and endangered plants and plant communities. Rare and endangered plants are not necessarily limited to those species which have been "listed" by state and federal agencies but should include any species that, based on all available data, can be shown to be rare and/or endangered under the following definitions.

   A species, subspecies or variety of plant is "endangered" when the prospects of its survival and reproduction are in immediate jeopardy form one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition or disease. A plant is "rare" when, although not presently threatened with extinction, the species, subspecies or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.

   Rare plant communities are those communities that are of highly limited distribution. These communities may or may not contain rare or endangered species. The most current version of the California Natural Diversity Data Base's Outline of Terrestrial Communities in California may be used as a guide to the names of communities.

2. It is appropriate to conduct a botanical field survey to determine if, or the extent that, rare plants will be affected by a proposed project when:

   a. Based on an initial biological assessment, it appears that the project may damage potential rare plant habitat;

   b. Rare plants have historically been identified on the project site, but adequate information of impact assessment is lacking; or

   c. No initial biological assessment has been conducted and it is unknown whether or not rare plants or their habitat exist on the site.

3. Botanical consultants should be selected on the basis of possession of the following qualifications (in order of importance):

   a. Experience as a botanical field investigator with experience in field sampling design and field methods;

   b. Taxonomic experience and a knowledge of plant ecology;

   c. Familiarity with the plants of the area, including rare species; and

   d. Familiarity with the appropriate state and federal statutes related to rare plants and plant collecting.

4. Field surveys should be conducted in a manner that will locate any rare or endangered species that may be present. Specifically, rare or endangered plant surveys should be:

   a. Conducted at the proper time of year when rare or endangered species are both "evident" and identifiable. Field surveys should be scheduled (1) to coincide with known flowering periods, and/or (2) during periods of phenological development that are necessary to identify the plant species of concern.

b. Floristic in nature. "Predictive surveys" (which predict the occurrence of rare species based on the occurrence of habitat or other physical features rather than actual field inspection) should be reserved for ecological studies, not for impact assessment. Every species noted in the field should be identified to the extent necessary to determine whether it is rare or endangered.

c. Conducted in a manner that is consistent with conservation ethics. Collection of rare or suspected rare species (voucher specimens) should be made only when such actions would not jeopardize the continued existence of the population and in accordance with applicable state and federal permit regulations. Voucher specimens should be deposited at recognized public herbaria for future reference. Photography should be used to document plant identification and habitat whenever possible, but especially when the population cannot withstand collection of voucher specimens.

d. Conducted using systematic field techniques in all habitats of the site to ensure a reasonably thorough coverage of potential impact areas.

e. Well documented. When a rare or endangered plant (or rare plant community) is located, a California Native Species (or Community) Field Survey Form or equivalent written form should be completed and submitted to the Natural Diversity Data Base.

5. Reports of botanical field surveys should be included in or with environmental assessments, negative declarations, EIR's and EIS's, should contain the following information:

a. Project description, including a detailed map of the project location and study area.

b. A written description of biological setting referencing the community nomenclature used and a vegetation map.

c. Detailed description of survey methodology.

d. Dates of field surveys.

e. Results of survey (including detailed maps).

f. An assessment of potential impacts.

g. Discussion of the importance of rare plant populations with consideration of nearby populations and total species distribution.

h. Recommended mitigation measures to reduce or avoid impacts.

i. List of all species identified.

j. Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms.

k. Name of field investigator(s).

l. References cited, persons contacted, herbaria visited, and disposition of voucher specimens.

Sensitivity Rankings (Cont.)

Community Name

S1.2 Southern Foredunes
Mono Pumice Flat
Southern Interior Basalt Fl. Vernal Pool

S2.1 Venturan Coastal Sage Scrub
Diegan Coastal Sage Scrub
Riversidean Upland Coastal Sage Scrub
Riversidean Desert Sage Scrub
Sagebrush Steppe
Desert Sink Scrub
Mafic Southern Mixed Chaparrel
San Diego Mesa Hardpan Vernal P.
San Diego Mesa Claypan Vernal P.
Alkali Meadow
Southern Coastal Salt Marsh
Coastal Brackish Marsh
Transmontane Alkali Marsh
Coastal and Valley Freshwater Marsh
S. Arroya Willow Riparian Forest
Southern Willow Scrub

Modoc-G.Bas. Cottonwood Willow Rip.
Modoc-Great Basin Riparian Scrub
Mojave Desert Wash Scrub
Engelmann Oak Woodland
Open Engelmann Oak Woodland
Closed Engelmann Oak Woodland
Island Oak Woodland
California Walnut Woodland
Island Ironwood Forest
Island Cherry Forest
S. Interior Cypress Forest
Bigcone Spruce-Canyon Oak Forest

S2.2 Active Coastal Dunes
Active Desert Dunes
Stab. and Part. Stab. Desert Dunes
Stab. and Part. Stab. Desert Sandfield
Mojave Mixed Steppe
Transmontane Freshwater Marsh
Coulter Pine Forest
S. California Fellfield
White Mountains Fellfield

S2.3 Bristlecone Pine Forest
Limber Pine Forest

ATTACHMENT 2

Sensitivity of Top Priority Rare Natural Communities in Southern California*

*Sensitivity rankings are determined by the Department of Fish and Game, California Natural Diversity Data Base and based on either number of known occurrences (locations) and/or amount of habitat remaining (acreage). The three rankings used for these top priority rare natural communities are as follows:

S1.- Less than 6 known locations and/or on less than 2,000 acres of habitat remaining

S2.- Occurs in 6-20 known locations and/or 2,000-10,000 acres of habitat remaining

S3.- Occurs in 21-100 known locations and/or 10,000-50,000 acres of habitat remaining

The number to the right of the decimal point after the ranking refers to the degree of threat posed to that natural community regardless of the ranking. For example:

S1.1 = very threatened
S2.2 = threatened
S3.3 = no current threats known

Sensitivity Rankings (February 1992)

Rank	Community Name	
S1.1	Mojave Riparian Forest	Southern Dune Scrub
	Sonoran Cottonwood Willow Riparian	Southern Coastal Bluff Scrub
	Mesquite Bosque	Maritime Succulent Scrub
	Elephant Tree Woodland	Riversidean Alluvial Fan Sage Scrub
	Crucifixion Thorn Woodland	Southern Maritime Chaparral
	Allthorn Woodland	Valley Needlegrass Grassland
	Arizonan Woodland	Great Basin Grassland
	Southern California Walnut Forest	Mojave Desert Grassland
	Mainland Cherry Forest	Pebble Plains
	Southern Bishop Pine Forest	Southern Sedge Bog
	Torrey Pine Forest	Cismontane Alkali Marsh
	Desert Mountain White Fir Forest	

LOS ANGELES CITY COUNCIL

Eric Garcetti

Councilmember, District 13

September 22, 2003

Department of Water and Power
Att. Paul Liu
111 N. Hope St, Room 1449
Los Angeles, CA 98051-0100

RE: Silver Lake Reservoir Complex Storage Replacement Project

Mr. Liu:

I look forward to reviewing the LA DWP's proposal for Silver Lake Reservoir Complex Storage Replacement Project and participating in the environmental review process. I believe a preferred alternative that locates the underground water storage on the "headworks" site will earn public support.

The Environmental Review of the Silver Lake Reservoir Complex Storage Replacement Project should address the broad range of regional and local impacts of the project, and be available for review by the residents affected. I can identify the following issues that should be addressed:

1. Impact to air quality and noise from operation of on-road and off-road construction vehicles during construction, and exposure of people sensitive to poor air quality to airborne pollutants.
2. Impact, presumably positive, on the ability of the LA-DWP to meet State and Federal water quality standards, and to protect and preserve water resources elsewhere.
3. Impact on the recreation facilities south of the Silver Lake Dam and on the Los Angeles River, and impact of the project on the recreation needs of the population. The City of Los Angeles has far less open space and recreation area than is typical nationwide, and this part of the City has only 0.38 acres of open space per 1000 people, compared to San Francisco with 10.3 acres/1000, and San Diego with 30.8 acres/1000, and a nationwide standard of 10 acres/1000. Developing additional recreation or open space resources is exceptionally important.
4. Impact on the DWP-adopted Master Plan for the Silver Lake Reservoir Complex and the uses of the Silver Lake Reservior over the long term.
5. Impact on the County of LA River Master Plan.

200 North Spring Street, Room 470 • Los Angeles CA 90012 • (213) 473-7013 • (213) 613-0819 fax • garcetti@council.lacity.org

6. Impacts on habitat for animals including at Silver Lake Reservoir 7 identified nests of Great Blue Herons west of the Ivanhoe dam, known coyote habitat, and potential habitats in the highly vegetated areas, with no foot traffic, on the east side of the reservoir. On the Los Angeles River, impact on the animals that gravitate there for the water and cover of brush, and impacts on the movement of migratory birds during and after the construction period.
7. Impact on the existing visual character of the host Silver Lake neighborhood during the construction period, when the reservoir will be empty, and after construction when the water color will change, including views from the designated Scenic Highway of Silver Lake Blvd, and pervasive views of the lake.
8. Impact on the City of Los Angeles solid waste disposal system of the construction waste generated.

Sincerely,

E. Garcetti

Eric Garcetti
Council Member
Los Angeles City Council District 13

State of California—Health and Human Services Agency
Department of Health Services

California Department of Health Services
DIANA M. BONTÁ, R.N., Dr. P.H.
Director

GRAY DAVIS
Governor

September 22, 2003

Mr. Paul Liu
Department of Water and Power
City of Los Angeles
111 North Hope Street, Room 1348
Los Angeles, CA 90051

Dear Mr. Liu:

SYSTEM NO. 1910067 – SILVER LAKE RESERVOIR COMPLEX STORAGE REPLACEMENT PROJECT, SCH# 2003081133

The California Department of Health Services, Southern California Drinking Water Field Operations Branch (the Department) has reviewed the Notice of Preparation for the Silver Lake Reservoir Complex Storage Replacement Project (the Project) draft Environmental Impact Report (EIR). The City of Los Angeles Department of Water and Power (the City) proposes to replace the potable water storage facilities in the Silver Lake Reservoir Complex (SLRC), which are uncovered, with a new, underground, covered storage reservoir at the former Headworks Spreading Grounds (HWSG) site. In preparing the draft EIR, the City should consider the following comments:

1. The 110-million gallon (MG) potable water storage reservoir would be buried and covered with a 15-acre natural space or park, and the remainder of the HWSG site might be converted into a natural ecosystem, including wetlands. The EIR should describe measures to protect the potable water supply from infiltration, animals, and other on-site sanitary hazards, including deliberate tampering with reservoir vents, access ways, overflow structures, and so forth.

2. The project description states that, in addition to the HWSG storage facility, new connections with the Metropolitan Water District of Southern California (MWD) will be installed to replace the storage capacity of the SLRC. The EIR should specify the anticipated annual increase, if any, in treated water purchases from the MWD. If there is a significant net increase, the EIR should discuss the sustainability of this source of supply in relation to the MWD's strategic plan.

Southern California Drinking Water Field Operations Branch, Los Angeles Region
1449 West Temple Street, Room 202, Los Angeles, CA, 90026
Telephone: (213) 580-5723 *FAX:* (213) 580-5711
Internet Address: www.dhs.ca.gov/ps/ddwem/

3. The bypass line at the SLRC would be submerged in a body of non-potable water. The EIR should discuss measures for protecting the bypass line from infiltration and for detecting leaks into or out of the submerged pipe.

4. The Project includes a 4-megawatt hydroelectric power generating facility at or near the HWSG site, presumably utilizing the supply line for the proposed 110-MG reservoir. The EIR should address any potential sanitary issues associated with the generating facility, including maintenance of the turbine and ancillary features.

5. The EIR should describe the City's long-term plans for maintenance of and access to the SLRC site, and state whether the SLRC will be available as an emergency water source.

In order to incorporate the new facilities into the water system, the City must obtain an amended domestic water supply permit from the Department. The permit application should include an engineering report that describes the proposed facilities and their operation. The engineering report should address the above comments in detail, along with any other potential effect on drinking water quality. If you have any questions, please contact Mr. Stefan Cajina at (213) 580-3127.

Sincerely,

Jeff O'Keefe, P.E.
District Engineer
Metropolitan District

cc: State Clearinghouse
Governor's Office of Planning and Research
P.O. Box 3044
Sacramento, CA 95812-3044

SDWSRF-Environmental Coordinator (w/route slip)
601 North 7th Street, MS 92
P.O. Box 942732
Sacramento, CA 94234-7320

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

JAMES A. NOYES, Director

900 SOUTH FREMONT AVENUE
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Telephone: (626) 458-5100
www.ladpw.org

ADDRESS ALL CORRESPONDENCE TO:
P.O BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE
REFER TO FILE: WM-4

September 23, 2003

Mr. Glenn Singley, Director
Water Planning and Project Management
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90051

Dear Mr. Singley:

**RESPONSE TO A NOTICE OF PREPARATION OF
A DRAFT ENVIRONMENTAL IMPACT REPORT
SILVER LAKE RESERVOIR COMPLEX STORAGE
REPLACEMENT PROJECT
CITY OF LOS ANGELES**

Thank you for the opportunity to provide comments on the subject document. The proposed project would remove Silver Lake and Ivanhoe Reservoirs (850 million gallons total) from direct service to the Los Angeles Department of Water and Power water distribution system. Water storage currently provided by the Silver Lake Reservoir complex would be replaced by a 110-million gallon underground covered space reservoir at the former Headworks Spreading Grounds along with additional Metropolitan Water District of Southern California. Headworks Spreading Grounds is located at 6001 West Forest Lawn Drive in the City of Los Angeles. We have reviewed the submittal and offer the following comments.

<u>Environmental Programs</u>

We have reviewed the subject document and have no comments.

If you have questions, please contact Mr. Robert Barker at (626) 458-5167.

<u>Geotechnical and Materials Engineering</u>

The Environmental Impact Report shall address the geotechnical issues identified in the Notice of Preparation/Initial Study.

Description of the project and the associated grading, i.e., existing and proposed grades, etc., must be shown on topographic map. Also, all geotechnical hazards must be identified, and any mitigation measures discussed in detail. The requested information shall be included in the appropriate documents, as requested by others.

The project is located within a mapped potentially liquefiable area, per the State of California Seismic Hazard Zone Map, Burbank and Hollywood Quadrangles. However, a liquefaction analysis is not warranted at this time. Detailed liquefaction analyses, conforming to the requirements of the State of California Division of Mines and Geology Special Publication 117, must be conducted at the tentative map and/or grading/building plan stages.

<u>Land Development</u>

Grading and Drainage

This environmental document has been reviewed only for drainage and water quality impacts to Los Angeles County facilities. There are no further comments at this time.

If you have any questions, please contact Mr. Timothy Chen at (626) 458-4921.

Transportation Planning

The proposed project would not have any significant impacts on Los Angeles County Highways.

If you have any questions, please contact Mr. Hubert Seto at (626) 458-4349.

Traffic and Lighting

The project will not have any significant impact to County and County/City roadways in the area. No further information is required.

If you have any questions, please contact Ms. Marian Guirguis at (626) 300-4848.

Watershed Management

The proposed project should include investigation of watershed management opportunities to maximize capture of local rainfall on the project site, eliminate incremental increases in flows to the storm drain system, and provide filtering of flows to capture contaminants originating from the project site.

If you have any questions regarding the above comments or the environmental review process of Public Works, please contact Ms. Massie Munroe at the above address or at (626) 458-4359.

Very truly yours,

JAMES A. NOYES
Director of Public Works

ROD H. KUBOMOTO
Assistant Deputy Director
Watershed Management Division

MM:kk/dbm
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From: Liu, Paul
Sent: Wednesday, September 24, 2003 11:24 AM
To: Jim Hunter
Cc: Phan, Linh
Subject: FW: Notice of Preparation of a DEIR for the Silver Lake Reservoir Complex Storage Replacement Project

-----Original Message-----
From: Baker, Roger [mailto:RBaker@ci.burbank.ca.us]
Sent: Wednesday, September 24, 2003 10:40 AM
To: Liu, Paul
Subject: Notice of Preparation of a DEIR for the Silver Lake Reservoir Complex Storage Replacement Project

Dear Mr. Liu.
Given the time constraints I am sending you our comments on the Notice of Preparation of a DEIR for the Silver lake Reservoir Complex Storage Replacement Project via e-mail.

We received a Notice of Preparation of a Draft Environmental Impact Report for the Silver Lake Reservoir Complex Storage Replacement Project on our Planning Division Web Site E-Mail address on September 16, 2003. We have reviewed the project description and analysis of the project in the Initial Study and Checklist. We agree that the categories of Aesthetics, Air Quality, Noise, and Transportation / Traffic that you have identified as potentially significant do represent areas that we feel could cause potentially significant impacts.

AESTHETICS
We are concerned about the aesthetics of the project because it is a very visible location from both areas within Griffith Park and within the City of Burbank. Specific attention will need to be given to the visual character of any above grade facilities, light or glare caused by exterior security lighting, and landscape screening.

NOISE
We are concerned about construction and operational related noise.

Our Noise Ordinance restricts construction activities within 500-feet of any residentially zoned property to between 7:00 a.m. and 7:00 p.m. Monday through Friday, and between 8:00 a.m. and 5:00 p.m. on Saturday, and prohibits construction on Sunday. Even though this project may be over 500-feet from any residentially zoned property in the City of Burbank, we are concerned about the potential for construction related noise that might impact the residential neighborhoods during the evening after 7:00 p.m. and in the early morning hours before 7:00 a.m.

We are also concerned about operational noise associated with the hydroelectric power generating facility and the emergency generator between the hours of 7:00 p.m. and 7:00 a.m.

TRANSPORTION / TRAFFIC
We are concerned about construction vehicle traffic access to the 134 Freeway and to the Golden State Freeway. We are specifically concerned about the intersection of Forest Lawn Drive and Barham Boulevard and north bound access to the Golden State Freeway that would take construction vehicle traffic through the City of Burbank.

We are also concerned about the potential conflict between construction vehicle traffic and equestrian uses. The project description indicates that construction of the project is expected to last 6-years, and the project is surrounded by equestrian trails along Forest Lawn drive and within Griffith Park, and equestrian trails and uses surrounding access to the 134 Freeway at Victory Boulevard and north bound access to the Golden State Freeway at Western Avenue.

We are also concerned that the site plan for the proposed facilities be designed to accommodate any future widening of the 134 Freeway in the event this should occur.

Thank you for the opportunity to provide our comments on the preparation of an environmental impact report for the proposed project, and we would like to be included on the distribution list of any future information or environmental documentation.

Sincerely

Roger Baker
Deputy City Planner
City of Burbank
275 East Olive Avenue
Burbank, CA 91502

(818) 238-5250

LCB & ASSOCIATES, INC.

CEMETERY ENGINEERING, PLANNING AND DEVELOPMENT

436 WEST COLORADO BLVD., SUITE 215
GLENDALE, CALIFORNIA 91204-1568

BUS: (818) 242-4109
FAX: (818) 242-8368

8383 CENTER DRIVE, SUITE B
LA MESA, CALIFORNIA 91942-2913

September 4, 2003

Mr. Paul Liu
111 North Hope Street
Room 1348
Los Angeles, CA 90051

Re: SLRC at HWSG Project

Dear Mr. Liu:

I have reviewed the preliminary material provided to me, including the NOP, Attachment A and I have the following initial comments:

1. Throughout the document reference is being made to Mount Zion cemetery when in fact, the correct name is Mount Sinai.
2. We have some concerns regarding the "passive recreation" uses on top of the 110 MG underground reservoir, particularly as they relate to negative noise and visual impact to our cemetery.
3. What, if any, are the noise and visual impacts of the proposed 4 MW hydroelectric power generation facility?
4. The construction phase of this project is expected to last 6 years or more. What effect will this have on traffic, particularly cemetery traffic, on Forest Lawn Drive? Other related issues are construction noise at site and ingress/egress impacts on the normal business being conducted at the cemetery.

We at Mount Sinai do support this project and want to be actively involved in the mitigation of our concerns.

Very truly yours,

Robert H. Levonian

RHL/sam

Cc: Len Lawrence
Milo Mandel, Esq.
Ruben Poplawski
Martin Adams

AKIN GUMP
STRAUSS HAUER & FELD LLP

Attorneys at Law

CARLYLE W. HALL, JR.
310.728.3242/fax: 310.728.2242
cwhall@akingump.com

September 24, 2003

VIA EMAIL AND REGULAR MAIL

Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90051

Re: Notice of Preparation of Draft EIR for Silver Lake Reservoir Complex Storage Replacement Project

Dear Mr. Liu:

The Coalition to Preserve Open Reservoirs ("CPOR") has reviewed the Notice of Preparation of a Draft Environmental Impact Report ("EIR") for the Silver Lake Reservoir Complex Storage Replacement Project. We appreciate the opportunity to comment on the upcoming Draft EIR. Our comments are provided pursuant to the California Environmental Quality Act and their implementing guidelines. Pub. Res. Code § 21082.1; 14 Cal. Code Regs. § 15084(c).

I. SUMMARY OF PROPOSED SILVER LAKE RESERVOIR REPLACEMENT PROJECT

According to the Notice of Preparation ("NOP"), the Los Angeles Department of Water and Power ("DWP") proposes to remove the Silver Lake Reservoir Complex ("SLRC"), which presently provides 850 million gallons of reservoir capacity, from direct service to the DWP water distribution system. Many water storage functions currently provided by the SLRC would be replaced by a 110 million gallon underground covered storage reservoir at the former Headworks Spreading Grounds. The new water storage reservoir at the Headworks site would also be accompanied by a 4-megawatt hydroelectric power generating facility. Further, as a related aspect of the proposed project, the NOP states that certain new recreational and open space uses would be provided at the Headworks site.

The existing SLRC site will continue to provide DWP with certain long-term facilities and functions. These are described in the NOP as follows:

> A bypass line is ... needed to convey the water through the Silver Lake Complex to the rest of the system. This line would be approximately 3,200 feet of 72-inch diameter pipe installed at the bottom of Silver Lake

> Reservoir, connecting to an existing 60-inch diameter pipe in the reservoir. Silver Lake Reservoir would be drained for approximately one year during construction and refilled afterwards. In addition, 850 feet of 72-inch diameter pipeline would be installed to connect the new bypass pipeline with the new River Supply Conduit (RSC) at Tesla Avenue; this portion of pipeline would be installed by tunneling methods.
>
> A regulating station to control water pressure would be located at the SLRC just south of the Silver Lake Reservoir dam on West Silver Lake Drive. The purpose of the regulating station is to reduce excess pressure from the Headworks Reservoir before entering the distribution system. The station would be approximately 45-feet long by 25-feet wide, buried, with top access. (NOP, Attachment A, p. 3)

The NOP states that the SLRC facility and property would be maintained consistent with the appearance and condition that DWP has provided for several years and that no significant changes in condition or appearance are anticipated at this time. The NOP does not describe its long-term restoration or management plans for the SLRC facilities and site.

II. SIGNIFICANT POTENTIAL LONG-TERM ENVIRONMENTAL IMPACTS, ALTERNATIVES AND MITIGATION MEASURES SHOULD BE EVALUATED BY THE EIR

CPOR has strong concerns about the potential impacts of the proposed project, as described in the NOP, at both the SLRC and the Headwork Spreading Grounds site. CPOR requests that the Draft EIR investigate the following items.

A. <u>DWP Should Broaden the Proposed Project Description and the Anticipated Long-Term "Beneficial Uses"</u>

As a "related but separate project," the NOP describes certain steps it proposes to take to develop beneficial uses at the Headworks site, potentially including natural space/parkland for passive recreation on top of the proposed buried reservoir, and establishment of wetlands and/or a natural ecosystem consisting of native vegetation on the remainder of the Headworks site. It is not clear why DWP regards these proposed development uses as separate "projects," rather than an integral aspect of the proposed project or as proposed mitigation measures that would avoid or lessen the environmental impacts of a single project. <u>See</u> CEQA Guidelines, § 15378(a) ("project" is defined as the "whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment").

With respect to the SLRC site, DWP should define the proposed project to include the "whole of an action," including all reasonably foreseeable actions and potential impacts.[1] CPOR requests that DWP define the project broadly and include long-term preservation, restoration and management measures at the SLRC to ensure that a complete analysis of environmental impacts is conducted. Additionally, the project description should include the SLRC as a backup source for drinking water, as well as a water source for landscaping uses, for fire protection uses via either water mains or helicopters, and/or as a stormwater catchment basin. The SLRC could also serve water quality testing or monitoring functions.

B. Alternative Scenarios that the Draft EIR Should Study

An alternative scenario that should be examined, if DWP does not wish to include the above-described long-term measures, activities and facilities as part of the proposed project, involves maintaining an active role, albeit limited, for the SLRC. The NOP asserts that DWP would continue to utilize the SLRC for only limited, passive-type functions, including pipeline and regulating functions. Yet, it also proposes draining the SLRC reservoirs for a year and then refilling them and apparently maintaining them into the indefinite future. Since the NOP is vague about what long-term plans DWP currently has, DWP should specifically evaluate the possibility of maintaining the SLRC reservoirs in service as a backup water resource.

As described above, in addition to a backup source of drinking water, the SLRC could serve as a water source for landscaping uses, for fire protection uses, and/or as a stormwater catchment basin. DWP could also locate or relocate water quality testing or monitoring functions and facilities to the SLRC. Maintaining the SLRC on a long-term basis as an open reservoir to serve these functions would be consistent with the current land use designations and with Silver Lake's Master Plan improvements. Also, any alternatives analysis should consider the potential for service interruption to the proposed bypass line due to earthquakes or other natural hazards.

[1] DWP has stated, from time to time, that it may cease maintenance of the reservoirs 10 years after the currently proposed project is complete. If this is true, DWP should explain how a 10-year period was determined and what environmental impacts will result. If DWP ceases to maintain the reservoirs, how will the site be maintained?

With respect to the Headworks site, various interested persons have previously indicated that they would like the Headworks site to be developed as a spreading ground for reclaimed water. DWP has previously asserted that it has fully evaluated such a proposed use and has determined that such an alternative is infeasible due to the potential presence of certain chemicals in the groundwater underlying the site. The Draft EIR should further describe why the Headworks site cannot be utilized as a spreading ground for reclaimed water, and/or why the site cannot be preserved in its current state until such time as the contamination issue is resolved.

Under any circumstances, it is certainly premature for DWP to describe the proposed project as the "best alternative." See NOP, Attachment A, at 1. Such a determination can not be made until after the EIR has been completed and a meaningful evaluation conducted. See CEQA Guidelines, § 15126.6(d).

C. As a Mitigation Measure to Mitigate Potential "Significant" Adverse Impacts, the EIR Needs to Evaluate a Long-Term Preservation, Restoration and Management Plan for the SLRC

The NOP expressly acknowledges that the SLRC is a "local scenic resource" and that potential adverse changes resulting from short-term construction activities for the regulating station and/or bypass pipeline or changed operation of the SLRC must be considered "significant." See DWP Initial Checklist, at 5. The reservoirs at Silver Lake were established in the early 1900s and have become major focal points in the community. A variety of plant and wildlife currently enrich this treasured scenic resource.

The Silver Lake and Ivanhoe Reservoirs have played a long and integral role in the shape and development of the Silver Lake community. In the late 1800s, hunters journeyed to the area to seek large numbers of game that were attracted by the natural ponding condition in the valley. Recognizing the value of the land, DWP began acquiring land for the SLRC in the 1880s when the surrounding area was primarily undeveloped. By the time the last parcel was acquired in 1904, the area still had very little evidence of human habitation. With the addition of the reservoirs, however, this quickly changed.

City Planners saw the potential of a uniquely situated residential development and invested substantial public monies in underground utilities and cement streets. In the 1920's and 1930's private developers were encouraged to build in the area and homeowners were attracted by the rolling hills and blue water views of the Silver Lake and Ivanhoe Reservoirs. Probably the most well-known developer was the silent film star Antonio Moreno, who modeled his estate after Mediterranean villages. His landmark home set the architectural theme for many of the homes in the hills on the west side of the reservoir.

As the Silver Lake community grew many homes were specifically designed and sited to take advantage of the reservoir views. The reservoir complex itself is now listed as a historic cultural monument.[2] Additionally, the Echo Park/Silver Lake community plans, which will be completed within the next six months, describe the reservoirs "as a focal point of a community, serving as both a source of identity and a valuable recreational and aesthetic asset."

In order to avoid adverse impacts that may result from changed operations, the Draft EIR should investigate a long-range preservation, restoration and management plan to preserve the existing environmental setting.[3] This plan should include (1) strategies to minimize impacts related to ongoing maintenance of the bypass pipeline, regulating facility, and the dams, (2) steps to maintain the reservoirs' water quality for designated uses, (3) steps to preserve and improve the environmental setting surrounding the reservoirs, and (4) alternative uses and facilities that could be pursued by DWP at the SLRC that would complement the long-term preservation and maintenance of the existing open reservoirs.[4]

Any DWP change to its long-term operations or maintenance of the SLRC could adversely impact the existing environmental conditions, especially the historic and scenic context of the area. The NOP does not adequately address potential environmental impacts associated with the future long-term operations and management of the SLRC and the need for a long-term preservation, restoration, and management plan in order to mitigate those potential impacts. The

[2] See HCM #422, Landmark L.A., Historic-Cultural Monuments of Los Angeles, Angel City Press 2002; and Gebhard & Winter, Los Angeles An Architectural Guide, Gibbs & Smith, 1994. In addition to the SLRC, the Richard Neutra VDL Research House (HCM #460) and the Neutra Office Building (HCM #676) are recognized as significant historic resources. In total, some forty-three Silver Lake properties are listed in Los Angeles. An Architectural Guide. The NOP did not contain a list of recipients. However, the Los Angeles Cultural Affairs Department should certainly receive a copy of the NOP. The Department is responsible for overseeing and preserving the City's collection of over 700 historic-cultural monuments. See Los Angeles Administrative Code §§ 22.128, 22.132; see also Los Angeles Municipal Code § 12.20.3 (Historic Preservation Overlay Zones).

[3] The NOP states that the proposed project serves the "purpose and need" of complying with state and federal water quality regulations pertaining to water quality standards for drinking water. The project objectives should be defined in the Draft EIR to include preserving, restoring, and maintaining the long-term beneficial uses of the SLRC for the Silver Lake community. The SLRC reservoirs have been an integral part of the community for approximately 100 years. Preserving this scenic and historic resource should be central objective in the Draft EIR.

[4] A long-range management plan should evaluate, among other matters, how DWP will fulfill its duties as a responsible public agency relative to repairing and/or replacing significant amounts of dead trees and plants, cracks in the 1993 reservoir concrete embankments, weak and rusty chain-link fencing, soil runoff into public streets, broken concrete walls, the parkway on the easterly side of Silverlake Boulevard, street lighting along the Armstrong pathway, and cracks along the Tesla water retaining concrete dam wall.

NOP vaguely states that the operation of the SLRC reservoirs "would change." Accordingly, CPOR requests that the following matters be evaluated in the Draft EIR.

- How will wildlife be protected in the long-term?

- How will water quality be effected? Because the SLRC may no longer be used for water supply under the proposed project, day-to-day operations would change. Specifically, the water currently flowing into Silver Lake and Ivanhoe Reservoirs would potentially bypass SLRC. The Draft EIR should discuss potential impacts that may result from such a hydrologic change. Potential impacts on water quality and on blue water views from hundreds of homes also needs to be evaluated.

- How will property values be preserved if the reservoirs cease to exist as they do today? Currently, approximately $1 billion of residential real estate have views of the reservoirs and an equal number identify with living, driving, walking, running and bicycling around the property.

- How will cultural resources be preserved? Silver Lake contains the largest collection of Modernist homes in the world, a significant number of which were designed for reservoir views. Additionally, the SLRC is listed by the City of Los Angeles Cultural Affairs Department as a historic cultural monument. Jeopardizing the future water views would take these homes out of their primary historical context. Also, the Transportation Element of the General Plan for the City of Los Angeles recognizes the area on either side of the Richard Neutra VDL Research House at 2300 Silverlake Boulevard as a Scenic Highway.

- Will public recreation amenities be provided? If restrictions on public access would no longer be necessary to protect a drinking water supply, DWP should evaluate the potential to provide recreational enhancements.

- Will DWP's long-term facilities and activities at the SLRC be consistent with applicable land use plans and policies? Specifically, the Draft EIR should describe its long-term facilities and activities and whether they are consistent with the Echo Park and Silver Lake community plans, or transportation elements of the Los Angeles General Plan. The Draft EIR should also address DWP's commitment to complete the Silver Lake Master Plan improvements.
- Does DWP intend to honor its pre-school lease agreements?
- How does DWP plan to maintain the site in the long-term? Does DWP plan to provide the $15-20 million needed to complete the Silver Lake Master Plan, as well as the annual maintenance cost?

The Draft EIR must evaluate all reasonably foreseeable impacts that may ultimately result from the proposed changes at the SLRC. The Draft EIR cannot simply assume that the reservoirs' appearance and condition will not change in the immediate future and exclude evaluation of foreseeable long-term potential impacts. CEQA requires evaluation of all reasonably foreseeable environmental impacts that may ultimately result. See Bozung v. LAFCO (1975) 13 Cal.3d 263, 281 (annexation plan was project because its ultimate effect would be to permit subdivision and development of land that had been in agricultural use).

CPOR requests that the Draft EIR evaluate a comprehensive long-term preservation, restoration and management plan to address and mitigate the potential long-term adverse impacts associated with the current proposal to take the SLRC reservoirs off-line.[5] Such plan could satisfy many of the concerns addressed above and would be consistent with the goals of CEQA.

D. Short-Term Construction Impacts

Implementation of the proposed project may result in potential short-term significant adverse impacts to the Headworks site and Silver Lake community with respect to several environmental disciplines. While the following discussion focuses on short-term construction

[5] When the Hollywood Reservoir was modified in order to comply with similar DWP water quality objectives, DWP prepared a 99-year maintenance plan together with a commitment to provide on-going mitigation funds. The Silver Lake and Ivanhoe Reservoirs should receive similar long-term consideration.

impacts to the SLRC, many of the same impacts are likely to occur at the Headworks site. DWP should study and implement appropriate mitigation measures to avoid or lessen those potential impacts.

1. Aesthetics

As noted above, SLRC is an important local scenic resource. This resource would be adversely impacted by several construction actions likely to occur, including drainage of the Silver Lake Reservoir for approximately one year, removal of concrete embankments and landscaping to allow construction vehicles to access the site, equipment storage, excavation and tunneling, and the constant movement of construction equipment.

To avoid or lessen these potential adverse impacts, the NOP should evaluate screening techniques and/or landscaped stockpile and equipment storage locations. Also, the Silver Lake Reservoir should be drained only when, and if, absolutely necessary to complete the bypass line. To ensure that the reservoir is drained for the shortest time possible, segments of the bypass line should be prefabricated. Also, DWP should prepare a detailed schedule and work plan, and should provide appropriate incentives/disincentives (penalties) in construction contracts to ensure that the project is completed on schedule.

2. Air Quality

The NOP states that the Draft EIR will include an air quality analysis to determine the significance of short-term air quality impacts associated with project construction. This analysis should specifically address particulate emissions that may be generated by vehicle emissions, disturbance of rock and soil, deterioration of tires and pavement, and other sources. Recently, the California Air Resources Board adopted new, stricter ambient air quality standards for particulate matter. The annual-average standard for PM_{10} was lowered from 30 ug/m^3 to 20 ug/m^3, and a new annual-average standard of 12 ug/m^3 was established for $PM_{2.5}$.[6]

Inhalation of such particulate matter, when the particles are smaller than ten microns in diameter, can cause serious health problems in people, ranging from asthma to other chronic or acute lung diseases. A major source of PM_{10} is diesel exhaust, which has been designated as a

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[6] See Press Release 02-28 (June 20, 2003) http://www.arb.ca.gov/newsrel/nr062002.htm. On June 5, 2003, the Office of Administrative Law approved the amendments to the regulations for the State Ambient Air Quality Standards for particulate matter. The new standards became effective on July 5, 2003. See ARB Standards Review Schedule http://www.arb.ca.gov/research/aaqs/std-rs/std-rs.htm.

"toxic air contaminant" and probable carcinogen by California Air Resources Board in 1998 and by the EPA in 2002.[7]

The Draft EIR should consider a variety of mitigation measures to avoid or lessen the air quality impacts, including (1) specification of clean-fueled construction equipment for on-site construction; (2) development of methods and/or incentives to encourage and promote alternative-fueled vehicles in commercial/cargo vehicles delivering construction material and equipment to the project sites; and (3) use of soil stabilization and/or water to reduce fugitive dust emissions from construction sites.

3. Biological Resources

According to the NOP, existing vegetation at the SLRC consists primarily of landscaped and ornamental vegetation, while wildlife at the site presently consists of species adapted to an urban environment. DWP's Initial Checklist, at 7. The NOP concludes that the impact on these resources would be "less than significant with mitigation incorporation." The environmental resources associated with the current SLRC facilities need to be studied and short and long-term mitigation measures to protect the biological resources (e.g., blue heron habitat) need to be evaluated. Additionally, if DWP determines that it is necessary to drain the Silver Lake Reservoir as part of the proposed project, the EIR should evaluate drainage schedules that do not coincide with high seasonal use by waterfowl.

4. Noise

According to the NOP, the Draft EIR will include a noise analysis to determine existing noise conditions and evaluate the significance of short-term noise impacts associated with project construction. Several potential sources of noise should be evaluated, including the transportation, excavation, and installation of 3,200 feet of 72-inch conduit at the bottom of Silver Lake Reservoir and 850 feet of 72-inch pipe to be installed by tunneling. The EIR should also study the capacity of the reservoir basin and the surrounding hills to act as an amplifier of noise.

Several mitigation measures should be considered by the Draft EIR to avoid or reduce potential noise impacts, including, but not limited to, the following:

[7] CARB Resolution 98-35 (August 27, 1998); CARB and Office of Environmental Health Assessment, Initial Statement of Reasons for Rulemaking, Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant, Report, June 1998; and EPA, Final Health Assessment Document for Diesel Engine Exhaust, September 2002.

- Noise control devices should be used, such as equipment mufflers, enclosures, and barriers. All sound reducing devices should be maintained throughout the construction period.

- Construction operations should be staged as far from noise-sensitive uses as possible. Also, the timing and/or sequence of the noisiest construction operations should avoid sensitive times of the day.

- Noisy equipment should be replaced with quieter equipment whenever possible (e.g., rubber tired equipment rather than track equipment).

- Every effort should be made to ensure that haul routes are located away from sensitive noise receptors.

5. *Public Services*

The NOP should list the impact on public services as potentially "significant." Response times for police and fire protection, and school and public bus schedules may be adversely affected during the construction of the project. These potential impacts and appropriate mitigation measures should be evaluated in the EIR.

6. *Traffic*

The proposed project described in the NOP may result in "significant" impacts to transportation and traffic in the vicinity of the SLRC site during project construction. The following mitigation measures should be considered:

- Establish a ground transportation/construction coordination office for the life of the proposed project to coordinate deliveries, monitor traffic conditions, advise motorists and those making deliveries about detours and congested areas, and monitor and enforce delivery times and routes. Truck deliveries should be concentrated during mid-day hours and avoid peak traffic periods.

- For dirt and aggregate and all other materials and equipment, truck deliveries should be on designated routes only (freeways and non-residential streets). Every effort should be made to avoid residential frontages.

- Construction deliveries requiring lane closures should be required to obtain delivery permits 30 days prior to delivery, allowing traffic maintenance plans to be modified and implemented.

- Haul routes should be maintained periodically and comply with City of Los Angeles or other appropriate jurisdictional requirements for maintenance. Minor striping, lane configurations, and signal phasing modifications should be provided as needed.

III. CONCLUDING COMMENTS

During the past 100 years, the Silver Lake reservoirs have become much more than a place to store water. The Draft EIR needs to address the community concerns regarding DWP's long-term commitment to operate and maintain the SLRC as an open reservoir. We trust that DWP will meets its obligation to prepare a comprehensive environmental impact report.

Thank you for the opportunity to comment on the Notice of Preparation.

Sincerely,

Carlyle W. Hall, Jr.

cc: Dave Keitel
Maryann Kuk
Shelley Marks
Alana Knaster

Public Scoping Meeting
Written Comment Form
LADWP Silver Lake Reservoir Complex Storage Replacement Project
September 17, 2003

The Los Angeles Department of Water and Power welcomes your participation. Please hand in this form by the end of this evening's public hearing or mail by September 24, 2003, to:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Room 1348
Los Angeles, CA 90012

Name: JEFF CARR
Address: 1801 APEX AVE.
L.A, CALIF.
Organization:

Comments (attach additional sheets if necessary):

PLEASE CONSIDER MAKING THE REGULATING STATION WITHIN THE RESERVOIR (BY THE PRESENT TOWER?) RATHER THAN INTRUDING ON THE PRECIOUS LIMITED GREEN & OPEN SPACE AT THE SOUTH OF THE RESERVOIR

FOR MORE INFORMATION, CONTACT:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90012
(213) 367-0761

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Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Room 1348
Los Angeles, CA 90012

Name Chip Clements
Address 2372 Loma Vista Place
LA 90039
Organization

Comments (attach additional sheets if necessary):

I think this is a terrific project and I strongly support it. Not only will it achieve water quality standards but will:

1. preserve the lakes
2. generate 4 MW of green energy
3. assist development of wet lands + parks along headwaters area of Griffith Park.

My requests:

1. Make lake draining period as short as possible.
2. Make a smooth transition to future, long-term recreational use.

FOR MORE INFORMATION, CONTACT:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90012
(213) 367-0761

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Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Room 1348
Los Angeles, CA 90012

Name Sara B. Collier

Address 1747 N. Sellan

Organization ______

Comments (attach additional sheets if necessary):

We wish to maintain the Silver Lake & Ivanhoe reservoirs in their present condition - Dept of Water & Power (DWP) Silver Lake enhances the area and it would be such a lost to the area.

FOR MORE INFORMATION, CONTACT:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90012
(213) 367-0761

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Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Room 1348
Los Angeles, CA 90012

Name DIANE EDWARDSON
Address 2630 CORRALITAS DR
LA 90039
Organization COMMUNITY RESIDENTS' ASSOC FOR PARKS

Comments (attach additional sheets if necessary):

ALL OF THE IMPACTS TO S.L. RESERVOIR NEED TO BE CONSIDERED. A YEAR (OR MORE) WITHOUT H2O WILL IMPACT WITH INCREASED AIR TEMPERATURE, INCREASE IN WILDLIFE SEARCHING FOR H2O IN NEIGHBORHOOD, DECREASE IN HOME VALUES.

MORE NEED TO IMPLEMENT ~~INCLUDE~~ MASTER PLAN IN MITIGATION FOR BEING WITHOUT H2O FOR A YEAR OR MORE. ~~YOU NEED TO [illegible]~~

OPEN THE LAKE PROPERTY TO PASSIVE RECREATION

FOR MORE INFORMATION, CONTACT:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90012
(213) 367-0761

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Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Room 1348
Los Angeles, CA 90012

Name: Marilyn Friedman
Address: 1763 N. Dillon St
LA 90026
Organization: Silverlake Senior Club

Comments (attach additional sheets if necessary):

The DWP should maintain the Ivanhoe & Silver lake reservoirs in their present state.

FOR MORE INFORMATION, CONTACT:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90012
(213) 367-0761

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Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Room 1348
Los Angeles, CA 90012

Name Siu K Lee

Address 2242 Silver Lake Blvd
Los Angeles, Ca 90039

Organization

Comments (attach additional sheets if necessary):

I wish DWP will continue taking care of the lake because DWP is better in environmental subjects than park and Recreation.

The master plan was mastermind by a strong special interested group who wants to turn Silver Lake into a recreation area so that they can sell properties around. Many old residentes around this area are strongly against this idea but have absolutely no power to voice themself. The so called environmentalists stop the "2" freeway on Glendale Blvd, installed a dog park next to the lake have already created a tremendous environmental disaster around this area. We would like to see the Lake remains the way it is right now.

FOR MORE INFORMATION, CONTACT:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90012
(213) 367-0761

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Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Room 1348
Los Angeles, CA 90012

Name: Dennis Nutter
Address: 2607 Locksley Place
LA Cal 90039
Organization: SLRA

Comments (attach additional sheets if necessary):

I want to place the storage tanks on the Reservour property because it is obvious that if the storage tanks are next to or under the present lake DWP will be obliged to protect the property from vandels & Terrorist's etcetc

Whichever way we go on this project there will have to be lots of Construction on the underlying pipelines in the lake area

So placeing the Storage tanks in the Silver Lake Compound provided the least expence and the best protection for the Silver Lake Community

FOR MORE INFORMATION, CONTACT:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90012
(213) 367-0761

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Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Room 1348
Los Angeles, CA 90012

Name Terry Riemer / Mike Stallcup

Address 1961 Micheltorena St.
Los Angeles, CA 90039

Organization ____________

Comments (attach additional sheets if necessary):

The newly presented concept of placing storage tanks at Headwaters seems reasonable. However, as pointed out by CSSLR, the project to convert Silver Lake to a view lake ~~but~~ lacks a long range plan to assure the proper stewardship of the lake and surrounding property. The long range stewardship of Silver Lake to maintain it ~~[illegible]~~ as a community treasure must be addressed in any ~~complete~~ acceptable environmental impact statement. We also expect that the execution of the Silver Lake master plan will be an important part of any plan.

FOR MORE INFORMATION, CONTACT:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90012
(213) 367-0761

Public Scoping Meeting
Written Comment Form
LADWP Silver Lake Reservoir Complex Storage Replacement Project
September 17, 2003

The Los Angeles Department of Water and Power welcomes your participation. Please hand in this form by the end of this evening's public hearing or mail by September 24, 2003, to:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Room 1348
Los Angeles, CA 90012

Name: SUSAN SIMON
Address: 2268 Moreno Dr
LA 90039
Organization: Property owner

Comments (attach additional sheets if necessary):

I support Councilman LaBonge's idea that DWP maintain S.L. Res. as is for the long term. (i.e. forever!). Don't change, alter, modify anything – Keep the rusty fence even!

Leave all of it as is!

FOR MORE INFORMATION, CONTACT:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90012
(213) 367-0761

SCOPING MEETING TO INTRODUCE THE SLRC/HEADWORKS E.I.R.

Next year will mark the 100th year since the LADWP accumulated the land for the Silverlake Reservoir complex. DWP plans on taking the Silverlake Reservoirs out of service upon completion of the Headworks portion of the project since they are not in the business of supporting a non-potable water facility.

In the past century of supplying drinking water LADWP was also indirectly in the business of:

- SUPPORTING a tranquil, beautiful body of water
- SUPPORTING a City Cultural Monument
- SUPPORTING recreation
- SUPPORTING a long-range reservoir Master Plan
- SUPPORTING animal habitation
- SUPPORTING open space
- SUPPORTING unique homes and historic architecture
- **And most of all supporting one of the city'S MOST UNIQUE COMMUNITIES!**

The LADWP needs to follow the CEQA guidelines by revising its NOP to consider long and short-term environmental impacts <u>now</u> within this EIR.

Harvey Steinberg

Submitted by: Harvey Steinberg
2023 Kenilworth Avenue
Los Angeles, CA 90039

September 17, 2003

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Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Room 1348
Los Angeles, CA 90012

Name Ron Vaughn
Address 2447 Hidalgo Ave
LA 90039
Organization

Comments (attach additional sheets if necessary):

1. Are all funds needed for the displayed projects allocated? If not what percentage of funding is required on a fiscal year basis and from what sources?
Responce requested
2. Has all required sub surface/seismic investigation for new proposed structures and pipe lines been completed? If not, how will estimated total construction cost be requested and from whom?
Responce requested
3. Is the issue of public access to the lake, with parking and restrooms anticipated by DWP? If so, what existing lake/reservoirs are considered comparable with regard to public access?
Responce requested.

FOR MORE INFORMATION, CONTACT:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90012
(213) 367-0761

Mr. Paul Liu
LADWP
111 Hope Street
Room 1348
Los Angeles, CA 90012

September 18, 2003

Dear Mr. Liu:

I am writing to give you my feedback on the meeting held last night, 9/17/03, regarding the Silver Lake Reservoir Complex Storage Replacement Project. I was there and am greatly interested in the direction the DWP may take.

My family and I live at 2065 West Silver Lake Drive, so whatever actions are taken will clearly impact our lives. We love the vistas provided by the reservoirs and the DWP grounds that surround them. After listening last night, I have some lingering concerns:

1. Is it really necessary to empty the Silver Lake Reservoir to install the bypass piping? Why not put the piping underneath the proposed jogging path that is to be installed along the west side of the reservoir on W. Silver Lake Drive. This would not have to take that long to install, and the lake wouldn't have to be drained. The DWP could then construct a jogging path on top, with planter and trees, maintaining that area then as part of their right of way. It's a straight shot down W. Silver Lake Drive with only a small section at the south end that would need to be tunneled.
2. If the DWP is going to abandon the reservoirs as drinking water sources, then it needs to take responsibility for returning the banks of the reservoir back into a more natural looking landscape. The current lakeshore made of cracked and sealed concrete and asphalt is a hideous eyesore. This should be rectified as part of the DWP's responsibility for the area.

My hope in the long run is that the City Parks and Recreation Department would take over the Reservoir grounds and develop them into recreational facilities for the exclusive daytime use of the area's school age children – possibly combining with an organization like the Boys and Girls Club, to utilize the meadow area for a large Boys and Girls Club recreational center.

Thank you for your work and your attention to these matters.

Sincerely,

Jered Hobbins
2065 W. Silver Lake Drive
Los Angeles, CA 90039
jeredhobbins@hotmail.com

Public Scoping Meeting
Written Comment Form
LADWP Silver Lake Reservoir Complex Storage Replacement Project
September 17, 2003

The Los Angeles Department of Water and Power welcomes your participation. Please hand in this form by the end of this evening's public hearing or mail by September 24, 2003, to:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street
Room 1348
Los Angeles, CA 90012

9/18/03

Name: RAYMOND L. HOWELL
Address: 2816 TESLA Ave
L.A. CA - 90039
Organization: ____

Comments (attach additional sheets if necessary):

I am Raymond L. Howell. I live at 2816 Tesla ave. L-A-CA. 90039 - just up the hill from the Tesla/W.S. Lake Drive intersection where a proposed regulating station for the replacement project is to be installed. I attended the meeting on 9/17/03.

I was interested in + concerned about the statement that, contrary to Mr. LaBonge's statement that the DWP would "hold on" to the property & operate it that it might be turned over to Parks + Recreation. Since DWP has been managing it for years, it would be better if they continue to do so.

I am very much against the plans for a red[illegible] on W.S. Lake Dr. + against opening up the areas around the lake for recreational purposes.

Sincerely,
R L Howell

FOR MORE INFORMATION, CONTACT:

Mr. Paul Liu
Los Angeles Department of Water and Power
111 North Hope Street, Room 1348
Los Angeles, CA 90012
(213) 367-0761

Phan, Linh

From: Liu, Paul
Sent: Thursday, September 18, 2003 12:28 PM
To: Jim Hunter
Cc: Phan, Linh
Subject: FW: HWSG and EIR Items

-----Original Message-----
From: Allen Lin Lee [mailto:alee99@sbcglobal.net]
Sent: Thursday, September 18, 2003 11:55 AM
To: Liu, Paul
Subject: HWSG and EIR Items

Hi Paul,

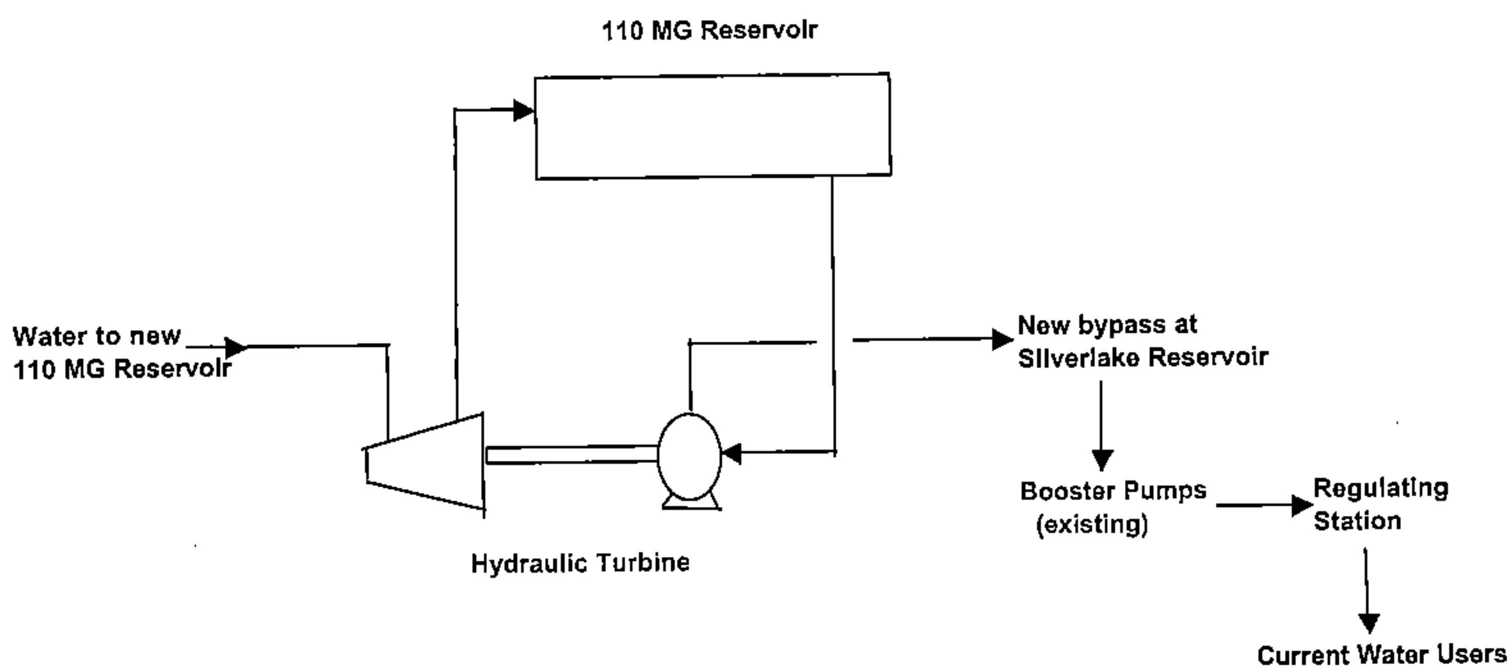
Last night's DWP-hosted scoping meeting in the Friend Hall was excellent. I do have 2 items related to this subject for you to consider in the EIR. I did not speak out in the meeting because I need a little time to think it over.

1. We need to address how to continue supply drinking water to the current water users. The Silverlake reservoir will be drained for the construction of a new bypass pipe, therefore the water supply is cut off at the onset of the reservoir work. Is there an alternate water source? If additional work must be done in the project area to provide the temporary water supply, what is that? It needs to be identified in details, and its impact to the community.

2. The 4 MW hydroelectric power generating plant upstream of the new 100 MG reservoir can be replaced with hydraulic turbines to recover the HP, and use it to drive the water pumps at HWSG. The existing water pumps in the Silverlake area can be used as booster pumps if that is necessary.The large building housing the power plant equipment and the electrical substation can be eliminated, thus the HWSG site will be environmentally more friendly. Please refer to my sketch in the attachment for this alternate plant configuration.

Regards

Allen Lee
323-663-4584



Alternate Configuration at HWSG site

Eells, Brenda/LAC

From: Liu, Paul [Paul.Liu@WATER.LADWP.com]
Sent: Tuesday, September 23, 2003 7:10 AM
To: Hunter, Jim/SCO
Cc: Phan, Linh
Subject: FW: SLR

-----Original Message-----
From: Lauren Malkasian [mailto:misslaurenm@earthlink.net]
Sent: Monday, September 22, 2003 9:01 PM
To: Liu, Paul
Subject: SLR

Dear Paul,

My neighbors have been emailing me re: the future of the SLR. I'm not sure were I stand. But I am leaning towards supporting the plans to make the lake a nature habitat similar to Lake Hollywood as long as it will be well maintained and run. Please let me know how I can get more involved.

Lauren Malkasian
3055 Landa Street
323-953-6633

Phan, Linh

From: Liu, Paul
Sent: Tuesday, September 23, 2003 7:10 AM
To: Jim Hunter
Cc: Phan, Linh
Subject: FW: Public Scoping Meeting

-----Original Message-----
From: PAIAED@aol.com [mailto:PAIAED@aol.com]
Sent: Monday, September 22, 2003 7:43 PM
To: Liu, Paul
Subject: Public Scoping Meeting

Written Comment Form
LADWP Silver Lake Reservoir Complex Storage Replacement Project
Sept 17, 2003

Mr. Paul Liu

Concerns Regarding future use of Silver Lake Reservoir:

Hollywood Reservoir is a good example of preserving the original ambience. Lake may be enjoyed by walkers and others while inaccessible to vandals and the need for added security.

We do not want the Silver Lake to become and attractive nusisance. Someone suggested that DWP make it available to the public as a recreation area. Should this occur, it would bring parking congestions, vandalism in and around the neighborhood, added security. Making the West Silverlake blvd narrower will not help with the traffic flow. As it is now, West SilverLake Blvd is becoming a busy Blvd for the morning and afternoon traffic.
We voice the opinion of many in our neighborhood.
Thank you
Ed & JuneTanimoto

Phan, Linh

From: Liu, Paul
Sent: Wednesday, September 24, 2003 11:25 AM
To: Jim Hunter
Cc: Phan, Linh
Subject: FW: Scoping, Silver Lake Storage Replacement Project

-----Original Message-----
From: WesJoe@aol.com [mailto:WesJoe@aol.com]
Sent: Wednesday, September 24, 2003 9:52 AM
To: Liu, Paul
Cc: gdake@council.lacity.org; jomahen@council.lacity.org
Subject: Scoping, Silver Lake Storage Replacement Project

Dear Mr. Liu:
Thank you for the opportunity to provide comments regarding the scope of environmental review for the Silver Lake Reservoir Complex Storage Replacement Project.

I'm a longtime resident of the Silver Lake area and for a time was president of the Silver Lake Improvement Association (though as clarification that organization has taken no position with respect to the Reservoir Replacement Project).

I strongly agree with the Committee to Save the Silver Lake Reservoir's call for the scope of review of this project to include the end use of the present reservoir site.

The Master Plan for the reservoir was based on upgrading of the on-site water treatment facilities. Removing potable water storage from the reservoir changes that. If no upgrading occurs, then the Master Plan along with the end use of the reservoir site need to be reconsidered.

To move just one step further, please include reconfiguring the reservoir for recreational uses as one of the alternatives considered for the end use of the reservoir.

The need for recreational opportunities in central Los Angeles, where the reservoir is located, is well documented. The reservoir site presents a wonderful opportunity for water-based recreation. This would mostly be a boon for nearby residents, but would also serve the region.

It's unlikely that such conversions are a common thing, and this proposal certainly needs to be studied carefully to identify which recreational opportunities would be appropriate and whether any physical changes would be required. Please include this within the scope of your review.

This is an opportunity to bring all of the joy that comes with water-based activities to central LA.

Thank you again for your consideration.

Wes Joe
932 Maltman #12
Los Angeles, CA 90026

From: Liu, Paul
Sent: Wednesday, September 24, 2003 2:30 PM
To: Jim Hunter
Cc: Phan, Linh
Subject: FW: EIR Scoping - Silver Lake-Headworks

-----Original Message-----
From: Maryann Kuk [mailto:marykuk@earthlink.net]
Sent: Wednesday, September 24, 2003 12:01 PM
To: Liu, Paul
Cc: krisohl@hotmail.com
Subject: EIR Scoping - Silver Lake-Headworks

Dear Paul:

I wanted for formalize in writing my comments about the timing of the draining of Silver Lake Reservoir as it relates to migrating water fowl. I understand that the best time for the reservoir to be drained is the winter when water usage is lowest. However, we have a long documented history of being a stopover on the Pacific Flyway. Consequently, the impact on these birds, ducks and geese needs to be addressed in the EIR.

The Stone Canyon method of pipeline installation (without draining the reservoir), needs to be fully explored before you make the final determination as to the draining of the reservoir.

Thank you.
Maryann Kuk

Phan, Linh

From: Liu, Paul
Sent: Thursday, September 25, 2003 7:11 AM
To: Jim Hunter
Cc: Phan, Linh
Subject: FW: comment - LADWP Silver Lake Reservoir Complex Storage Replacement Project

-----Original Message-----
From: CLIESELT@aol.com [mailto:CLIESELT@aol.com]
Sent: Wednesday, September 24, 2003 4:35 PM
To: Liu, Paul
Subject: comment - LADWP Silver Lake Reservoir Complex Storage Replacement Project

September 24, 2003

Dear Paul Liu,

This letter is about three concerns I have about the LADWP Silver Lake Reservoir Complex Storage Replacement Project.

First, after reading a lengthy article in the New Yorker magazine most recently about the need for a third tunnel for water being built into New York City taking so many years to complete, I thought:
How important is it for us to have LONG RANGE PLANNING for our project here in Silverlake?
If there were an earthquake, could our water supply be quickly RESTORED or would we have to drain the reservoir in order to fix it? Could planning for alternative water routes be included easily now, not later?
Will the supply line be made of MATERIALS that are the state of the art for such projects?
Are we cutting corners because of some arbitrary TIME LINE?
Are we taking short cuts because of the COSTS?

Second, as a naturalist and jogger/walker for thirty-six years in the Silverlake community, the REGULATING STATION to be located at the SLRC just south of the Silver Lake Reservoir dam on West Silver Lake Drive ON PRESENT COMMUNITY PARK SPACE also concerns me. What other possible locations have been discussed/considered for the regulating station? Can it be located inside the reservoir fenced property instead of conveniently set on playground space? Yes, it is to be placed underground but with top access, that means the public loses the use of that playground space, right? We need every inch of the Silverlake Park for recreation. Come look at the crowds on weekends.

Third, I trust the Silver Lake Reservoir open space will remain a place of beauty, a stopping place for Nature to survive the rigors of city living, a source of water for protection against the disasters of fire, and a contributing factor to the value of inner city community.

Thank you for considering my concerns at this time.

Sincerely yours,
Catharine Y. Takemoto
3209 Landa Street
Los Angeles, CA 90039-3015
e-mail - CLIESELT@aol.com

Phan, Linh

From: Liu, Paul
Sent: Monday, September 29, 2003 7:20 AM
To: Jim Hunter
Cc: Phan, Linh
Subject: FW: LADWP Silver Lake Reservoir Complex

-----Original Message-----
From: MSGMSG@aol.com [mailto:MSGMSG@aol.com]
Sent: Thursday, September 25, 2003 5:23 PM
To: Liu, Paul
Subject: LADWP Silver Lake Reservoir Complex

Dear Mr. Liu,

I would like to express my concern regarding the draft proposal that was presented to the community on September 17, 2003 at the public scoping meeting. I think the off site buried storage reservoir at the former Headworks Spreading Grounds is a great solution for conformance with the new water quality regulations. I would like as much attention that has been put into the "skin" of the HWSG site to be put into the final plan at the Silver Lake and Ivanhoe Reservoir site. Perhaps the same collaboration between the Parks and Recreation Department and the US Army Corps of Engineers can be worked out, with community involvement (Silver Lake Residents Association and the Committee to Save Silver Lake's Reservoirs).

I understand that the DWP in planning on proceeding with the initial stage of the "Master Plan" of enhancements to the Silver Lake / Ivanhoe site. I suggest that since this plan was based on the reservoirs being used for drinking water with all the restrictions involved it is time to reevaluate that plan with the new usage in mind.

Finally a plea to minimize the impact that the construction will have on this community. This is a successfully functioning inner city neighborhood which is a real treasure to both its occupants and the metropolitan area as a whole.

Respectfully yours,

Melinda Sue Gordon
2330 Duane Street #105
Silver Lake, CA 90039

Appendix B
Water Resources

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
INTRADEPARTMENTAL CORRESPONDENCE

Date: June 21, 2004

To: Distribution

From: Paul Liu PL

Subject: Headworks Spreading Issues

Distribution:

Mario Acevedo
Mark J. Aldrian
Thomas M. Erb
Richard F. Harasick
Hadi S. Jonny
Mark G. Mackowski
Linh T. Phan
Susan R. Rowghani
Glenn C. Singley
William T. Van Wagoner
Tina C. Wilson

I. PURPOSE

The purpose of this document is to address issues relating to spreading water from the Los Angeles River (LAR) at the Headworks Spreading Grounds (Headworks Property) for eventual use as potable drinking water.

II. BACKGROUND

The purpose of diverting water from the LAR to the Headworks Property for recharging the San Fernando Basin (SFB) is to increase the annual entitlement and utility of this local water supply for the City of Los Angeles. The SFB is an adjudicated basin in which entitlements were established in the "Judgment of the California Superior Court in Case No. 650079, City of Los Angeles vs. Cities of San Fernando, et al, dated January 26, 1979" (Judgment). In accordance to the Judgment, the City owns all of the native water in the SFB (as well as the Upper Los Angeles River Area) and has entitlements that are based on the following components:

Table 1

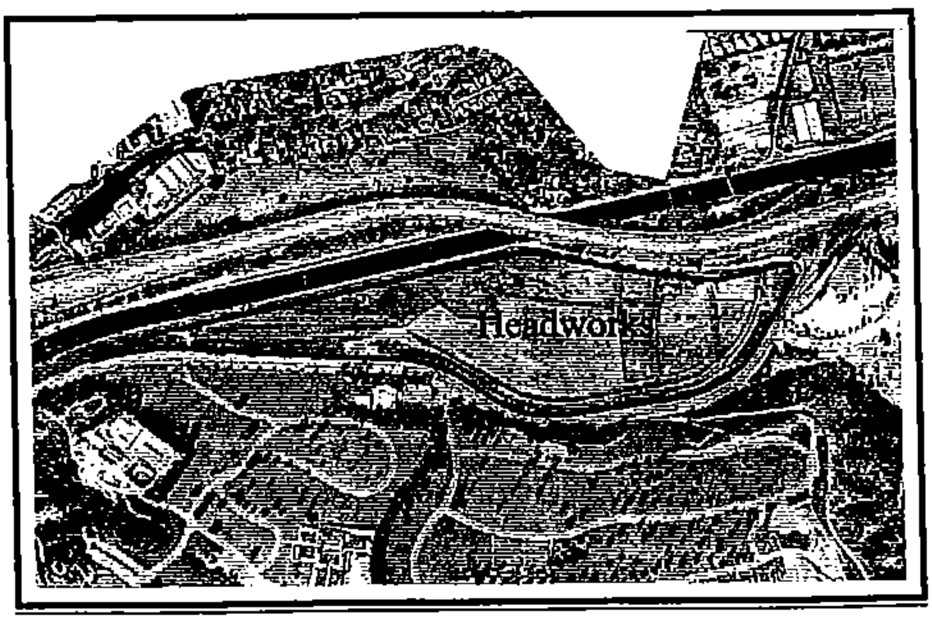
Native Water	43,660 AF/yr
Credit for 20.8% of imported water delivered for use over the SFB and that is estimated to return to the SFB	43,000 AF/yr

With the determination that the Native Safe Yield is fixed at 43,660 AF/yr, only the recycled water portion of the water diverted from the LAR to the Headworks Property can be used to increase the City's annual SFB entitlement. Water within the LAR throughout the year near the Headworks Property is comprised of approximately 70% recycled water and 30% urban runoff (LA Public Works Gaging Station F300-R & Tillman Plant Outflow Data).

III. <u>LOCATION</u>

The Headworks Property is 43 acres of undeveloped land adjacent to the LAR and between the City of Burbank and Griffith Park (Figure 1). It is bounded on the north by the LAR and the 134 Freeway, and on the east and south by Forest Lawn Drive. The property is owned by the City of Los Angeles and the LADWP retains an easement over the entire property.

<u>Figure 1 – Outline of Headworks Property</u>



IV. <u>HISTORY</u>

1915 – Deep Gallery Wells are installed on-site. The LAR flows over the top of the Headworks Property at this point in time. Water that percolated from the LAR through the soil would be collected through the Deep Gallery Wells and then served to the distribution system.

1929 – Groundwater extraction wells are installed 2,500-3,000 feet northeast of Headworks and are known as the Headworks Well Field.

1938 – The Headworks portion of the LAR is lined. Spreading from the LAR to the basins at the Headworks Property begins at this point.

1972 – Deep Gallery Wells are decommissioned due to water quality concerns. However, spreading still continues and the Headworks Well Field remains operational.

1983 – Spreading is ceased at the Headworks Property due to the Donald C. Tillman Water Reclamation Plant (Tillman Plant) coming on-line and discharging water into the LAR upstream of the Headworks Property. The California Department of Health Services (DHS) prohibited the diversion of LAR water for recharge purposes due to the water quality concerns associated with treated wastewater.

1986 – Pumping is ceased at the Headworks Well Field due to contamination discovered within the SFB with trichloroethylene (TCE) and perchloroethylene (PCE) being the primary constituents.

Table 2 summarizes the historical annual spreading on record. Data was not available for years 1963-1968.

Table 2 – Annual Spreading on Record

YEAR	AMOUNT (ACRE-FEET)	YEAR	AMOUNT (ACRE-FEET)
1982-83	10	1959-60	8,040
1981-82	3,853	1958-59	9,045
1980-81	4,652	1957-58	6,248
1979-80	5,448	1956-57	4,788
1978-79	2,463	1955-56	6,551
1977-78	3,200	1954-55	10,882
1976-77	3,142	1953-54	6,624
1975-76	3,837	1952-53	7,401
1974-75	4,070	1951-52	1,523
1973-74	6,205	1950-51	4,890
1972-73	5,182	1949-50	7,697
1971-72	7,389	1948-49	6,452
1970-71	6,804	1947-48	19,016

YEAR	AMOUNT (ACRE-FEET)	YEAR	AMOUNT (ACRE-FEET)
1969-70	11,021	1946-47	18,492
1968-69	6,698	1945-46	21,144
1967-68	N/A	1944-45	21,028
1966-67	N/A	1943-44	19,861
1965-66	N/A	1942-43	14,289
1964-65	N/A	1941-42	13,258
1963-64	N/A	1940-41	11,001
1962-63	10,279	1939-40	10,977
1961-62	10,648	1938-39	9,662
1960-61	6,122		

Average of all years on record: **8,700 acre-feet (AF)**
Average after Deep Gallery Wells decommissioned (1972-1983): **3,800 AF**

V. WATER QUALITY CONCERNS

The Headworks Well Field was then taken off-line in 1986 due to groundwater contamination (primarily TCE and PCE) that was discovered in the SFB. However, a plan in the late 1990s was initiated to restore the existing Headworks Well Field along with a 30-cfs treatment facility located within the Headworks Property to replace three contaminated upstream well fields (Erwin, Whitnall, and Verdugo). Attachment 1 shows the outline of the TCE contaminant plume in 2001 along with the locations of the different well fields.

A. DHS Requirements

As part of the approval process for the proposed Headworks treatment facility, DHS required LADWP to perform a source water assessment of the contaminants within the aquifer (*DHS Policy Memo 97-005*). A constituent by the name of 1,2,3 Trichloropropane (1,2,3 TCP) was discovered within the ten-year capture zone. The sample result was 700 parts-per trillion (ppt) which is above the State Action Level of 5 ppt. As a result, DHS indicated that a multi-barrier approach to treat 1,2,3 TCP down to non-detect levels would be required as specified in Policy Memo 97-005. The City of Burbank is currently treating 1,2,3 TCP down to non-detect levels using aeration followed by liquid-phase granular activated carbon (LPGAC) and the same treatment processes could be expected for Headworks.

DHS Policy Memo 97-005 also requires utilities to identify alternatives to the use of an extremely impaired source and compare the health risks associated with these to the proposed project's potential health risk. The Hansen and Pacoima Spreading Grounds (~35,000 and ~20,000 AF/year spreading capacity, respectively) are two locations north of the contaminant zone within the SFB. If recycled water is spread at these two larger spreading grounds, groundwater modeling has shown that there is sufficient travel time north of the TCE and PCE plumes where treatment would not be required (1995 Groundwater Quality Impact Assessment for the East Valley Water Recycling Project – Phase 1A).

The current draft Groundwater Recharge Reuse Regulation (Title 22, Division 4, Chapter 3) also limits the percentage of recycled water contribution (RWC) for spreading or injection to 50%. The other 50% shall come from a "diluent water" source that is not treated wastewater. Water within the LAR throughout the year near the Headworks Property is comprised of approximately 70% recycled water and 30% urban runoff (LA Public Works Gaging Station F300-R & Tillman Plant Outflow Data). In order to assure the RWC does not exceed 50%, approximately 28.5% of additional potable water would need to be blended with LAR water prior to spreading.

B. Regional Water Quality Control Board (RWQCB) Requirements

The RWQCB has developed basin plans to address water quality issues as a result of the State of California 1969 Porter-Cologne Water Quality Act. The 1995 Water Quality Control Plan for the Los Angeles River Basin (Basin Plan) has set forth objectives for various constituents of concern. Table 3 lists the basin objectives for the Headworks area along with samples taken from the LAR at the Headworks intake:

Table 3

	Basin Plan Objective (mg/L)	LAR Sample Taken on 4/1/04 (mg/L)	Is Sample Above Basin Plan Objective?
Chloride	100	126	Yes
Total Dissolved Solids (TDS)	600	753	Yes
Nitrate & Nitrite as N	10	4.4	No
Sulfate	250	197	No
Boron	1.5	.48	No

Since the chloride and TDS samples taken on April 1, 2004 are above basin objectives, RWQCB may require LADWP to pre-treat LAR water to the basin objectives or below as part of RWQCB's anti-degradation policy (Resolution No. 68-16) before spreading at Headworks is allowed. However, if the Tillman Plant is required to add reverse osmosis, it is likely that LAR water can be spread at Headworks without any pre-treatment.

VI. <u>COST ANALYSIS</u>

The two main cost elements are:

1. The additional 28.5% potable water cost associated with blending down LAR water to the 50% recycled water limitation for spreading 11,000 AF/year.

2. The cost associated with pumping and treating 11,000 AF/year of groundwater.

The proposed operation of the Headworks Treatment Facility was to pump and treat 11,000 AF/year (April 1st thru October 1st) to replace the supply from the Erwin, Whitnall, and Verdugo Well Fields.

For cost element #1, it is assumed that LADWP will plan on spreading the same amount as pumping per year (11,000 AF). An additional 3,100 AF of potable water (28.5%) is needed under this scenario. The cost is derived by multiplying 3,100 AF by $418/AF and dividing by the total amount spread (11,000 AF). $418/AF is the 2004 Tier 1 Treated Metropolitan Water District (MWD) cost and is used by LADWP to calculate water replacement costs.

For cost element #2, a cost-estimate for the proposed treatment facilities was performed by LADWP's Groundwater Group in 1996 (*Headworks Well Field Remediation Project Alternative Study*) and updated by Montgomery Watson Harza in 2004 (*Tech Memo dated 4-16-04*) for a 30-cfs aeration plus LPGAC facility.

Table 4 is a summary of the two cost elements as compared with Tier 1 treated MWD water.

Table 4 – Cost Comparison with MWD

		Cost ($/AF)	MWD Cost ($/AF)
1.	28.5% Blending Cost	118	
2.	Pumping and Treatment Cost*	615	
	Total	**733**	**418**

*Present worth costs (capital and O&M) per AF

VII. POTENTIAL FUTURE ON-SITE CONSIDERATIONS

In response to concerns raised regarding future opportunities of capturing LAR water at the site, the following two concepts were explored.

The first concept is to maximize the proposed lined wetlands area within the Headworks Ecosystem Restoration Project. Since the site has a high percolation rate (~3 feet/day), the area required to spread 7,500-10,000 AF/year over a 12-month period is approximately 14-19 acres. The proposed Headworks Reservoir will take up approximately 19 acres which leaves 26 acres available on-site for other uses which currently includes a proposed lined wetlands area. This concept assumes LAR water quality at the Headworks Property is high enough such that DHS and RWQCD will allow spreading. The lining to the area can then be removed from the wetlands to allow for infiltration. However, a grout curtain (~$7 million) around the base of the Headworks Reservoir may be needed to protect the foundation of the tank from uplift and liquefaction.

The second concept is to install deep injection wells (200+ feet) on-site to directly inject the LAR water into the basin. Again the water quality of the LAR has to be high enough for DHS and RWQCB to approve. The main advantages of this concept is that each well is only 12-24 inches in diameter and a grout curtain is unnecessary since the water is injected directly below the existing groundwater table. To inject approximately 10,000 AF/yr will require four 7.5 cfs wells. The approximate current capital cost is $2.8 million (or $700,000 each).

These two proposed concepts will also need to be evaluated with other potential options (i.e., East Valley Water Recycling Project) for capturing recycled and excess runoff water to achieve the best overall solution.

VIII. SUMMARY

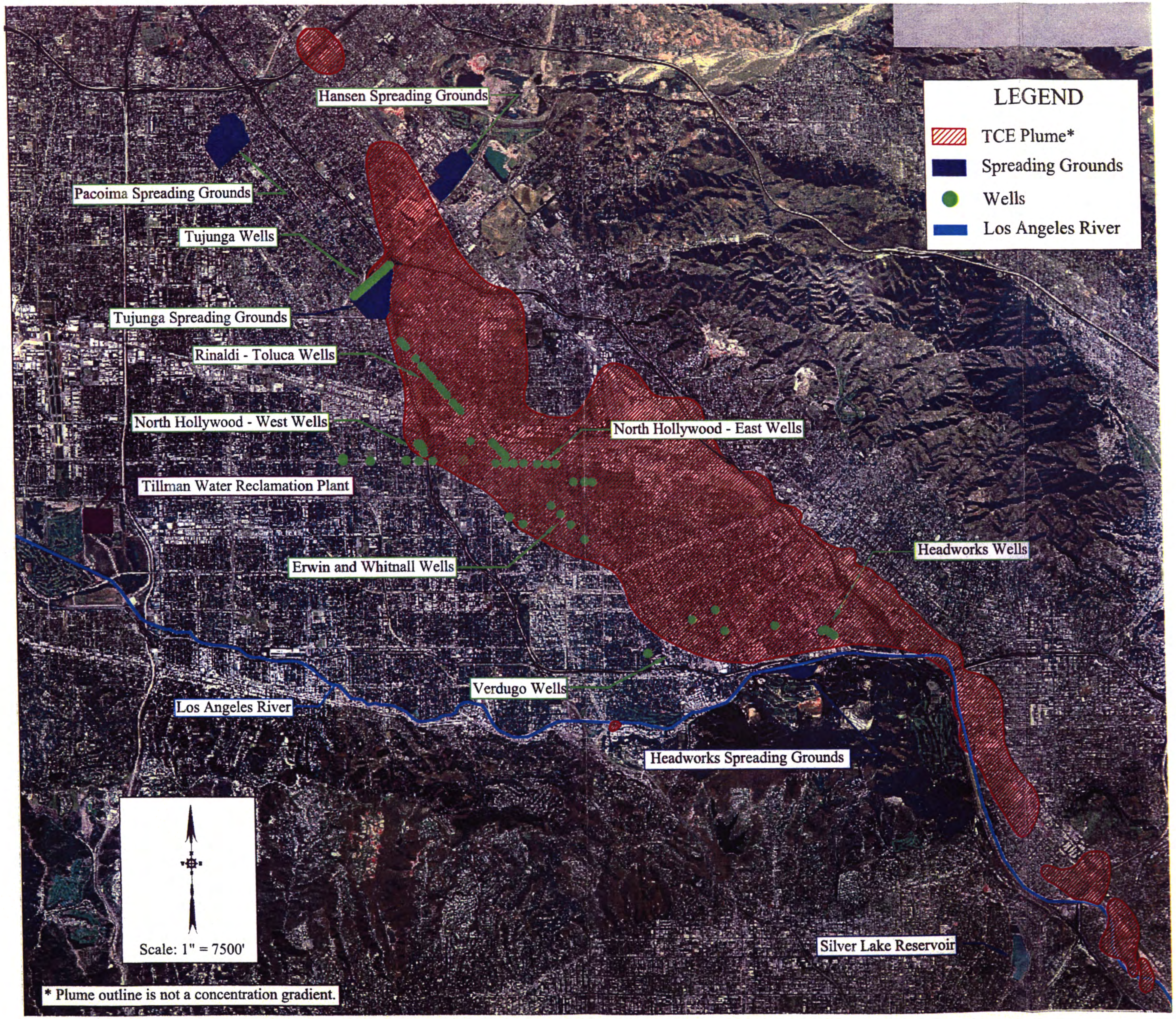
While spreading water to increase the City's groundwater entitlement is a good concept, spreading LAR water at the Headworks Property has formidable challenges. DHS and RWQCB requirements would have to be met to ensure the highest quality of water during the permitting process. Because of the contamination within the SFB, treatment would be required potentially before spreading and after removal from the groundwater basin in order to be served in the distribution system. The total cost of spreading, pumping, and treating LAR water costs on average \$315/AF more than treated MWD water at the Headworks Property. This translates to an additional \$3.47 million dollars annually as compared with purchased MWD water. Although there are some concepts that can be explored for future water capture, these options will have to be assessed along with other alternatives at that time.

PEL:jmp
Attachment
c/att: Paul E. Liu

Headworks Reservoir
FileNET

Planning/PL – M – Headworks Spreading Issues

Attachment 1 - San Fernando Basin 2001 TCE Plume



Appendix C
Biological Resources

Final Draft Report

Silver Lake Reservoir Complex Storage Replacement Project Biological Resources Technical Report

Prepared for

Los Angeles Department of Water and Power

May 2004

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Santa Ana, California 92707

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Tables

Acronyms

BMP	Best Management Practice
BOD	biological oxygen demand
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFP	Fully Protected Species
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Data Base
CNPS	California Native Plant Society
CSC	Species of Special Concern
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationships System
EIR	Environmental Impact Report
FC	Candidate
FE	Federally Endangered
FESA	Federal Endangered Species Act
FPE	Federally Proposed Endangered
FPT	Federally Proposed Threatened
FSC	Species of Concern
FT	Federally Threatened
General Permit	General Construction Permit
GIS	Geographical Information System
HAA	halo acetic acid
HCP	Habitat Conservation Plan
HWSG	Headworks Spreading Grounds
kV	kilovolt
LADWP	Los Angeles Department of Water and Power

NPDES	National Pollutant Discharge Elimination System
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
MG	million gallon
MW	megawatt
NOP	Notice of Preparation
NWP	Nationwide Permit
OHWM	ordinary high water mark
PRC	Public Resources Code
Proposed Project	Silver Lake Reservoir Complex Storage Replacement Project
PVC	polyvinyl chloride
RSC	River Supply Conduit
RWQCB	Regional Water Quality Control Board
S2DBR	Stage 2 Disinfection By-Products Rule
SAA	Streambed Alteration Agreement
SE	State Endangered
SEA	Significant Ecological Area
SLRC	Silver Lake Reservoir Complex
SNA	Significant Natural Areas
SR	State Rare
ST	State Threatened
SWPPP	Storm Water Pollution Prevention Plan
THM	trihalomethane
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USFWS	United States Fish and Wildlife Service

1.0 Project Background and Description

1.1 Background

The Los Angeles Department of Water and Power (LADWP) is the Lead Agency and will prepare a Draft Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA) for the Silver Lake Reservoir Complex (SLRC) Storage Replacement Project (Proposed Project). LADWP proposes to remove Silver Lake and Ivanhoe Reservoirs from direct service to the LADWP water distribution system. Water storage currently provided by the SLRC would be replaced by a 110-million-gallon (MG) underground covered storage reservoir at the former Headworks Spreading Grounds (HWSG) site. The new storage reservoir would be accompanied by a 4-megawatt (MW) hydroelectric power-generating facility at the HWSG site to capture energy from the water pressure coming into the reservoir. A regulating station at the southern end of the SLRC and a new bypass pipeline around the reservoir complex would convey water to existing service areas, and the operation of Silver Lake and Ivanhoe Reservoirs as drinking water storage facilities would change. Construction of the SLRC Storage Replacement Project is anticipated to require up to 6 years to complete.

CH2M HILL, on behalf of LADWP, has conducted this biological resources analysis to support preparation of an EIR for the Proposed Project. To adequately identify biological surveys necessary to support an EIR-level analysis, CH2M HILL conducted an initial site reconnaissance, evaluated proposed activities at the sites, and identified potential impacts to biological resources that may result from the proposed action. This preliminary review was followed by a more detailed analysis, which included field mapping of existing resources, conducting focused surveys for sensitive species, conducting literature review, and evaluating proposed actions relative to site conditions, potential impacts, and mitigation. Resource agencies with interest in the Proposed Project include the California Department of Fish and Game (CDFG), the United States Fish and Wildlife Service (USFWS), the United States Army Corps of Engineers (USACE), and the Regional Water Quality Control Board (RWQCB), collectively referred to as “agencies” for this report. Field surveys for this analysis were conducted during the spring survey season in 2004. This report summarizes the CH2M HILL approach, findings, and environmental analysis in support of an EIR.

1.2 Project Purpose and Need

Several recent state and federal water quality regulations require that LADWP make changes to its open reservoir system. The two regulations of concern are the Stage 2 Disinfection By-Products Rule (S2DBR) and the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). In order to meet these two regulations along with the previous Surface Water Treatment Rule (1989), LADWP is required to cover or remove from service its 10 open-air distribution reservoirs and convert its system to chloramines. The S2DBR addresses chlorination by-products such as trihalomethanes (THMs) and halo acetic acids (HAAs). Chlorine is effective at treating algae in open reservoirs such as Silver Lake and Ivanhoe, but it also reacts with naturally occurring organic materials that produce THMs and HAAs. The higher the level of algae and other organic material in the reservoirs, the greater the potential of THMs and HAAs. Both compounds are Cancer Group B carcinogens (shown to cause cancer in laboratory animals). The LT2ESWTR requires that all existing open finished water reservoirs be covered or meet 99.99 percent virus kill before the water enters the distribution system. LADWP has investigated several onsite and offsite alternatives to functionally replace the open storage capacity at Silver Lake and Ivanhoe Reservoirs and has determined that the Proposed Project is the best alternative from a cost, construction, and maintenance perspective.

1.3 Project Description

The Proposed Project would remove Silver Lake and Ivanhoe Reservoirs from direct service to the LADWP water distribution system. Water storage currently provided by the SLRC would be replaced by a 110-MG underground covered storage reservoir at the former HWSG site. The new storage reservoir would be accompanied by a 4-MW hydroelectric power-generating facility at the HWSG site to capture energy from the water pressure coming into the reservoir. A regulating station at the southern end of the SLRC and a new bypass pipeline around the reservoir complex would convey water delivery flow to existing service areas. Operation of Silver Lake and Ivanhoe Reservoirs as drinking water storage facilities would change. Construction of the SLRC Storage Replacement Project is anticipated to approximately 6.5 years to complete. The project location and setting are generally described below, along with a brief description of each element of the Proposed Project. A full project description is included in Chapter 2 of the Draft EIR.

1.3.1 Project Location

The Proposed Project would be located at the HWSG and at the SLRC. The HWSG site consists of 43 acres of undeveloped land adjacent to the Los Angeles River and between the City of Burbank and Griffith Park. It is bounded on the north by the Los Angeles River and State Highway 134 (also known as the Glendale Freeway), and on the east and south by Forest Lawn Drive.

The SLRC is located in the community of Silver Lake and consists of LADWP-owned Silver Lake and Ivanhoe Reservoirs and related facilities. Silver Lake is 5 miles northwest of downtown Los Angeles, just east of Griffith Park.

1.3.2 General Setting and Surrounding Land Uses

Land use immediately adjacent to the HWSG site is composed of the Los Angeles River, State Highway 134, parks, and cemeteries. The HWSG site is fronted on the south by the Mount Sinai Memorial Park and Forest Lawn Memorial Park. Griffith Park lies to the southeast of the site. Immediately north of the site is the Los Angeles River channel, along with the transportation corridor for State Highway 134. To the north of the freeway are residential neighborhoods; north and west of the site are the extensive complexes of NBC Studios, Disney Studios, and Warner Brothers Studios. To the northeast of the site is the Los Angeles Equestrian Center, and just east of the site is Traveltown Museum in Griffith Park.

The community of Silver Lake surrounding the SLRC is generally bordered by Interstate 5 to the north, State Highway 134 and Glendale Boulevard to the east, Sunset Boulevard to the south, and Griffith Park Boulevard to the west. Land use immediately surrounding SLRC is almost exclusively residential. Commercial uses in the immediate vicinity are primarily limited to the major cross streets, including Silver Lake, Sunset, and Glendale Boulevards, and Rowena Avenue.

1.3.3 Facilities at the HWSG Site

110-MG Underground Storage Reservoir

To replace the operational storage from Silver Lake and Ivanhoe Reservoirs, LADWP would construct a 110-MG buried reservoir at the HWSG site. The reservoir would occupy approximately 19 acres and would be located on the east side of the HWSG site.

4-MW Hydroelectric Power Generating Facility

To capitalize on a green power opportunity and reduce the water pressure coming into the new storage reservoir, LADWP would construct a 4-MW hydroelectric power-generating facility at the western edge of the HWSG site. The hydroelectric facility would require a powerhouse to house the turbine/generator and associated controls and instrumentation. The facility also would require an outdoor substation and backup emergency generator, and would be connected to the existing 35-kilovolt (kV) LADWP distribution system.

1.3.4 Facilities at the SLRC

Bypass Pipeline

A bypass pipeline to convey water around the SLRC to the rest of the water distribution system would be tunneled beneath various streets along the western edge of the SLRC, primarily beneath West Silver Lake Drive. The bypass pipeline would consist of approximately 4,900 linear feet of 66-inch-diameter pipeline that would be constructed of welded steel encased in concrete.

Regulating Station

A regulating station and associated facilities to control water pressure would be located within a 30,000-square-foot area within the grassy area just south of the Silver Lake Reservoir dam. The station and associated facilities would be buried with top access.

Changed Operation of Silver Lake and Ivanhoe Reservoirs

Because Silver Lake and Ivanhoe Reservoirs at SLRC would no longer be used for water supply, day-to-day operations would change. Specifically, the water currently flowing into Silver Lake and Ivanhoe Reservoirs would bypass SLRC as described in the above paragraphs. Silver Lake Reservoir is in an urban setting and is eutrophic, as defined by existing nutrient concentrations. Currently, the reservoir is managed by the LADWP as a drinking water reservoir and is maintained in a mostly clear condition by the application of approved treatment chemicals, primarily chlorine. Additionally, limited areas of surrounding vegetation are treated with pesticides to reduce the number of adult midge flies.

Following the removal of Silver Lake as an integral part of the drinking water system, the reservoir will be allowed to revert to a more natural state. This will be accomplished by discontinuing the addition of water treatment chemicals. The LADWP expects that, as a result, the water in the reservoir will generally change from a clear appearance to a less transparent, green color. This change in color will be due to increased algal growth because of sufficient existing nutrient concentrations. It is not expected that the amount of algae will exceed that which has been experienced periodically in the past. It is expected that a series of changes will occur over time in the types of organisms present as the reservoir adapts to the new operating regimen. It also is expected that changes in water appearance will accompany the addition of water to maintain reservoir water levels. Although the reservoir has fairly steep paved banks, it is likely that some emergent aquatic vegetation will become established. It is not known at this time if Silver Lake will become thermally stratified, as the depth of the reservoir is very close to the depth where stratification would normally occur.

The LADWP proposes to follow an adaptive management plan whereby potential management tools will be evaluated after the reservoir achieves a more natural condition. The SLRC facility and property would be maintained consistent with the appearance and condition that LADWP has provided at this facility for several years. No other significant changes at the SLRC facility are being anticipated by LADWP at this time.

1.3.5 Best Management Practices

Best Management Practices (BMPs) would be implemented as applicable during construction and operation of the Proposed Project, consistent with construction and operation practices at LADWP sites. These management practices would serve as Avoidance and Minimization Measures for reducing or eliminating impacts to biological resources. These measures would be a part of the Proposed Project action, and are described in more detail below.

Construction Measures

The HWSG site contains limited natural habitat that supports wildlife foraging and nesting. In addition, adjacent hillsides at Griffith Park support more extensive natural habitat. The SLRC supports lacustrine habitat (open lake) that is utilized by roosting waterfowl, primarily during the migratory season. To minimize construction impacts to these resources, the following measures would be implemented during construction.

1. Worker environmental awareness training for construction personnel would be provided to identify sensitive biological resources that may occur in construction areas, and identify measures required to minimize project impacts during construction and operation. Ongoing environmental monitoring will be provided by LADWP to ensure compliance with environmental requirements throughout the construction phase of the Proposed Project.

2. Preconstruction surveys by qualified biologists would be implemented for special-status species in impact areas prior to beginning ground-disturbing activities, and if necessary and feasible, resource relocation or exclusion would be implemented. Resource relocation would be conducted by qualified biologists in coordination with CDFG or

USFWS. Exclusion zones would be implemented with fencing and/or signage that restricts access.

3. The boundaries of the construction area within the project site would be marked with stakes and flags. No construction activities, vehicular access, equipment storage, stockpiling, or significant human intrusion would occur outside the designated construction area.
4. Project ingress and egress routes would be designated and flagged or staked, and vehicle traffic outside these routes would not be allowed. Vehicular traffic would adhere to a speed limit of 15 miles per hour (mph) during construction to ensure avoidance of impacts to sensitive biological resources on access roads.
5. Lighting for construction activities conducted during nighttime hours would be minimized to the extent possible through the use of directional shading to protect nocturnal wildlife activities. Construction later than 8 p.m. is not anticipated for the Proposed Project.
6. Construction sites would be monitored daily to pick up trash and litter. Food-related trash and litter would be placed in closed containers and disposed of daily. Pets would be prohibited in the construction area.
7. Intentional killing or collection of either plants or wildlife at construction sites would be prohibited. Discharging of firearms would be prohibited on construction sites.
8. Only agency-approved pesticides, herbicides, fertilizers, dust suppressants, or other potentially harmful materials would be applied within the construction area, in accordance with relevant state and federal regulations.
9. Soil or invasive plant seed transfer from clothing, shoes, or equipment would be minimized through rigorous cleaning and monitoring of personnel or equipment transfers between sites, or prior to initial entry on the site.
10. In habitats where nesting birds might occur, vegetation removal would occur outside the breeding bird season (February 1 to August 31) to avoid take or disturbance that would cause abandonment of active nests containing eggs and/or young. If project activities cannot avoid the breeding bird season, nest surveys will be conducted and active nests avoided and provided with a minimum buffer as determined by a biologist. For active raptor nests, this buffer will be a minimum of 500 feet.
11. In habitats where roosting bats might occur, ground disturbance and roost destruction would be avoided during the parturition period (March 15 through August 31). Where this is not feasible, exit surveys and/or roost surveys of potential roost sites would occur, and active roosts would be flagged. Construction activity within 300 feet of active roosts would be prohibited until the completion of parturition (end of August). Alternatively, if potential roosts are identified prior to onset of parturition, roosts may be excluded during the evening forage period (within 4 hours after dark) or fitted with one-way exit doors to effectively eliminate and exclude roost.

12. A revegetation plan would be prepared for all areas where bare ground is left exposed by construction activities. The revegetation plan will consist of container stock and/or seed of plants native to historical conditions at the Proposed Project site, including grassland, riparian, scrub, and woodland species native to the Santa Monica Mountains and/or Los Angeles River corridor. The plan would specify application methods and quantities, performance criteria, and monitoring requirements.
13. Only permitted, authorized construction vehicles that have been inspected to ensure fire safety requirements on the construction sites would be allowed. Vehicles would be equipped with catalytic converters with shielding or other acceptable fire prevention features. Camping, trash-burning fires, and warming fires would be prohibited in the construction area.
14. Equipment would not be operated in areas of ponded or flowing water, and no wet excavations would be performed during construction. Stationary equipment such as motors, pumps, generators, and welders would be located a minimum of 200 feet outside CDFG and USACE jurisdictional drainages. Construction staging areas, stockpiling, and equipment storage would be located a minimum of 100 feet outside CDFG and USACE jurisdictional drainages.
15. Construction vehicles and equipment would be checked periodically to ensure that they are in proper working condition and that there would be no potential for fugitive emissions of oil and other hazardous products. Refueling or lubrication of vehicles and cleaning of equipment, or other activities that involve open use of fuels, lubricants, or solvents, would occur in upland locations at least 500 feet away from CDFG and USACE jurisdictional drainages, and at least 200 feet from other flagged, sensitive biological resources.
16. The project would obtain a National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater General Construction Permit (General Permit), and comply with all permit requirements. As part of the permit requirements, a Storm Water Pollution Prevention Plan (SWPPP) would be prepared for the project. The SWPPP would provide detailed descriptions of the various structural and nonstructural water quality management measures to be used, and may include construction BMPs; downstream water quality monitoring and use of permanent source-control BMPs; and treatment control BMPs, which may include installation of filters, straw bale barriers, silt fences, and treatment wetlands. These structures would be located outside CDFG and USACE jurisdictional drainages.
17. A Mitigation Monitoring Plan that outlines how LADWP would implement and monitor the mitigation measures specified herein would be prepared, and construction monitoring and compliance reports that analyze the effectiveness of the mitigation measures would be prepared.

Operation Measures

The Proposed Project facilities are designed and operated, consistent with state and federal regulations, to install and implement proper site controls, which would include appropriate stormwater management, site noise control, controls for night lighting and operations, reservoir operations and management, and appropriate controls on maintenance activities.

These management and control measures will be important in protecting sensitive biological resource receptors from disturbance associated with facility operations. Specifics of the management and control measures are developed in the following portions of the EIR document:

- Water Resources Chapter (stormwater management)
- Noise Chapter (site noise control)
- Visual Resources Chapter (night lighting and operations)

2.0 Study Methodology

2.1 Background Literature/Database Review

A review of relevant biological databases for biological resources in the Proposed Project area was conducted. This included a review of the California Natural Diversity Data Base (CNDDB) managed by the CDFG (CDFG, 2004a); the California Wildlife Habitat Relationships System (CWHR) (CDFG, 2004b); proposed or final Critical Habitat for species listed as "threatened" or "endangered" designated by the USFWS under the Federal Endangered Species Act (FESA); Significant Ecological Areas (SEAs) as determined by the County of Los Angeles; and Significant Natural Areas (SNAs) as determined by CDFG.

Existing environmental documents, planning or technical reports, government publications, and other published materials with information relevant to biological resources in the region or the site were collected, reviewed, and summarized, particularly where information provided specific species occurrence records near the Proposed Project site. A full list of documents that were reviewed for this report is provided in Section 6.0, References and Project Bibliography.

2.2 Agency Coordination

The CDFG, the USFWS, the Los Angeles County Planning Department, the RWQCB, and the USACE were contacted with the Notice of Preparation (NOP) for the Proposed Project and asked to comment on specific resource concerns. Follow-up contact was implemented where appropriate.

2.3 Site Surveys

2.3.1 Reconnaissance Surveys

Large scale aerial photographs (minimum 1 inch = 500 feet; or 1:6,000 scale) were procured from LADWP; photos were integrated into a project Geographical Information System (GIS). Vegetative communities and habitat types were identified and characterized for the Proposed Project area and surrounding landscape to within 500 feet. Additional information identified for the site included the following: (1) general locations of "waters of the U.S." as defined by the USACE as containing waters in a 2-year flood frequency; (2) CDFG stream jurisdictional areas determined as having a defined "bed and bank"; and (3) special-habitat features important for sensitive species. Along with preliminary habitat identification, site habitat was characterized based on suitability to support special-status species.

2.3.2 Focused Surveys

Based on preliminary habitat investigations, the need for limited focused species surveys was identified. At HWSG, this included surveys for nesting raptors, bat roosts, and sensitive reptiles. At SLRC this included surveys for roosting waterfowl and nesting ardeids (herons and egrets). Reconnaissance and focused surveys were conducted on March 15, April 1, April 6, and April 28, 2004 (see Table 2-1).

Focused surveys for special-status breeding birds were conducted. This included nesting raptors, including ground transects for burrowing owl (*Athene cunicularia*) at HWSG, and surveys for tree-nesting raptors in ornamental landscape trees at both sites. Burrowing owl surveys were conducted by surveying walking transects on maximum 10 meter centers throughout HWSG, looking for burrows or individuals. Nesting raptor surveys were conducted by surveying trees in the Proposed Project vicinity with binoculars for stick nest structures or nesting cavities. Focused surveys to identify, characterize, and map bat roosts were also conducted. Focused surveys for sensitive reptile species included a 0.5-day effort to identify habitat and individuals of San Diego horned lizard (*Phrynosoma coronatum blainvillei*) at HWSG. Finally, on two occasions, roosting waterfowl species present at the SLRC were identified.

TABLE 2-1
Focused Species Surveys Conducted at HWSG and SLRC

Survey	Species Covered and Status	Method	No. of Visits/ Days	Dates (2004)	Location/ General Habitat
Breeding Birds	Burrowing owl (CSC) Loggerhead shrike (CSC) California horned lark (CSC) Yellow-breasted chat (CSC) Nesting raptors (CSC, CFP)	Morning Point Count and Transects	2	April 1 April 6	HWSG riparian, grassland, scrub; tall trees
Roosting Waterfowl	Migratory waterfowl	Visual Surveys	2	April 6 April 28	SLRC lacustrine
Heron Rookeries	Nesting ardeids (herons and egrets)	Visual Surveys	2	April 6 April 28	HWSG, SLRC tall trees adjacent to water features
Bat Roosts	Numerous bat species (SC/CSC)	Daytime Survey	1	April 1 April 6	HWSG, SLRC Buildings, concrete structures, bridges
Sensitive Reptiles	San Diego horned lizard (CSC)	Daytime Survey	0.5	April 1	HWSG, washes, scrub

Notes:
1- Key to status designations-

Federal Designations:

(FE) Federally Endangered, (FT) Federally Threatened, (FPE) Federally Proposed Endangered, (FPT) Federally Proposed Threatened, (FSC) Species of Concern, (FC) Candidate

State Designations:

(SE) State Endangered, (ST) State Threatened, (SR) State Rare, (CSC) Species of Special Concern, (CFP) Fully Protected Species

3.0 Existing Environment

3.1 Regulatory Framework

3.1.1 Federal Regulations and Standards

The Proposed Project may be subject to the following federal regulations:

- **Federal Endangered Species Act (FESA), including coordination requirements of Sections 7 and 10 and Habitat Conservation Plan (HCP) requirements of Section 9 (16 United States Code [USC] §1531 *et seq.*; 50 Code of Federal Regulations [CFR] Part 402).** Section 9 of FESA prohibits the "take" of species federally listed as threatened or endangered. "Take" is further defined to include any harm or harassment, including significant habitat modification or degradation that could potentially kill or injure wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Take incidental to otherwise lawful activities can be authorized under Section 7 of FESA, where a federal nexus or agency is involved. Section 10 of FESA provides for project proponents of nonfederal activities to apply for take incidental to otherwise lawful activities; this generally includes the development of an HCP.

- **Migratory Bird Treaty Act (16 USC 703-712; 50 CFR 10).** The federal Migratory Bird Treaty Act prohibits the "take" of migratory birds, unless permitted. This regulation can constrain construction activities that have the potential to affect nesting birds either through vegetation removal and land clearing, or through other construction- or operation-related disturbance.

- **Sections 401 and 404 of the Clean Water Act (CWA) (33 USC §1344).** Activities that have the potential to discharge fill materials into "waters of the U.S." including wetlands are regulated under Section 404 of the CWA, as administered by the USACE. Fill activities may be permitted by a Nationwide or Individual Permit. The Nationwide Permit Program involves certain activities that have been preauthorized by USACE. Individual Permit applications are more involved, and generally take up to 6 months for permit issuance. Section 404 (1)(b) guidelines require the USACE to rule in favor of the least environmentally damaging practicable alternative when multiple alternatives are available for a project. Typically, the USACE requires mitigation in the form of restoration of areas of temporary impacts, and restoration/enhancement of additional wetland areas at a specified ratio of impacts. Alternatively, in lieu fees can be paid into a mitigation banking fund. Projects requiring a Section 404 permit also require a CWA Section 401 Water Quality Certification or Waiver, issued by the appropriate RWQCB.

3.1.2 State Regulations and Standards

The Proposed Project may be subject to the following state regulations:

- **CEQA as amended (Public Resources Code [PRC] §21000 *et seq.*).** The goal of CEQA is to assist California public agencies in identifying potential significant environmental effects of their actions, and either avoiding or mitigating those effects, when feasible. The regulation applies when there is discretionary approval for the project by a state or local authority.
- **California Endangered Species Act (CESA) (California Fish and Game Code §2050 *et seq.*).** Section 2050 of the California Fish and Game Code prohibits any activities that would jeopardize or take a species listed as threatened or endangered within the state. Projects that have the potential to impact species listed as threatened or endangered by the state might require an Incidental Take Permit from the CDFG under Section 2081 of the Fish and Game code. The application for this permit requires a project description, an analysis of impacts to the species, and an analysis of the probability of the long-term survival of the species as related to impacts.
- **California Fully Protected Wildlife Species Provisions (California Fish and Game Code §3511, §4700, §5050, and §5515).** These provisions prohibit the taking of fully protected birds, mammals, amphibians, and fish. The CDFG might authorize the project, with conditions, after reviewing the project impacts.
- **Birds of Prey Protection Provision (California Fish and Game Code §3503.5).** This provision prohibits the taking of birds of prey, including any birds of the order Falconiformes or Strigiformes, and including nests or eggs of such birds.
- **Fish and Wildlife Protection and Conservation – Streambed Alteration Agreements (California Fish and Game Code §1600).** Section 1600 of the Fish and Game Code regulates the alteration of the bed, bank, or channel of a stream, river, or lake, including dry washes. Generally, CDFG asserts jurisdiction up to the top of significant bank cuts, or to the outside of any riparian vegetation associated with a water course. Activities that have the potential to affect jurisdictional areas can be authorized through issuance of a Streambed Alteration Agreement (SAA). The SAA specifies conditions and mitigation measures that would minimize impacts to riparian resources from proposed actions. The issuance of an SAA takes from 1 to 3 months.

3.1.3 Special Land Designations

Federal Critical Habitat

Under the FESA, the USFWS is required to designate Critical Habitat for species listed as endangered or threatened. The FESA designates Critical Habitat to encompass those areas occupied by the species where the physical and biological features essential to the conservation of the species are present. No designated Critical Habitat is present at the Proposed Project site, nor within 5 miles of the site.

Significant Natural Areas

SNAs are established by the CDFG, under the Fish and Game Code Sections 1930 to 1933. SNAs are areas that contain important examples of the biological diversity in California. These areas are identified using the following biological criteria only, irrespective of any administrative or jurisdictional considerations:

- Areas supporting extremely rare species or habitats
- Areas supporting associations or concentrations of rare species or habitats

SNAs work interactively with the CDFG CNDDB, and, therefore, the SNA inventory is heavily weighted toward rarity. The identification of SNAs is purely for educational purposes and does not imply additional authority by CDFG over these areas (CDFG, 2004c).

There are no SNAs at the Proposed Project site. Verdugo Mountain Park, located 4 miles to the north of the HWSG site, supports an SNA designated for a rare population of Davidson's bush mallow (*Malacothamnus davidsonii*). Ernest E. Debs Regional Park along the Arroyo Seco, 4 miles east of the SLRC, supports rare California walnut (*Juglans californicus*) woodland.

Significant Ecological Areas

SEAs were established in 1976 by Los Angeles County to designate areas with sensitive environmental conditions and/or resources. The county developed the concept in conjunction with adopting the original County General Plan and SEAs are defined and delineated in conjunction with Land Use and Open Space Elements for the County General Plan. The County of Los Angeles Department of Regional Planning is currently updating the SEA portion of the General Plan. Uses normally allowed in the corresponding land use classification would continue to be permitted unless a finding is made that the Proposed Project would have an adverse affect on the SEA (Los Angeles County Department of Regional Planning, 1990).

SEA boundaries are general in nature and broadly outline the biotic resources of concern. The Los Angeles County General Plan allows development in SEAs as long as development is "highly compatible" with the identified resources (CDFG and USACE, 1999). There are 62 SEAs identified in Los Angles County. SEA boundaries are typically mapped to include areas of biological continuity; however, SEA jurisdiction does not apply within individual city boundaries that overlap.

Just to the south of the HWSG site, the Griffith Park SEA encompasses natural biotic communities within Griffith Park, which supports coastal sage scrub, chaparral, riparian, and southern oak woodland plant communities typical in interior and coastal mountain ranges of California. The communities are significant at Griffith Park because they are isolated by surrounding urban development; as such, they may play an important role as a reservoir of native species and genetic diversity, as well as providing habitat stopovers for migrant birds. No buffer zones are required for the Griffith Park SEA; as such, there is no direct constraint on development of the Proposed Project.

The Verdugo Mountains SEA lies 4 miles to the north of HWSG. It consists of an extensive, relatively undisturbed island on natural vegetation in an otherwise urbanized landscape; plant communities include coastal sage scrub, chaparral, and riparian woodland. This area may serve as the only remaining habitat link between the Santa Monica Mountains to the southwest and the San Gabriel Mountains to the northeast.

3.2 Project Site Description

3.2.1 General Environment

The HWSG is located in the southeastern portion of the San Fernando Valley, in the City of Los Angeles, on the south bank of the Los Angeles River. It is a relatively flat parcel adjacent to the river, just below the north slopes of the easternmost spur of the Santa Monica Mountains. In addition to the river channel, it is fronted on the north by State Highway 134, on the south by Forest Lawn Drive, and on the east by freeway on-ramps. Elevation at HWSG at 496 feet. Adjacent land use includes urban and developed areas to the north, cemeteries to the south, the Traveltown Museum to the east, and portions of Griffith Park with natural landcover to the southeast. A utility corridor extends east and west on the site; where this extends west of the site, the landcover is relatively open.

The SLRC is located in the hilly residential neighborhoods of the Silver Lake community. Surrounding land uses include residential and limited commercial. There is no natural land cover in the vicinity of SLRC; however, an area dominated by non-native species in a naturalized condition exists on the eastern shore of the SLRC.

3.2.2 Plant and Wildlife Communities

Vegetative communities on the Proposed Project sites were characterized during site visits. Wildlife usage of these communities also was noted. The sites were characterized according to Holland (1986). Native vegetation communities were limited to the HWSG. The native communities are sparse and patchy compared to typical representations of these communities where land disturbance has been less intense. Non-native vegetation both surrounds native plant communities, and is interspersed throughout the communities.

Existing vegetation communities and wildlife species observed or commonly associated with these communities at the project site are described below.

Southern Mixed Chaparral/Venturan Coastal Sage Scrub

Representatives from both these communities are found together in a scrub community with patchy occurrence on the HWSG site, consisting of open to moderately dense woody vegetation, ranging from 4 to 12 feet in height, with understory varying from sparse to moderately dense, where non-native annual herbaceous vegetation is present. Dominant species include coyote bush (*Baccharis pilularis*), coffeeberry (*Rhamnus californica*), California buckwheat (*Eriogonum fasciculatum*), sugarbush (*Rhus ovata*), squaw bush (*Rhus trilobata*), poison oak (*Toxicodendron trilobata*), California bay (*Umbellularia californica*), and monkeyflower (*Diplacus* sp.). Non-native plants present include scotch broom (*Cytisus scoparius*), oleander (*Nerium oleander*), and castor bean (*Ricinus communis*).

Common wildlife species associated with this community at the project site include spotted towhee (*Pipilo erythrophthalmus*), mourning dove (*Zenaida macroura*), allen's hummingbird (*Selasphorus sasin*), northern mockingbird (*Mimus polyglottos*), white-crowned sparrow (*Zonotrichia leucophrys*), scrub jay (*Aphelocoma coerulescens*), spotted towhee (*Pipilo maculatus*), California towhee (*Pipilo crissalis*), desert cottontail (*Sylvilagus audubonii*), coyote (*Canis latrans*), and western fence lizard (*Sceloporus occidentalis*).

Ruderal/Non-Native Grassland

The ruderal/non-native grassland is present throughout the Proposed Project at the HWSG site, on disturbed areas impacted by previous land development activities, including spreading basin construction and operation. This community contains dominant species of slender wild oat (*Avena barbata*), hare barley (*Hordeum leporinum*), red brome (*Bromus rubens*), and soft chess (*Bromus mollis*). Scattered shrubs may include tree tobacco (*Nicotine glauca*) and mulefat (*Baccharis salicifolia*).

Common wildlife species associated with this community at the project site include red-tailed hawk (*Buteo jamaicensis*), northern rough-winged swallow (*Stelgidopteryx serripennis*), Brewer's blackbird (*Euphagus cyanocephalus*), mourning dove, desert cottontail, and coyote.

Mulefat/Willow Scrub

There are two significant drainages within the Proposed Project site at HWSG. These drainages are fed primarily from storm or nuisance flow runoff from the adjacent cemeteries. Storm drains appear to enter the HWSG in the east of the site, in the center of the site along the southern boundary along Forest Lawn Drive; the storm drain that enters at the center of the site appears to drain to the east, collecting in a drainage channel to a small retention basin located on the far east of the site. The eastern storm drain also enters this site. This basin has a hydrologic connection to the Los Angeles River. In the western portion of the site, also along Forest Lawn Drive, another storm drain enters, the fate of which is unknown. It does appear to connect in some fashion with a drainage channel that carries water from the former spreading basins; this channel extends from east to west, and a portion of the flow is carried through a polyvinyl chloride (PVC) pipe set on the bottom of the channel.

Mulefat/willow scrub has established along portions of the significant drainages, as well as in some locations along levees associated with the former spreading ground operations. Dense mulefat-dominated riparian scrub is located along the drainage on the southern portion of the site, extending up the slope where the storm drain enters. Other riparian plants, including arroyo willow (*Salix laevigata*), Goodding's black willow (*S. gooddingii*), Mexican elderberry (*Sambucus mexicana*), and box elder (*Acer negundo*) also are found in scattered occurrence within the mulefat scrub. In addition, a few small coast live oak (*Quercus agrifolia*) are associated with this community. Standing water was present in the wetter portions of some drainages during the field surveys. Mulefat and other riparian species have established in some locations on the berms of former spreading basins, and may be moderately dense in some places, but are generally only as wide as the basin.

The retention basin on the eastern portion of the HWSG site has a small swale with limited wetland characteristics in its center, encompassing an area of about 200 square feet. Herbaceous plants are present in this swale, and include toad rush (*Juncus bufonius*), Johnsongrass (*Sorghum halepense*), and others. Field sampling indicates it does not meet the criteria of a jurisdictional wetland as defined by the USACE. Specifically, wetland soils are not evident, and vegetation adapted to wetland conditions comprises less than 20 percent of the site cover.

Common wildlife species associated with the riparian community at the Project site include Black phoebe (*Sayornis nigra*). Other bird species observed utilizing the habitat are generalists that also utilize adjacent upland scrub and ruderal/grassland habitats.

Ornamental Landscaped

Ornamental landscaped vegetation is found on perimeter locations on the HWSG along Forest Lawn Drive, and along State Highway 134 on the north of the site. Tree species present include acacia (*Acacia* sp.), poplar (*Populus* sp.), pines (*Pinus* spp.), and ash (*Fraxinus* spp.). Ornamental landscaped vegetation is also common around SLRC; in particular, extensive stands occur around the LADWP facilities on the eastern side of the complex, in parklands on the southern portion of the complex, and in other pockets around the perimeter of the concrete-lined reservoirs.

Ornamental landscaped vegetation supports a number of species of wildlife adapted to urban conditions. This includes house finch (*Carpodacus mexicanus*), American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), and northern mockingbird. In addition, ornamental trees may support nesting species, including nesting raptors such as red-tailed hawk, and nesting waterbirds such as great blue heron (*Ardea herodias*). Great blue heron nests in ornamental trees on the northwest side of Silver Lake.

The vegetation on the east side of LADWP at SLRC represents a naturalized community of predominantly non-native ornamental trees and shrubs, including eucalyptus (*Eucalyptus* spp.), hemlock (*Tsuga* sp.), cedar (*Cupressus* sp.), *Ficus* sp., pine (*Pinus* sp.), in a mix with some native trees including coast live oak and Mexican elderberry. The canopy coverage is moderate to dense, with an understory ranging from grassland to shrub. The naturalized community supports a variety of native and non-native wildlife.

Aquatic Riverine

The Los Angeles River fronts the HWSG along the northern boundary of the site. In this location, the river is confined to a concrete box channel, about 200 feet in width, and up to 20 feet deep. There is no riparian or emergent vegetated habitat developed or associated with the Los Angeles River in this location. However, substantial algae production occurs in the shallow sheet flow between storm flows, and a limited wildlife habitat is supported. Wildlife species observed included mallard (*Anas platyrhynchos*) and black phoebe.

Aquatic Lacustrine

The SLRC supports extensive open water habitat. Silver Lake and Ivanhoe Reservoirs have water surface areas of approximately 77 and 8 acres respectively. Maximum depths are about 41 feet for Silver Lake and 30 feet for Ivanhoe Reservoir. Both reservoirs have steep concrete banks, and there is no shoreline or emergent vegetation within the SLRC. Silver Lake has soil over most of the reservoir bottom. Ivanhoe has a concrete bottom. As potable water reservoirs, influent water is chlorinated; plus additional chlorine is, or can be, added to both reservoirs.

Water flow-through rates are very high in both reservoirs; turnover time for Silver Lake is from 1 to 2 weeks. Ivanhoe Reservoir is as high as 1 day. The high flow-through precludes permanent stratification in either reservoir. Chlorine concentrations maintain water quality and water clarity, and also preclude fish life. Excess influent water in Ivanhoe Reservoir overflows over a small waterfall into Silver Lake. Excess inflow into Silver Lake is discharged into a storm drain. Storm runoff to both reservoirs is minimal since the "watersheds" for each are mostly confined to their respective surface areas.

Based on field visits by STO Design Group in June 2002 (STO Design Group, 2002), the reservoirs indicated moderate nutrient enrichment. Ivanhoe water was very clear (due to chlorination and high flow-through rates). There was considerable benthic algae due to both light penetration over much of the reservoir bottom, and to nutrients in the influent water. In some places, algae had detached and was floating on the surface. Invertebrate production was high, probably associated with nutrient rich conditions and algae. Silver Lake exhibited less clarity, and had a greenish tinge due to phytoplankton.

Natural accumulation of nutrients such as phosphorus (P) and nitrogen (N) in lakes is called eutrophication. Lakes can range from nutrient poor, clear lakes (oligotrophic) to moderate nutrient input (mesotrophic), to nutrient rich lakes (eutrophic to hypertrophic). With increasing eutrophication, water clarity is reduced, and algal concentrations, aquatic insect densities, and biological oxygen demand (BOD) become higher. If nutrient inputs are extreme, water becomes a dark green color, the water surface and water column are often clogged with floating or submerged algae, and odors, insect infestations, and fish kills can occur. This is generally undesirable for both aesthetic and biological reasons.

The field observations suggest that source waters for both Ivanhoe and Silver Lake have sufficient nutrient content to produce a mesotrophic state (moderate level) of eutrophication. Eutrophication is generally limited by both high flow-through rates, moderate nutrient input in source water, and the addition of chlorine to the water supply.

There is sufficient invertebrate production to support a small resident waterfowl population, consisting of a few mallards, and small numbers of migrant waterfowl. Migrant birds observed on the SLRC include ruddy duck (*Oxyura jamaicensis*), eared grebe (*Podiceps nigricollis*), and bufflehead (*Bucephala albeola*); these species are known to forage on aquatic invertebrates. Canada goose (*Branta canadensis*) also has been observed at the SLRC, and may forage on aquatic or terrestrial plants. Gulls (*Larus* spp.) have been observed using the SLRC. The nesting herons do not forage at SLRC, since there is a lack of shallow foraging habitat for these species.

Numbers of migrant and resident waterfowl observed on the SLRC on two separate dates are provided in Table 3-1.

TABLE 3-1
Waterfowl Numbers Observed at SLRC During 2004 Field Surveys

Species	April 6, 2004 Count	April 28, 2004 Count
Mallard *Anas platyrhynchos*	8	7
Ruddy duck *Oxyura jamaicensis*	199	36
Eared grebe *Podiceps nigricolli*	5	1
Canada goose *Branta canadensis*	2	---
Gulls spp. *Larus* spp.	6	1

3.2.3 Jurisdictional Waters

United States Army Corps of Engineers

Pursuant to Section 404 of the CWA, the USACE regulates the discharge of dredged and/or fill material into "waters of the U.S.," as previously stated. The limit of "waters of the U.S." is generally identified as the limit of the ordinary high water mark (OHWM) of a stream or drainage as extended by any adjacent wetlands. The OHWM generally is considered to be the highest level to which water flows at least every other year (50 out of 100 years). Wetlands are defined in the CFR as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration (wetland hydrology) sufficient to support, and that under normal circumstances do support, a prevalence of vegetation (hydrophytic vegetation) typically adapted for life in saturated soil conditions (hydric soils)" (40 CFR 230.3, 33 CFR 328.3). Generally, wetlands "include swamps, marshes, bogs and similar areas" (40 CFR 230.3). The *Wetlands Delineation Manual* (USACE, 1987) requires an examination for the presence of indicators of three mandatory diagnostic characteristics. These characteristics or wetland parameters include hydrology, hydrophytic vegetation, and hydric soils. Except in limited instances, the *Wetlands Delineation Manual* requires that evidence of a minimum of one positive indicator from each of the three mandatory wetland parameters be present for an area to be called a wetland under Section 404 jurisdiction.

California Department of Fish and Game

Pursuant to Section 1600 of the Fish and Game Code, CDFG has jurisdiction over activities that affect the bed or bank of drainages within the state. Since the purpose of the Fish and Game Code is to protect fish and game resources, CDFG interprets Section 1600 as including impacts to riparian habitat adjacent to the water of the state, in addition to the drainage itself. Jurisdiction is typically defined as the bed of a drainage and the bank up to the top of significant cut, extending to the outer limits of riparian vegetation where it occurs beyond the bank cut.

Jurisdictional Area Identification

The location of "waters of the U.S." and CDFG jurisdictional areas within the project sites were identified during field surveys. A formal wetland delineation was not conducted for the project site, and no evidence supporting a positive wetland determination was present. Although some wetland vegetation within the detention basin at HWSG was present, no other wetland indicators were present. As defined by the 1987 *Wetland Delineation Manual* (USACE, 1987), evidence of a minimum of one positive wetland indicator from each parameter (hydrology, vegetation, and soil) must be present to support a positive wetland determination. Riparian vegetation and distinct bed shelving was observed along the two major drainages at HWSG, indicating regular surface channel flow, and defining the major site drainages as jurisdictional "waters of the U.S." and CDFG jurisdictional areas.

CDFG jurisdiction is present along major channels within the HWSG, which support mulefat, Mexican elderberry, and some willows. This includes the major drainage channel along the southern portion of the site, and channels contiguous with this where storm drains enter the site. USACE jurisdiction is present along the OHWM of these channels where flow is present during 2-year storm events in an open channel.

3.3 Special-Status Species

The following section addresses special-status species observed, reported, or having the potential to occur at the Proposed Project site or its immediate vicinity. These resources include plant and wildlife species that have been afforded recognition by federal and state resource agencies, as well as private conservation organizations, as taxon (species, subspecies, or variety) with a documented or perceived decline or limitation of its population size or geographical extent and/or distribution resulting in most cases from habitat loss.

Special-status species include those that are (1) listed or proposed for listing by state or federal agencies as rare, threatened, or endangered; (2) federal Species of Concern or state Species of Special Concern; (3) species listed by the California Native Plant Society (CNPS) with a designation of Category 2 (indicating species that are rare or endangered in California but more common elsewhere) or 1B (indicating species that are rare or endangered in California and elsewhere); or (4) species identified by biologists with regional knowledge as being of conservation concern or local interest. Tables 3-2 and 3-3 provide lists of special-status plant and wildlife species potentially occurring in the project area and include information on status, likelihood for occurrence, and habitat requirements.

3.3.1 Special-Status Plants

Table 3-2 identifies the special-status plant species that have the potential to occur in the general vicinity of the Proposed Project, and identifies their status and general information about the type of habitat in which they have been documented to occur. This section provides a description for each of these species and provides additional information about the range of their occurrences in the project vicinity. Species descriptions and occurrence information described below, unless otherwise indicated, were determined from the CNDDB (CDFG, 2004a), the CNPS Inventory of Rare and Endangered Plants (CNPS, 2004), and botanical literature (Hickman, 1993).

TABLE 3-2
Potential Special-Status Plant Species, Proposed Project

Species	Status[1] (Federal/ State/CNPS)	Potential for Occurrence in Area of Potential Effects/ Nearest Identified Occurrence[2]	Habitat Requirements
Nevin's Barberry *Berberis nevinii*	**FE/SE/1B**	Recorded in 1986 in Griffith Park near Vista del Valle Road; population probably planted after fire; low potential for occurrence on project site.	Chaparral, cismontane woodland, coastal scrub, riparian scrub.
Davidson's Bush Mallow *Malacothamnus davidsonii*	**SC/---/1B**	Recorded in 1987 in Cabrini Canyon near Burbank; site graded in 1999. Limited potential for occurrence.	Coastal scrub, riparian woodland and mulefat scrub, chaparral, sandy washes.
Slender Mariposa Lily *Calochortus clavatus* var. *gracilis*	**SC/---/1B**	No recent records for this species in the vicinity of the Project. Limited potential for occurrence in study area.	Chaparral, coastal scrub. Endemic to Los Angeles County.
Parish's Brittlescale *Atriplex parishii*	**---/---/1B**	Historically occurred in Santa Monica Mountains; recent records unknown, and not collected in state since 1974. Low potential for occurrence.	Alkali meadows, vernal pools, chenopod scrub, playas
Parish's Gooseberry *Ribes divaricatum* var. *parishii*	**---/---/1B**	Historic collections in region, but no recent records; possibly extirpated. Low potential for occurrence.	Riparian woodland, *Salix* swales in riparian habitat.
Davidson's saltscale *Atriplex serenana* var. *davidsonii*	**---/---/1B**	Historically occurred in Los Angeles basin, but presumed extirpated. Low potential for occurrence.	Coastal bluff scrub, coastal scrub, alkaline soils.
Braunton's Milk Vetch *Astragalus brauntonii*	**FE/---/1B**	This species has historically occurred in Orange, Los Angeles, and Ventura Counties; however, there are no recent records near the Project site. Low potential for occurrence.	Chaparral, coastal sage scrub, grasslands; often associated with recent burns or disturbed areas.
Plummer's Mariposa Lily *Calochortus plummerae*	**SC/---/1B**	Historically documented in Santa Monica Mountains and Verdugo Canyon; no recent records. Low potential for occurrence.	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest.
Palmer's Grapplinghook *Harpagonella palmeri*	**---/---/2**	No occurrence records identified in the area, but potential for occurrence.	Grassland, sage scrub, and chaparral.
Prostrate navarretia *Navarretia prostrata*	**SC/---/1B**	Historically occurred in region, but no recent records. Low potential for occurrence.	Coastal scrub, valley and foothill grassland, vernal pools, alkaline soils in grassland.
San Fernando Valley Spineflower *Chorizanthe parryi* var. *fernandina*	**SC/SE/1A**	Historically occurred in vicinity, but no recent records. Low potential for occurrence in project site.	Coastal scrub. Formerly known from southern California.

TABLE 3-2
Potential Special-Status Plant Species, Proposed Project

Species	Status[1] (Federal/ State/CNPS)	Potential for Occurrence in Area of Potential Effects/ Nearest Identified Occurrence[2]	Habitat Requirements
Los Angeles Sunflower *Helianthus nuttallii* ssp. *parishii*	**---/---/1A**	Historically in Los Angeles County and range described in botanical literature, but presumed extinct	Marshes and swamps, from 5 to 5,000 feet in Southern California
Lyon's pentachaeta (*Pentachaeta lyonii*)	**FE/SE**	The nearest occurrence record is in the vicinity of Simi Valley, East of Highway 23, where two populations were recorded in 1991 and 1995. Not anticipated in project area.	Chaparral, clearings in chaparral, grasslands, firebreaks
Many-stemmed Dudleya *Dudleya multicaulis*	**---/---/1B**	Historically mapped in vicinity of Hollywood Reservoir, but no recent records. Low potential for occurrence.	Chaparral, coastal scrub, valley and foothill grassland. In heavy, clay soils or grassy slopes.

Notes-
1- Key to Status Designations:
Federal Designations:
(FE) Federally Endangered, (FT) Federally Threatened, (FPE) Federally Proposed Endangered, (FPT) Federally Proposed Threatened, (FSC) Species of Concern, (FC) Candidate
State Designations:
(SE) State Endangered, (ST) State Threatened, (SR) State Rare, (CSC) Species of Special Concern, (CFP) Fully Protected Species
California Native Plant Society (CNPS) Designations:
(1A) Presumed extinct in California; (1B) Rare, threatened, or endangered in California and elsewhere; (2) Rare, threatened, or endangered in California, but more common elsewhere; (3) More information is needed; (4) Limited distribution

2- See text for sources.

Nevin's Barberry (Berberis nevinii). Nevin's barberry is federally endangered and state endangered, and a CNPS List Category 1B species. This evergreen shrub occurs in coarse soils and rocky slopes in chaparral and gravelly wash margins in alluvial scrub and typically blooms between April and June. This species is known to occur in Los Angeles, Riverside, San Bernardino, and San Diego Counties below 2,133 feet elevation. A small population of 30 to 40 plants was discovered in Griffith Park below Water Tower No. 113 off Vista Del Valle Road in 1986. The species was commonly planted after fires in the 1930s and 1940s, which may have been the origination of this population (CDFG, 2004a). Occurrence on the project site is unlikely.

Slender Mariposa Lily (Calochortus clavatus var. *gracilis).* The slender mariposa lily is a federal Species of Concern and a CNPS List Category 1B species. It is a perennial species that is found in shaded foothill canyons, often in grassy slopes below 3,280 feet elevation. No recent records in the area have been identified. There is low potential for occurrence on the Proposed Project site.

Plummer's Mariposa Lily (Calochortus plummerae). The Plummer's mariposa lily is a federal Species of Concern and a CNPS List Category 1B species. This late blooming (May through

July) mariposa lily is found in dry, rocky areas of alluvial fan sage scrub, chaparral, coastal sage scrub, and lower coniferous forest habitats at elevations below 5,577 feet. No records of the species were identified in this area since 1932 (CDFG, 2004a), and it is probably absent. There is low potential for occurrence on the project site.

San Fernando Valley Spineflower (Chorizanthe parryi var. *fernandina).* San Fernando Valley spineflower is a federal Species of Concern and a CNPS List Category 1A species. Category 1A species are thought to be extinct. However, in 2000, this species was observed to occur at Newhall Ranch, about 3.2 miles southwest of Val Verde, south of the Santa Clara River (CDFG 2004a). This annual herb historically grew in sandy soils in coastal sage scrub habitats historically in Los Angeles, Orange, and San Diego Counties. The only records for the Project vicinity identified were from 1890, when plants were collected from the Hollywood and Burbank areas (CDFG 2004a). There is very low potential for occurrence on the Proposed Project site.

Palmer's Grapplinghook (Harpagonella palmeri). Palmer's grapplinghook is a CNPS List Category 2 species. This small and inconspicuous annual grows on dry slopes and mesas in grassland, sage scrub, and chaparral habitats below 1,500 feet. It typically blooms between March and April and historically occurred from Los Angeles County to Baja California and on the Channel Islands. Occurrences in Los Angeles County have been documented at the San Mateo Wilderness Area in Cleveland National Forest, and on Santa Catalina Island. There is potential for occurrence on the project site.

Braunton's Milk-Vetch (Astragalus brauntonii). This species is federally endangered and a CNPS List Category 1B species. It occurs in chaparral, coastal sage scrub, and grasslands, and often is associated with recent burns or disturbances. It historically has occurred throughout Orange, Los Angeles, and Ventura Counties, but populations have been reduced severely from development. Historic records occur from the Hollywood area from 1908 (CDFG, 2004a). More recent occurrence records occur from the Simi Valley area to the northeast of the project site, and from the Thousand Oaks area (Nelson, pers. comm. 2000). Given the rarity of this species, there is low potential for occurrence on the project site.

Lyon's Pentachaeta (Pentachaeta lyonii). Lyon's pentachaeta is listed as federally and state endangered. It is an annual herb that blooms from March through August and is generally found in chaparral, and valley and foothill grassland, occurring in clearings of chaparral, usually at the ecotone between grassland and chaparral or edges of firebreaks. There are no occurrence records for this species in the immediate vicinity of the Proposed Project. The nearest locations of occurrence were in the vicinity of Simi Valley, east of Highway 23, where two populations were recorded in 1991 and 1995 (CDFG, 2004a). There is small potential for the species on the Project site.

Davidson's Bush Mallow (Malacothamnus davidsonii). Davidson's bush mallow is a federal Species of Concern and a CNPS Category 1B species. This species is reported from sandy washes in coastal scrub, riparian woodland, and chaparral, occurring from 590 feet to 2,800 feet elevation. The most recent record identified for the area was a 1987 record from Cabrini Canyon in the vicinity of Burbank. A population of 1 to 200 plants was surrounded by coastal sage scrub; a few additional plants were found in an adjacent mulefat riparian scrub wash. The site was graded in 1999, and the population is no longer extant (CDFG, 2004a). It has limited potential to occur on the Project site.

Parish's Brittlescale (Atriplex parishii). Parish's brittlescale is a CNPS Category 1B plant. It occurs in alkali meadows, vernal pools, chenopod scrub, and playas, usually on drying alkali flats with fine soils, from 12 to 500 feet elevation. It was historically mapped along the foot of the Santa Monica Mountains north of Griffith Park, near Cahuenga. However, it has been collected in California only once since 1974 in 1993 (CDFG, 2004a). It is unlikely to occur on the Project site.

Davidson's Saltscale (Atriplex serenana var. davidsonii). Davidson's saltscale is a CNPS Category 1B species. It occurs in coastal scrub and coastal bluff scrub in alkaline soils from 10 to 800 feet elevation. It was historically mapped in the Hollywood area in 1902 (CDFG, 2004a), but no recent records were identified. It is unlikely to occur on the Project site.

Parish's Gooseberry (Ribes divaricatum var. parishii). Parish's gooseberry is a CNPS Category 1B species. This species occurs in association with willow riparian woodlands, at elevations from 200 to 1,000 feet. It was historically collected from Pasadena (1882), Whittier Narrows (1951), San Gabriel River (1934), and Lexington Wash in El Monte (1925) (CDFG, 2004a). However, no recent records were identified. It has low potential to occur on the Project site.

Los Angeles Sunflower (Helianthus nuttallii ssp. parishii). This species is a CNPS Category 1A plant, meaning it is thought to be extinct. It historically occurred in coastal and freshwater marshes and swamps throughout Los Angeles County from 5 to 5,000 feet. The last historical record was from 1957 (CDFG, 2004a). It is unlikely to be rediscovered on the Project site, and habitat is lacking.

Prostrate Navarretia (Navarretia prostrata). Prostrate navarretia is a federal Species of Concern and a CNPS Category 1B species. It occurs in coastal scrub, valley and foothill grassland, and vernal pools, generally in alkaline soils, from 50 to 2,300 feet elevation. It was historically recorded in Los Angeles and Hollywood locations in 1881 (CDFG, 2004a), but no recent records were identified. It is probably locally extirpated, with a low potential for occurrence on the Project site.

Many-Stemmed Dudleya (Dudleya multicaulis). Many-stemmed dudleya is a CNPS Category 1B species. It occurs in chaparral, coastal scrub, and valley and foothill grassland in heavy, often clay soils or grassy slopes from 0 to 2,600 feet. It is endemic to Southern California. Historical records exist for a Hollywood Hills location from 1925 (CDFG, 2004a), but no recent records were identified. The plant is probably extirpated in this area, and there is a low potential for occurrence on the Project site.

3.3.2 Special-Status Wildlife

Table 3-3 identifies the special-status wildlife species that have the potential to occur in the general vicinity of the Proposed Project, including status, habitat types, potential for and records of occurrence in the Proposed Project vicinity. This section provides species descriptions and provides additional information about occurrences in the Proposed Project area.

TABLE 3-3
Potential Special-Status Wildlife Species, Proposed Project

Species	Status[1] (Federal/State)	Potential for Occurrence in Area of Potential Effects	Nearest Identified Occurrence[2]	Habitat Requirements
Birds				
Great blue heron (nesting) *Ardea herodias*	**---/---**	Occurs; utilizes SLRC and adjacent trees for nesting/roosting	Nest regularly at SLRC; nesting in 2004	Colonial nester in tall trees near marsh or lake foraging sites
Great egret (nesting) *Ardea alba*	**---/---**	Moderate; may utilize SLRC and adjacent trees for nesting/roosting	---	Colonial nester in tall trees near marsh or lake foraging sites
Black-crowned night heron *Nycticorax nycticorax*	**---/---**	Moderate; may utilize SLRC and adjacent trees for nesting/roosting	---	Colonial nester in trees or emergent vegetation near marshlands
Burrowing Owl *Athene cunicularia*	**FSC/CSC**	Low; no burrows or individuals observed during field surveys at HWSG	Historical occurrence in vicinity, but no recent records.	Open grasslands and agricultural fields with burrowing mammal populations
California Gnatcatcher *Polioptila californica californica*	**FT/CSC**	No habitat in Project site. Habitat for this species may exist in portions of Griffith Park	Recent records (1991) from Verdugo Hills 4 miles north of project site	Obligate, permanent resident of coastal sage scrub or chaparral in vicinity of coastal sage scrub
California Horned Lark *Eremophila alpestris actia*	**---/CSC**	Moderate (nest, forage)	---	Open grasslands, agricultural fields, disturbed and barren areas
California Yellow Warbler *Dendroica petechia brewsteri*	**---/CSC**	Moderate (transient);	---	Dense riparian woodland and scrub, including willows, cottonwoods, sycamores, and mulefat
Coastal Cactus Wren *Campylorhynchus brunneicapillus couesi*	**---/CSC**	No habitat present in the project vicinity.	---	Obligate, coastal sage scrub with extensive stands of *Opuntia* sp.
Cooper's Hawk *Accipiter cooperii*	**---/CSC**	High (forage)	---	Riparian woodland and forest, including willows, cottonwoods, and sycamores
Golden Eagle *Aquila chrysaetos canadensis*	**---/CSC**	Moderate (forage)	---	Open country, rolling foothills, mountain areas and desert; breeds on overhanging ledges, high cliff sites, and large trees
Loggerhead Shrike *Lanius ludovicianus*	**FSC/CSC**	Moderate - High	---	Grasslands, sage scrub, chaparral, riparian, alluvial, and characterized by open scattered trees and shrubs

TABLE 3-3
Potential Special-Status Wildlife Species, Proposed Project

Species	Status[1] (Federal/State)	Potential for Occurrence in Area of Potential Effects	Nearest Identified Occurrence[2]	Habitat Requirements
Northern Harrier *Circus cyaneus*	**---/CSC**	Unlikely	---	Breeds in open country such as grasslands and agricultural fields near wetlands; prefers extensive grasslands
Short-eared Owl *Asio flammeus*	**---/CSC**	Unlikely	---	Areas with few trees such as grasslands, coastal estuaries and wetlands
White-tailed Kite *Elanus leucurus*	**---/CFP**	Moderate	---	Open country with trees such as oak, willow, and sycamore
Yellow-breasted chat *Icteria virens*	**---/CSC**	Moderate	---	Dense scrub and early seral stage riparian habitat including willow and mulefat thickets
Amphibians				
Coast Range Newt *Taricha torosa torosa*	**---/CSC**	May occur in the area, but no habitat on the Project site	---	Coastal drainages in Southern California; slow moving streams and ponds with adjacent intact terrestrial vegetation
Western Spadefoot *Scaphiopus hammondii*	**FSC/CSC**	May occur in the area, but no habitat on the Project site	---	Seasonal pools lacking fish, bullfrogs and crayfish for breeding; adjacent grasslands for foraging
Reptiles				
Coastal Western Whiptail *Cnemidophorus tigris multiscutatus*	**---/CSC**	Moderate	---	Open, arid rocky areas with sparse vegetation
San Diego Horned Lizard *Phrynosoma coronatum blainvillei*	**---/CSC**	Moderate	---	Open grassland, scrub, and chaparral with harvester ant mounds
Mammals				
San Diego Black-tailed Jackrabbit *Lepus californicus bennettii*	**---/CSC**	Moderate	---	Coastal sage brush, and Scrub and grasslands
California leaf-nosed bat *Macrotus californicus*	**---/CSC**	Low	---	Desert riparian, succulent scrub, desert scrub, and other arid habitats; roosts in mines, caves far from human habitation
Long-eared myotis *Myotis evotis*	**FSC/---**	Moderate	Pasadena	Scrub, chaparral, open areas; uses small caves and crevices for roosting

TABLE 3-3
Potential Special-Status Wildlife Species, Proposed Project

Species	Status[1] (Federal/State)	Potential for Occurrence in Area of Potential Effects	Nearest Identified Occurrence[2]	Habitat Requirements
Long-legged myotis *Myotis volans*	**FSC/---**	Moderate	Pasadena	Coastal scrub, chaparral, woodlands; roosts in rock crevices, buildings, and under tree bark
Mexican long-tongued bat *Choeronycteris mexicana*	**---/CSC**	Unlikely	Ventura County	Forages on nectar, pollen, and occasionally fruit; roosts in dimly lit buildings or caves
Pallid Bat *Antrozous pallidus*	**---/CSC**	Low	---	Forages close to ground in open areas; roosts in caves, rock crevices, mines, buildings, and hollow trees
Big free-tailed bat *Nyctinomops macrotis*	**---/CSC**	Moderate	Burbank, 1997	Open or urban areas; rugged, rocky terrain.
Western mastiff bat *Eumops perotis californicus*	**FSC/CSC**	Moderate	Los Angeles County; nearby locations	Roost in rock crevices on high cliff faces, high buildings, trees, and tunnels; forages over a variety of habitats including coastal scrub, and urban areas
Yuma myotis *Myotis yumanensis*	**FSC/---**	Moderate	---	Widespread in California; forages over water; roosts in buildings, mines, crevices
Fish				
Arroyo chub *Gila orcutti*	**---/CSC**	Not likely to occur in adjacent Los Angeles River	Upstream at Sepulveda Basin, 2001	Cool perennial streams with riffles and pools, with sand and mud substrates, and dense riparian canopy

Notes:
1- Key to status designations-

Federal Designations:
(FE) Federally Endangered, (FT) Federally Threatened, (FPE) Federally Proposed Endangered, (FPT) Federally Proposed Threatened, (FSC) Species of Concern, (FC) Candidate

State Designations:
(SE) State Endangered, (ST) State Threatened, (SR) State Rare, (CSC) Species of Special Concern, (CFP) Fully Protected Species

2- See text for sources

Fish

Arroyo Chub (Gila orcutti). The Arroyo Chub is recognized as a California Species of Special Concern by the CDFG. It prefers slow-moving or backwater sections of warm to cool streams with substrates of sand or mud with a typical stream depth of greater than 40 centimeters (Moyle, 1976). This species is common at various locations throughout Southern California (University of California Riverside, 2001; Swift et al., 1993). The nearest known occurrence for this species is within Encino Creek in Sepulveda Basin; it would not be expected to occur in the Los Angeles River in the vicinity of HWSG because the river is developed with a concrete bottom.

Birds

Coastal California Gnatcatcher (Polioptila californica californica). The coastal California gnatcatcher is listed as federally threatened under FESA and as a California Species of Special Concern by CDFG. This species is localized and occurs in arid and coastal regions of Los Angeles, Orange, Riverside, and San Diego Counties. The California gnatcatcher occurs in or near sage scrub habitat with characteristic species of California sagebrush, various species of sage, California buckwheat, lemonade berry (*Rhus integrifolia*), and prickly pear (*Optunia* spp.). Gnatcatchers generally tend to prefer open stands of sage scrub, occurring in higher numbers in scrub habitat with an open canopy, and in low numbers or absent in dense, tall scrub with a closed overstory canopy. However, gnatcatchers also have been detected utilizing non-sage scrub habitats for foraging during drought. The nesting season is late February to August. Intact sage scrub habitat does not occur on site; the nearest known intact habitat is in Griffith Park, greater than 0.25 mile south of the HWSG, or north in the Verdugo Mountains, 4 miles north of the HWSG.

Yellow-Breasted Chat (Icteria virens). This species is recognized as a California Species of Special Concern by the CDFG. The yellow-breasted chat is a fairly common summer resident; nesting in low, dense riparian willow thickets with a understory component of blackberry and wild grape along stream banks. The Proposed Project site does not support optimal habitat for yellow-breasted chat; however, there is limited potential that chats could use mulefat thickets on the HWSG, or in scrub habitat in the wooded area to the east of SLRC.

California Yellow Warbler (Dendroica petechia brewsteri). This species is recognized as a California Species of Special Concern by the CDFG. It breeds in riparian woodlands from coastal and desert lowlands up to 8,000 feet in the Sierra Nevada mountains, and commonly utilizes mature riparian woodlands dominated by willow, cottonwood, sycamores, and alders for nesting and foraging. No breeding habitat is present on the Project site for this species; however, transient birds may utilize mulefat scrub communities on the HWSG site during migration.

California Horned Lark (Eremophila alpestris actia). This species is commonly found on bare ground, disturbed areas, grassland, and open agricultural fields. The California horned lark is recognized as a California Species of Special Concern by CDFG. This species is found along the coast of Northern California, in the San Joaquin Valley, in the coast ranges south of San Francisco Bay, and in Southern California west of the deserts. In Southern California, this subspecies is a fairly common breeding resident in grasslands and other dry, open habitats. During the winter season, other subspecies occur in Southern California, and the horned lark (including its subspecies) can be locally common in the region. The species may use the former spreading ground basins at HWSG for breeding or foraging; however, none were detected during field surveys.

Golden Eagle (Aquila chrysaetos). The golden eagle is recognized as a California Species of Special Concern by CDFG. Habitat for this species is typically rolling foothills, mountain areas, and desert. Golden eagles need open terrain for hunting and prefer grasslands, deserts, savannah, and early successional stages of forest and shrub habitats. This species prefers to nest in rugged, open habitats with canyons and escarpments, with overhanging ledges and cliffs and large trees used as cover. No CNDDB records occur for this species in the project area. Golden eagle was not observed during field surveys, but has some potential to forage in open habitats on the HWSG site, including grasslands and former spreading basins. However, it is rarely observed in highly developed areas such as those present in the HWSG location.

White-Tailed Kite (Elanus leucurus). The white-tailed kite is recognized as a California Fully Protected Species by CDFG. This species nests in stands of oaks, willows, sycamores, and other trees, and forages in low elevation, open grasslands, agricultural areas, and wetlands. This species preys mostly on voles and other small, diurnal mammals, taking small mammal prey approximately 95 percent of the time; as such, its preferred forage habitat is open grasslands. No CNDDB records occur for this species in the project area. The Proposed Project site does not have suitable nesting sites; however, there is good forage habitat on open grasslands on the HWSG site, and birds may nest in tall landscape trees in nearby locations, or in native habitat in Griffith Park to the south of the site. In addition, the wooded habitat east of the SLRC may support this species.

Cooper's Hawk (Accipiter cooperii). The Cooper's hawk is recognized as a California Species of Special Concern by the CDFG. This species commonly breeds in riparian areas and oak woodlands. The Cooper's hawk is also found where wooded areas occur in patches and groves and often uses patchy woodlands and edges with snags for perching. This species primarily feeds on avian prey in the air, on the ground, and in vegetation. Within the range in California, it most frequently uses dense stands of live oak, riparian deciduous, or other forest habitats near water (Zeiner et al., 1990). No CNDDB records occur for the vicinity; however, the species is commonly observed in natural habitats in nearby Griffith Park. Some suitable foraging habitat is present on the HWSG site, although breeding habitat is limited, and breeding and foraging habitat may be present in the wooded area on the east side of the SLRC.

Northern Harrier (Circus cyaneus). This species is recognized as a California Species of Special Concern by the CDFG. The northern harrier is frequently found in meadows, grasslands, open rangelands, desert sinks, and fresh and saltwater emergent wetlands. This species prefers to nest in emergent marsh vegetation along rivers and lakes, but may also nest in grassland and agricultural fields. The northern harrier is a regular winter migrant, but only occasionally breeds in Los Angeles County; populations have been greatly reduced due to loss of habitat. No CNDDB records occur for this species in the project area and northern harrier was not observed during the course of field surveys. In general, it prefers more extensive grasslands than those that can be found at the project site, or wetlands. The Proposed Project site provides very limited foraging or breeding habitat and the species is unlikely to occur.

Burrowing Owl (Athene cunicularia). The burrowing owl is a federal Species of Concern and a California Species of Special Concern. This species is widespread throughout the western United States, but has declined in this and many other areas due to habitat modification, poisoning of its prey, and introduction of nest predators. This species is diurnal, usually nonmigratory in this portion of its range. It excavates nests in the ground, often enlarging burrows of ground squirrels. It is found in low densities in desert habitats, but can occur in much higher densities near agricultural lands, where rodent and insect prey is more abundant. No CNDDB records occur for this species in the project area. Limited suitable habitat is present on the HWSG site; however, neither individuals nor burrows were observed, in spite of ground surveys in open habitats. The species has low potential to occur on the project site.

Short-Eared Owl (Asio flammeus). The short-eared owl is recognized as a California Species of Special Concern by the CDFG. This species commonly occurs in areas with few trees, such as agricultural fields, grasslands, and coastal estuaries. Within Southern California, where it is considered a nonbreeding bird, it is seen in saltwater marshes, freshwater marshes, tall grass meadows, and agricultural lands at almost any time of year, but most commonly late August through mid-April. No CNDDB records occur for this species in the project area and none were observed during the course of field surveys. It is unlikely that this species occurs within the Proposed Project site due to lack of suitable habitat.

Coastal Cactus Wren (Campylorhynchus brunneicapillus couesi). This species is recognized as a California Species of Special Concern by CDFG. The coastal cactus wren is an obligate, nonmigratory resident of the coastal sage scrub plant community. It is closely associated with three species of cacti and occurs almost exclusively in thickets of cholla (*Opuntia prolifera*) and stands of coastal sage scrub dominated by prickly pear (*Opuntia littoralis* and *Opuntia oricola*). No CNDDB records occur for this species in the project area and none were observed during the course of field surveys. Because of the lack of stands of *Opuntia* cactus on the HWSG site, there is no suitable habitat, and the species is presumed absent. It may be present at nearby Griffith Park.

Loggerhead Shrike (Lanius ludovicianus). The loggerhead shrike is recognized as a Federal Species of Concern and as a California Species of Special Concern by CDFG. Loggerhead shrikes are common residents and winter visitors of California foothills and lowlands. This species can be found within open habitat types including sage scrub, non-native grasslands, chaparral, riparian, croplands, and areas characterized by open scattered trees and shrubs; fences, posts, or other potential perches are typically present. The loggerhead shrike forages for large insects over open ground within areas of short vegetation, usually impaling prey on thorns, wire barbs, or sharp twigs to cache for later feeding. Suitable habitat is present throughout the Proposed Project site, and the species has a moderate to high potential of breeding within the shrubby areas of the HWSG site.

Nesting Ardeids (Herons and Egrets). Nesting ardeids may include great blue heron, great egret (*Ardea alba*), and black-crowned night heron (*Nycticorax nycticorax*). These species nest colonially in rookery sites located near marshes, tide-flats, irrigated pastures, mudflats, and margins of rivers and lakes. They generally prefer tall trees for nest sites, and multispecies rookeries are common. Rookeries of these species are recognized as a sensitive resource by CDFG (CDFG, 2004a), but the species themselves have no special-status state or federal designation. These species generally forage in shallow water, mudflats, and wet meadows for large invertebrates, amphibians and reptiles, or fish. There is suitable nesting habitat in tall trees and the SLRC, and nesting great blue herons have been observed for several years. Foraging habitat is not available at the SLRC since water is too deep, but occasional foraging may occur at the HWSG in open wet swales, wet channels, and within the Los Angeles River channel.

Amphibians

Coast Range Newt (Taricha torosa torosa). The coast range newt is recognized as a California Species of Special Concern by CDFG south of Monterey. This species breeds in slow-moving streams and ponds with adjacent intact terrestrial vegetation along the western coast of California from Humboldt County to the Mexican border. The coast range newt typically feeds on earthworms, insects, snails, and other small invertebrates. No CNDDB records occur for this species within 5 miles of the project area. Coast range newt is unlikely to occur within the project site due to lack of suitable aquatic habitat.

Western Spadefoot (Scaphiopus hammondii). The western spadefoot is recognized as a federal Species of Concern and a California Species of Special Concern by CDFG. This species primarily occurs in vernal pools for breeding and egg-laying in grassland habitats. It can also commonly occur in valley-foothill hardwood woodlands, coastal sage scrub, and chaparral. Rain pools must lack fish, bullfrogs, and crayfish in order for western spadefoot to successfully reproduce and metamorphose. The habitat utilized by the spadefoot consisted of rainfall-filled depressions and/or vernal pools. Although some rain pools may persist for short times on the HWSG, they do not, in general, have the characteristics of pools to support western spadefoot.

Reptiles

Coastal Western Whiptail (Cnemidophorus tigris multiscutatus). The coastal western whiptail is recognized as a California Species of Special Concern by the CDFG. This species occurs in coastal Southern California from Ventura County south into Baja California. It is commonly found utilizing open rocky areas in a variety of habitat types such as coastal sage scrub and grasslands. Prey items of the western whiptail include termites, scorpions, solfugids, cockroaches, ant lion larvae, and various insect eggs, larvae, and pupae. No historical CNDDB records for this species occur within the vicinity of the project area and no coastal western whiptails were detected within the Proposed Project site during the course of field surveys. Some limited habitat occurs on the HWSG site.

Orange-throated whiptail (*Cnemidophorus hyperythrus beldingi*). The orange-throated whiptail is recognized as a California Species of Special Concern by the CDFG. This species historically occupied low-elevation (Riversidean) coastal sage scrub, chaparral, and valley-foothill hardwood habitats. This species is presumably tied to perennial vegetation because its major food source, termites (Bostic, 1966), requires perennial plants as a food base. California buckwheat is an important indicator of favorable habitat for orange-throated whiptail (McGurty, 1981). No historical CNDDB records for this species occur within the vicinity of the project area, and no orange-throated whiptail were detected within the Proposed Project site and the surrounding areas during field surveys. However, some limited habitat is present on the HWSG site, and there is a low potential for occurrence.

San Diego Horned Lizard (Phrynosoma coronatum blainvillei). The San Diego horned lizard is recognized as a California Species of Special Concern. This species is restricted to southwest California and northwest Baja California where it occupies coastal sage scrub and chaparral and other open habitats, including sandy washes. The San Diego horned lizard can be found in a variety of habitats from sage scrub to coniferous and broadleaf woodlands; however, it prefers areas with friable, rocky, or shallow sandy soils with open scrub for sunning and burrowing. Its preferred food is harvester ants. Focused surveys were conducted in suitable habitat at HWSG for San Diego horned lizards. No individuals or signs were observed; however, some suitable habitat occurs within the Proposed Project site, including sandy areas within former spreading grounds.

Mammals

San Diego Black-Tailed Jackrabbit (Lepus californicus bennettii). The San Diego black-tailed jackrabbit is recognized as a California Species of Special Concern by CDFG. This species ranges from coastal Southern California, in Santa Barbara County, to northwest Baja California. It is commonly found in coastal sage brush and Riversidean sage scrub habitats with intermediate canopy stages, open spaces, and herbaceous edges. No CNDDB records occur for this species within 5 miles of the project area. San Diego black-tailed jackrabbit was not observed on the project site during field surveys; however, some marginal habitat does exist at the HWSG.

California Leaf-Nosed Bat (Macrotus californicus). The California leaf-nosed bat is recognized as a California Species of Special Concern. This species ranges from Riverside, Imperial, San Diego, and San Bernardino Counties south to the Mexican border, in desert riparian, desert wash, desert scrub, desert succulent scrub, alkali desert scrub, and other arid habitats. This species commonly roosts in mines and caves, generally far from human habitation. Historical records for this species occur in undeveloped areas of Southern California (Constantine, 1998); however, given the lack of potential roosts in the area, it is unlikely to occur at HWSG or SLRC.

Mexican Long-Tongued Bat (Choeronycteris mexicana). The Mexican long-tongued bat is recognized as a California Species of Special Concern by CDFG. The long-tongued bat was formerly known only from San Diego County, but more recent records (1998, 1999) occur from Los Angeles and Ventura Counties (Constantine, 1998). This species roosts in caves, mines, and buildings; preferring dimly lit sites. The long-tongued bat primarily feeds on nectar, pollen, and occasionally fruit while hovering. Pregnant females have been found from February through September. Most births occur in June and early July, and the species is wary and very sensitive to disturbance of roost sites. No records for this species are present in CNDDB within the project vicinity, and given the spotty occurrence of the species north of San Diego County and the lack of suitable roosts, it is not likely to occur.

Long-Eared Myotis (Myotis evotis). The long-eared myotis is recognized as a Federal Species of Concern. This species is a yearlong resident throughout California, absent only from the Central Valley and Mojave Deserts; it seems to prefer higher elevation coniferous forests. It preys on flying insects or forages on the ground or in vegetation. The species roosts in trees, under tree bark, in rock crevices, or buildings, or in caves. Nursery colonies may number 12 to 30 individuals. Young are born May to July, with a peak in June. Young are flying by early August. Museum records for this species have been documented for Los Angeles County in the Pasadena area (Garrett, 1993). CNDDB records for this species are limited to a handful of records in Central and Northern California. The project site may support foraging for this species; there is some limited potential for roosts in structures at both the HWSG and the SLRC.

Long-Legged Myotis (Myotis volans). The long-legged myotis is recognized as a Federal Species of Concern. It is a yearlong resident throughout California, absent only from the Central Valley and Mojave Deserts. It is most common in forested areas above 4,000 feet, but also is found in coastal scrub, chaparral, and woodlands. It roosts in rock crevices, buildings, and under tree bark. It preys on flying insects, and may forage over water, scrub, or woodland habitats. Young are born in June and July, may begin flying in mid-July, and are weaned by September. Museum records for this species have been documented for the Pasadena area (Garrett, 1993). There are no CNDDB records in the general project vicinity for this species. The Proposed Project site appears to provide limited roosting habitat for the species, which may utilize crevices or small caves in rocky outcrops and cliffs.

Yuma Myotis (Myotis yumanensis). The Yuma myotis is designated a Federal Species of Concern. This species is a yearlong resident, and generally common, throughout California. It roosts in trees, under tree bark, in rock crevices, buildings, caves, under bridges, in buildings, mines, and in abandoned swallow nests under bridges. It preys on flying insects, generally foraging over water sources. Nursery colonies may number several thousand individuals. Young are born May to mid-June, with a peak in early June. Limited records of this species are present in CNDDB for California, consisting of a handful of records in Central and Northern California. The project site appears to provide some limited roosting habitat for the species, which may utilize crevices or small caves in rocky outcrops, as well as buildings. There is a moderate likelihood of occurrence at both the HWSG and the SLRC.

Western Mastiff Bat (Eumops perotis californicus). The western mastiff bat is recognized as a Federal Species of Concern and a California Species of Special Concern. This species is an uncommon resident of interior and coastal regions of Central and Southern California, occurring in a variety of open, arid habitats. The species roosts in cliff faces, high buildings, tees, and tunnels; nursery roosts are described as tight rock crevices at least 3 feet deep and 2 inches wide. It catches prey in flight, foraging over various habitats. Parturition dates vary more for this species than other species, and may occur from April through August or September. Constantine (1998) reports numerous records of this species from Los Angeles County. Garrett (1993) also reports museum records from Los Angeles County. Given the broad habitat usage of this species, there is a moderate likelihood of occurrence on the Proposed Project site.

Big Free-Tailed Bat (Nyctinomops macrotis). The big free-tailed bay is recognized as a California Species of Special Concern. This species is rare in Southern California, with previous records restricted to urban areas in San Diego County. The big free-tailed bat is found in open and urban habitats, preferring rugged, rocky terrain. It forages in the air over water sources for large moths and other flying insects. This species roosts in rocky crevices high on cliff faces. Young are born into small nursery colonies in June and July, and are capable of flight in August to mid-September. Recent records (Constantine, 1998) identify a range extension into Los Angeles and Orange Counties, with numerous records in the lower Los Angeles Basin. The nearest detection is in Burbank in 1987. There is some moderate potential for foraging bats of this species on the HWSG or the SLRC.

Pallid Bat (Antrozous pallidus). The pallid bat is recognized as a California Species of Special Concern by CDFG. This species is a yearlong resident throughout lower elevations of California, utilizing open, dry habitats from grasslands, open scrub, shrublands, woodlands, and forests. It typically forages close to the ground and may take prey on the ground. Day roosts are typically in caves, crevices, mines, buildings, and hollow trees. The species is social, often roosting in groups of 20 or more, ranging to well over 100, in many cases with other species; however, it may also be found individually. Maternity colonies form in early April, and may contain from 12 to 100 individuals. Young are weaned in 7 weeks, and are observed flying in July and August. No records for this species are present in CNDDB within 5 miles of the project site; however, given the wide range of this species, and preference for open, dry habitats, there is some limited potential for this species to occur within the Proposed Project site.

3.3.3 Special Habitat Features

Special habitat features may provide substantial benefit to wildlife populations, and potentially special-status species. Special habitat features that were identified on the project site include utility towers at the HWSG site, and scattered tall trees at both sites, which may provide nesting locations for herons and egrets, or raptors. In addition, the extensive concrete structures associated with the Los Angeles River and the SLRC provide nesting surfaces for some swallows, and overhangs and crevices provide roosting opportunities for bats. The pump station at the southern end of Silver Lake supports a large colony of nesting northern rough-wing swallows.

3.4 Wildlife Movement Corridors

The HWSG site is not situated where it provides connectivity between other natural habitat areas and is not expected to be a significant wildlife movement corridor. It is surrounded by developed land on all four sides, and habitat on the site is generally degraded and less than optimal for native species.

The SLRC may provide some stopover for migratory waterfowl, as previously described. The site is limited as an optimal waterfowl resting area, since invertebrate production is limited by the current operations that involve addition of chlorine to the water; this practice also probably precludes fish from establishing in the reservoir. In addition, aquatic or emergent vegetation communities typically associated with waterfowl areas are absent at SLRC, limiting species to those that forage in deeper water without plant cover.

4.0 Impacts and Proposed Mitigation

4.1 Impacts Definition

4.1.1 General Definition

Direct impacts occur when biological resources are altered, disturbed, destroyed, or removed during the course of project implementation. Direct impacts can result from such activities as construction, grading, and filling of habitats. Direct impacts can include the loss of individual species from habitat clearing or construction-related mortality; loss of foraging, nesting, or burrowing habitat for wildlife species; or alteration of substrates, which prevents re-establishment of native vegetation.

Indirect impacts occur when project-related activities affect biological resources in a less overt manner. Such impacts include elevated noise and light levels, erosion of hillsides and/or sedimentation and siltation of aquatic habitats, and production of fugitive dust emissions.

Both direct and indirect impacts can be classified as either temporary or permanent, depending on the duration of the impacts. Temporary impacts are impacts that might be considered to have reversible effects on biological resources. Examples of temporary impacts include noise and light generated from construction activities, production of fugitive dust emissions during construction, and construction traffic. Permanent impacts are those impacts resulting in the irreversible removal, disturbance, or destruction of biological resources. The Proposed Project implementation would result in both direct and indirect impacts to biological resources that might be either permanent or temporary in nature.

In determining if these impacts are significant to plant and wildlife species, the actual and potential occurrence of the species in the study area is correlated with the significance criteria.

4.1.2 Significance Criteria

The following summarizes thresholds of significance for impacts to biological resources, based on Appendix G (Environmental Checklist Form) of the State CEQA Guidelines, Section 15000 *et seq*.; these thresholds are used to determine the level of significance for this study and analysis. Levels of significance or effect include the following: (1) no impact or effect; (2) adverse impact but less than significant; (3) beneficial impact; (4) significant adverse impact but with mitigation reduced to less than significant; (5) unavoidable significant adverse impact; and (6) cumulative impact. A significance adverse impact is defined as one or more of the following:

- It has a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the CDFG or USFWS.

- It has a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or USFWS.
- It has a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pools, and coastal areas) through direct removal, filling, hydrological interruption, or other means.
- It interferes substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native wildlife nursery sites.
- It conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- It conflicts with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Cumulative impacts are defined where a project has impacts that are individually limited, but cumulatively considerable. "Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

4.2 General Impacts

4.2.1 Potential Impacts to Vegetation Communities

Potential Impacts

Headworks Spreading Grounds

Direct impacts will occur to natural vegetation communities at the HWSG. The plant community primarily impacted by construction is ruderal/non-native grassland. The primary footprint of both the Proposed Reservoir and the Material and Equipment Staging Area are within previous disturbed areas, including former spreading basins, currently dominated by non-native grassland. These areas vary from recently graded and disturbed areas to basins that have not been disturbed for many years since basins were operated. In some cases, the spreading basins have native riparian or scrub species, including mulefat, California coffeeberry, and arroyo willow, around perimeter berms, but these are generally not developed plant communities.

The channel on the south side of HWSG also will be impacted by the Proposed Reservoir. This channel appears to flow intermittently. The corridor is marginal to well-developed. Where it is developed, it is dominated by mulefat/willow scrub. Portions of this channel will be filled, and the riparian corridor is within the footprint of the reservoir. The River Supply Conduit (RSC) pipeline (a separate project) will also run through this area and will impact this community. The Material and Equipment Staging Area will be adjacent to the riparian corridor and the channel, but the development of this area will be constrained to areas away from the riparian corridor, and as such, will not impact the community.

The Grading Equipment Staging Area, the Hydrogeneration Plant Staging Area, and the Hydrogeneration Plant are within areas of previous channel development or along other lands disturbed during construction of the site or from road construction of the nearby Forest Lawn Drive. Portions of these areas are dominated by southern mixed chaparral and landscaped/ornamental communities, as well as the ruderal/non-native grassland community. The representation of southern mixed chaparral is generally not well-developed, but lacks density, and consists of some native shrubs interspersed with non-native vegetation and ornamental trees and shrubs. The staging areas would temporarily impact these communities, while the Hyrogeneration Plant would result in permanent land conversion.

Ruderal/non-native grassland community is not recognized as a sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS. As such, the loss of this community would not represent a significant impact, and no mitigation is required.

The southern mixed chaparral community, while native, is not recognized as a sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS. In addition, the expression of the community at HWSG is not well-developed, lacks density, and is interspersed with non-natives. As such, the temporary or permanent loss of this community would not represent a significant impact, and no mitigation is required.

Riparian communities are recognized as sensitive natural communities, and the loss of the riparian community along the southern edge of the site from the Proposed Reservoir construction would represent a significant impact, requiring mitigation.

Silver Lake Reservoir Complex

No vegetation communities would be impacted by the Proposed Project at SLRC. As such, no mitigation is required.

Mitigation Measures

To mitigate for the loss of riparian habitat along the south portion of HWSG, mitigation will be implemented that will include replacement of riparian areas consistent with anticipated requirements of federal CWA permits and state Section 1600 agreements. With mitigation, the impact to riparian habitat will be less than significant.

4.2.2 Potential Impacts to CDFG and USACE Jurisdictional Areas

Potential Impacts

Potential impacts to waters of the U.S. and CDFG jurisdictional stream bed and bank will occur from construction of the Proposed Reservoir at HWSG. Impacts will occur to waters of the U.S. along the eastern boundary of the footprint of the reservoir, where a small retention basin is within 2-year flood limits (OHWM) and would be considered a water of the U.S. Impacts will also occur along the southern portion of the Proposed Reservoir site where, as previously described, a channel under both CDFG and USACE jurisdiction would be impacted. The Material and Equipment Staging Area will be adjacent to the riparian corridor and the channel, but the development of this area will be constrained to areas at least 100 feet away from jurisdictional boundaries, and as such, will not impact the community.

The fill and permanent loss of waters of the U.S. and CDFG jurisdictional stream bed and bank would represent a significant impact, requiring mitigation.

Mitigation Measures

For potential impacts to jurisdictional waters, the project would obtain and comply with conditions of permits issued from USACE (CWA, Section 404) and the CDFG (SAA, Section 1603). The details of mitigation requirements for impacts to jurisdictional waters would be determined through continuing consultation with USACE and CDFG. With mitigation, the impact would be less than significant.

4.2.3 Potential Impacts to General Wildlife Species

Potential Impacts

Common wildlife species that inhabit, move through, or forage within the habitats in HWSG, particularly small mammals, reptiles, amphibians, and other fauna of slow mobility would be subject to mortality or displacement. More mobile wildlife species and noise-sensitive species currently using these habitats would be expected to avoid the Proposed Project site and neighboring areas, with the initiation of construction activities. Impacts to special-status wildlife species are addressed below. Impacts to common wildlife species associated with the vegetation types discussed above would be reduced through implementation of good construction work practices, as described in the project description (Chapter 2 of the Draft EIR). Although some impacts would occur from the Proposed Project, the minimal loss of wildlife would not reduce the populations of common wildlife species in the region below self-sustaining numbers, and the impacts would be less than significant.

Mitigation Measures

No mitigation is required.

4.2.4 Potential Impacts to Aquatic Communities

Los Angeles River

Potential impacts to the Los Angeles River, which is adjacent to the HWSG site, may result from stormwater runoff during construction activities at HWSG where there is a reduction in water quality resulting from increased sedimentation or other contaminants. These water quality changes could potentially reduce the quality of aquatic habitats. To avoid impacts to downstream water quality, an SWPPP will be developed and implemented, and will include BMPs to minimize downstream effects of stormwater runoff or conveyance of sediment or other contaminants into waterways (see Project Description, Chapter 2 of the Draft EIR). With this avoidance measure, the impact would be less than significant.

Silver Lake and Ivanhoe Reservoirs

Silver Lake and Ivanhoe Reservoirs are in an urban setting and are eutrophic, as defined by existing nutrient concentrations. Currently, the SLRC is maintained in a mostly clear condition by the application of approved treatment chemicals, primarily chlorine. Additionally, limited areas of surrounding vegetation are treated with pesticides to reduce the number of adult midge flies.

Following the removal of the SLRC as an integral part of the drinking water system as a part of the Proposed Project, the reservoirs will be allowed to revert to a more natural state. This will be accomplished by discontinuing the addition of water treatment chemicals. LADWP expects that, as a result, the water in the reservoir will generally change from a clear appearance to a less transparent, green color. This change in color will be due to increased algal growth because of sufficient existing nutrient concentrations, but it is not expected that the amount of algae will exceed that which has been experienced periodically in the past.

Although the reservoirs have fairly steep paved banks, it is possible that some emergent aquatic vegetation will become established. It is not known at this time if Silver Lake will become thermally stratified, as the depth of the reservoir is very close to the depth where stratification would normally occur.

The changes in aquatic habitat at the SLRC associated with the Proposed Project are not anticipated to adversely affect biological resources. In general, with the elimination or reduction in application of chlorine to the water supply, there may be an increase in invertebrate production, and fish such as mosquitofish (*Gambusia affinis*) may become established. This would be an increase in forage supply for waterfowl and other waterbirds that utilize the SLRC, and would be a net benefit to biological resources. If conditions temporarily become eutrophic or hypertrophic, there would be a corresponding decline in dissolved oxygen, and this may limit invertebrate production or result in fish kills. However, conditions would not be expected to drop below the existing current baseline, where invertebrate production and fish are limited by the addition of chlorine to the system.

If emergent vegetation becomes established at the SLRC, the emergent wetland would represent a new habitat type not currently present, and would attract additional species of waterbirds and other wildlife, resulting in a net benefit to biological resources.

Mitigation Measures

Impacts to aquatic habitats are not anticipated to be adverse, and no mitigation is required.

4.3 Potential Impacts to Special-Status Plant Species

Potential Impacts

Special-status plant species that could occur in the project area have been described. In general, the rarity of many of the special-status plants within the developed portions of the Santa Monica Mountains precludes the likelihood they will be found on the HWSG. No recent records for special-status plants have been identified in the immediate area on the Proposed Project site. The site has been extensively disturbed during recent construction activities, as well as historically with operation of the spreading grounds. As such, the site is not expected to support special-status plant species. Nevertheless, portions of the site have been left relatively undisturbed for many years, and rare plants may have a reservoir/seed source in the nearby Griffith Park natural lands. Since the loss of special-status plants would represent a significant adverse impact, if special-status plants are present within the impact areas, mitigation would be required. Because of this, rare plant surveys will be conducted prior to ground-disturbing activities. Mitigation will be implemented if rare plants are identified within the project footprint.

Mitigation Measures

Mitigation for potential impacts to special-status plants will include the following:

1. Preconstruction surveys will be conducted at HWSG prior to any ground-disturbing activities, and in the appropriate flowering season for special-status plants.
2. If rare plants are identified on HWSG, then mitigation will be developed in coordination with the appropriate resource agency (CDFG or USFWS), which may potentially include the following:
   a. Exclusion zones where practical to preclude impacts to rare plant.
   b. Translocation of seeds, topsoil, and/or plants to areas outside of disturbance footprint.
   c. Establishment of new populations in areas that will not be subject to future development, and where populations may be protected and managed in perpetuity.
   d. Investment in mitigation bank lands as appropriate to the specific species.

4.4 Special-Status Wildlife Species

A number of special-status species that may occur in the general project vicinity are unlikely to occur within the area of potential effects for the Proposed Project, either on or near the project site or along areas of potential downstream effects. These species are indicated in Table 3-3 as unlikely to occur within the area of potential effects. No impact is anticipated to these species from the Proposed Project, and they are not addressed further here. The species addressed in the following sections have some potential to occur within the area of potential effects, either in the SLRC or the HWSG sites, and potential impacts from the Proposed Project are addressed here.

4.4.1 Potential Impacts to Federal- and State-Listed Wildlife Species

There is no habitat present for wildlife species listed as threatened or endangered under state or federal regulations, at either HWSG or SLRC, and no impacts are anticipated. Therefore, no mitigation measures are required.

4.4.2 Potential Impacts to Reptile Species of Special Concern

Potential Impacts

The following special-status reptiles have the potential to occur in the project area: orange throated whiptail, coastal western whiptail, and San Diego horned lizard.

***Orange-Throated Whiptail*, *Coastal Western Whiptail*.** At the HWSG site, the coastal western whiptail is likely to be associated with the grassland, coastal scrub, and chaparral habitats; they prefer open rocky areas. The orange-throated whiptail may use areas with woody scrub or woodland vegetation. Habitat is, in general, marginal for these species, but there is some limited potential for occurrence. Direct, permanent loss of open grassland habitat and some limited scrubland habitat would occur from grading and filling activities. Although there is some potential loss of individuals and habitat of this species, the habitat is not optimal, and the species occurrence on the project site has not been confirmed. It is likely that more favorable habitat for this species occurs in nearby Griffith Park, or in the Verdugo Hills to the north of the site. As such, the potential loss of this species or habitat would be less than significant.

***San Diego Horned Lizard*.** This species may be associated with dry wash, coastal scrub, or chaparral habitats on the HWSG site, although focused surveys did not identify individuals or signs of this species. Some harvester ant mounds are present that provide forage for this species, and it may have gone undetected during surveys. In general, the previously disturbed habitat at HWSG is not optimal habitat. Direct, permanent loss of open grassland habitat and some limited scrubland habitat would occur from grading and filling activities. Although there is some potential loss of individuals and habitat of this species, the habitat is not optimal, and the species occurrence on the project site has not been confirmed. It is likely that more favorable habitat for this species occurs in nearby Griffith Park, or in the Verdugo Hills to the north of the site. As such, the potential loss of this species or habitat would be less than significant.

Mitigation Measures

No mitigation measures are necessary.

4.4.3 Potential Impacts to Nesting Bird Species of Special Concern

Potential Impacts

Yellow-breasted chat, California yellow warbler, loggerhead shrike, California horned lark, golden eagle, white-tailed kite, prairie falcon, Cooper’s hawk, northern harrier, burrowing owl, and short-eared owl are federal Species of Concern or state Species of Special Concern known to breed in the project vicinity. Of these, only yellow-breasted chat, California horned lark, loggerhead shrike, and burrowing owl have potential to nest directly on the project site.

***Yellow-Breasted Chat*.** Suitable breeding habitat for yellow-breasted chat, which requires dense riparian thickets of mulefat and willows and other brushy tangles near watercourses, is present in limited areas of the HWSG. The most sensitive of the riparian areas that would support this species lie adjacent to the Material and Equipment Staging Area, and direct impacts to riparian areas adjacent to this will be avoided. The presence of this species will be determined during preconstruction surveys of the HWSG site, prior to ground-disturbing activities. If the species is present, then construction noise and dust could disrupt breeding activities. Impact on breeding yellow-breasted chat would represent a significant adverse impact, requiring mitigation.

California Horned Lark, Loggerhead Shrike. The dry, open grassland areas at the HWSG site provide a suitable foraging and breeding habitat for the California horned lark and the loggerhead shrike. These species may occur throughout their range in Southern California. Potential for these species to occur and breed in open areas at the project site is moderate. Construction activities involving grading and filling of the annual grasslands and the mixed grassland/shrub habitats would result in direct permanent loss of nesting and foraging habitat. Direct loss of nesting individuals of these species may also occur during construction activities, if the species are present, representing a significant adverse impact. The presence of these species will be determined during preconstruction surveys of the HWSG site prior to ground-disturbing activities. If the species is present, mitigation will be required.

Burrowing Owl. The grassland habitat on the HWSG site provides limited potential breeding and foraging habitat for this species. However, there are no known records of occurrence of this species in the project vicinity, and the species was not observed during field surveys. Focused surveys for the species failed to detect any burrows or other sign of burrowing owl. As such, it is presumed absent from the project site, and no impact is anticipated. To ensure no burrowing owls move into the site prior to construction, this species will be included in any preconstruction surveys. If it does occupy the site, impacts to breeding birds or habitat during construction would represent a significant impact, requiring mitigation.

Nesting Ardeids. Nesting great blue heron is present at the SLRC in at least one nesting colony along the northwestern shore of Silver Lake. The colony is reported to have up to three nesting pairs. Other nesting ardeids (e.g., black-crowned night heron, snowy egret) may be present from time to time in this location or in other locations around the SLRC. While having no special federal or state designation, these species are of local interest and concern when present in nesting colonies. Impacts from construction noise and disturbance may occur from construction of the bypass and connection pipelines at Silver Lake, and other construction activities at the SLRC. The known nesting colony would be within 100 feet of some of the construction activities, particularly those along West Silver Lake Drive and any activities within the reservoir itself. Disruption to nesting great blue heron or other ardeids would represent a significant adverse impact, requiring mitigation.

Mitigation Measures

Preconstruction surveys for nesting special-status birds will be conducted of the HWSG and the SLRC prior to ground-disturbing activities. Depending on the results of these surveys, the following mitigation measures will be implemented:

1. All vegetation removal required for the project will occur prior to the nesting season for most birds (February to August) to avoid direct impacts to nesting birds.
2. Where nests for special-status birds are established within 500 feet of construction activities, construction will be delayed until (a) fledglings leave the nest and are independent of adults; or (b) it is determined by CDFG that no adverse effects are likely to occur to the nest or brood from adjacent construction activities, and a Biological Monitor is provided to conduct construction monitoring to ensure that effects on the nest site or brood do not reach adverse levels.
3. Construction adjacent to the known heron rookery at Silver Lake will be avoided during the nesting season for herons (February to August).

4.4.4 Potential Impacts to Foraging or Transient Bird Species of Special Concern (Passerines)

Potential Impacts

California Yellow Warbler. Breeding habitat is not present on the HWSG site for this species. Transient birds may sometimes move through chaparral or mulefat habitats onsite. However, the site does not represent a substantial movement corridor, and the loss of this habitat for migrating individuals of this species would not represent a significant impact.

Mitigation Measures

No mitigation measures are necessary.

4.4.5 Potential Impacts to Foraging or Transient Bird Species of Special Concern (Raptors)

Potential Impacts

Golden Eagle, *White-Tailed Kite.* Golden eagle and white-tailed kite occur in the region and have the potential to forage over grasslands and open country at the project site. Loss of grassland forage sites for these species has been occurring throughout Los Angeles County (Harris, pers. comm. 2002), and the species may be regionally declining for this reason. The Proposed Project includes seeding the HWSG site with grassland and shrubland species native to the area following construction. There would be no net loss of grassland forage habitat for these species once the grassland is restored, and the impact would be less than significant.

Cooper's Hawk. This species may forage on HWSG in chaparral or woodland habitats, or on SLRC in naturalized woodland habitats. The preferred forage habitat of this species is open woodlands, riparian woodlands, and occasionally chaparral. There would be little suitable foraging habitat lost from the Proposed Project on HWSG, since the project footprint is primarily in ruderal and disturbed grassland habitat. Since there are abundant other riparian and chaparral habitats in the nearby Griffith Park, the loss of a small amount of foraging habitat would not represent a significant adverse impact.

Mitigation Measures

No mitigation measures are necessary.

4.4.6 Potential Impacts to Foraging or Transient Bird Species of Special Concern (Waterfowl)

Potential Impacts

Both Silver Lake and Ivanhoe Reservoirs generate sufficient invertebrate production to support a small population of migratory waterfowl. Birds identified as using the SLRC will forage on invertebrates as well as aquatic and terrestrial vegetation. No species that specialize on foraging on fish were observed at the SLRC. The current water supply to the SLRC is chlorinated to maintain clarity. Following the removal of the SLRC as an integral part of the drinking water system as a part of the Proposed Project, the reservoirs will be allowed to revert to a more natural state. This will be accomplished by discontinuing the addition of water treatment chemicals. It is anticipated that, as a result, increased algal growth will occur because of sufficient existing nutrient concentrations; however, it is not expected that the amount of algae will exceed that which has been experienced periodically in the past.

The changes in aquatic habitat at the SLRC associated with the Proposed Project are not anticipated to adversely affect migratory wildlife. In general, with the elimination or reduction in application of chlorine to the water supply, there may be an increase in invertebrate production, and fish such as mosquitofish may become established. This would be an increase in forage supply for migratory waterfowl, and would be a net benefit to these species. If conditions temporarily become eutrophic or hypertrophic, there would be a corresponding decline in dissolved oxygen, and this may limit invertebrate production or result in fish kills. However, conditions would not be expected to drop below the existing current baseline, where invertebrate production and fish are limited by the addition of chlorine to the system.

Some emergent vegetation may eventually become established at SLRC. The emergent wetland would represent a new habitat type not currently present, and would attract additional species of waterfowl adapted to shallow marsh conditions, resulting in a net benefit to migratory waterfowl.

Mitigation Measures

Impacts to migratory waterfowl from the Proposed Project are anticipated to be beneficial; as such, no mitigation is required.

4.4.7 Potential Impacts to Special-Status Mammals (Excluding Bats)

Potential Impacts

San Diego Black-Tailed Jackrabbit. This species has some potential for occurrence in grassland and shrub areas at the HWSG site. Grading and filling activities from Proposed Project implementation would result in direct permanent loss of habitat. Some direct mortality of these species may also occur during construction. These impacts, while considered adverse, are not expected to be significant, given that better representation of such habitats occurs nearby at Griffith Park. The proposed implementation of site revegetation and raptor set-asides would further reduce potential adverse effects to this species.

Mitigation Measures

No mitigation measures are required.

4.4.8 Potential Impacts to Special-Status Mammals (Bats)

Potential Impacts

Long-Eared Myotis, *Long-Legged Myotis*, *Yuma Myotis.* These federal Species of Concern forage over scrub, chaparral, water, and other open habitats, and may roost in crevices or small caves on rocky cliffs or outcrops. There is good habitat at both the HWSG and the

SLRC for foraging; limited habitat for roosting may occur in storm drains, under concrete structures, or in buildings. While the Project would result in some temporary loss of vegetation communities, aerial foraging habitats would still be available, and the impact on foraging bats is anticipated to be less than significant. Impacts to roosts may occur where roost sites are near construction disturbance areas. This would represent a significant adverse impact, requiring mitigation.

Western Mastiff Bat, Big Free-Tailed Bat. These California Species of Special Concern forage over desert, scrub, chaparral, and other open habitats, and may roost in caves, crevices on low to high cliffs, buildings, or in rocky outcrops. There is good habitat at both the HWSG and the SLRC for foraging; limited habitat for roosting may occur in storm drains, under concrete structures, or in buildings. While the project would result in some temporary loss of vegetation communities, aerial foraging habitats would still be available, and the impact on foraging bats is anticipated to be less than significant. Impacts to roosts may occur where roost sites are near construction disturbance areas. This would represent a significant adverse impact, requiring mitigation.

Mitigation Measures

Preconstruction surveys for bat roosts will be conducted at the HWSG and the SLRC prior to ground-disturbing activities. Where active roosts are identified during these surveys, the following mitigation measures will be implemented:

1. Within 300 feet of the location of active roosts, ground disturbance and roost destruction would be avoided during the parturition period (March 15 through August 31).
2. Where this avoidance is not feasible, if potential roosts are identified prior to onset of parturition, roosts may be removed during the evening forage period (within 4 hours after dark) or fitted with one-way exit doors to effectively eliminate and exclude roost.

4.5 Potential Impacts to Wildlife Movement Corridors

The HWSG is not anticipated to be an important wildlife movement corridor, as previously described. The SLRC may provide stopover to migratory waterfowl between breeding and wintering grounds. As previously described, the Proposed Project may result in changes to the aquatic habitat at SLRC that may benefit waterfowl by increasing the abundance and diversity of forage for these species, and potentially increasing the diversity of habitats to include some emergent vegetation. The extent of the change may be a minor to modest increase in prey abundance and diversity. However, in general, conditions would not drop below the current baseline, which supports some invertebrate production that provides forage for a small number of migratory waterfowl. As such, no significant adverse impact is anticipated, and no mitigation is required.

4.6 Cumulative Impacts

Cumulative impacts to biological resources may be considered in conjunction with a review of current, past, or Proposed Projects in the region; however, this review has not been completed on the Proposed Project to date.

5.0 Additional Regulatory Requirements

This Biological Resources Technical Report has been prepared to support environmental documentation required by CEQA. Relevant environmental regulations were previously reviewed in Section 3.0, Existing Environment. Additional regulatory requirements relative to biological resources necessary prior to project implementation are summarized here.

5.1 Federal Endangered Species Act/State Endangered Species Act

The FESA provides for the conservation of federally listed threatened and endangered species and the ecosystems they inhabit, and prohibits the "taking" of a federally listed wildlife species without first obtaining the necessary authorization from USFWS. Preliminary analysis, as documented in this report, indicates that the Proposed Project is not likely to result in "take" of a federally listed species. As such, no further action is anticipated to be necessary.

The CESA prohibits "taking" of California state-listed species. Preliminary analysis, as documented in this report, indicates that the Proposed Project is not likely to result in "take" of a state-listed species. The project EIR would be reviewed by CDFG to determine if there is any potential take of state-listed species.

5.2 Clean Water Act, Section 404/401

Under Section 404 of the CWA, any activities that may result in the discharge of dredged or fill material into the "waters of the U.S." must be authorized by USACE. "Waters of the U.S." is defined broadly to include lakes, rivers, streams, sloughs, and intermittent drainages. Depending on the final project description, the Proposed Project is likely to involve placement of fill materials in jurisdictional waters and would require a permit under Section 404. The Nationwide Permit (NWP) Program was developed to preauthorize certain activities with minimal impacts on jurisdictional waters. Alternatively, projects with more substantial impacts to jurisdictional waters require an Individual Permit.

This application process involves completion of a Department of the Army Permit, which should include the following: vicinity map, plan view and drawings, sections, full project description, site photographs, biological and cultural resource reports, list of pending permits and approvals, and a proposed mitigation plan to compensate for impacts. Additional examination of the project and its proposed impacts to jurisdictional waters is required before a determination can be made regarding the appropriate permit process.

The issuance of a Section 404 permit from the USACE is contingent upon obtaining a 401 Water Quality Certification from the RWQCB. This process would require approximately 180 days, during which, the permit application is subject to a public review period.

5.3 California Fish and Game Code, Section 1600

Section 1600 of the Fish and Game Code regulates the alteration of the bed, bank, or channel of a stream, river, or lake, including dry washes, and requires issuance of an SAA for projects resulting in such alteration. The Proposed Project is likely to require an SAA issued by CDFG. To acquire an SAA, project proponents submit a completed 1603 Notification of Lake or Streambed Alteration form and a Project Questionnaire form. The following should also be included: vicinity map, plan view and drawings, sections, full project description, site photographs, completed CEQA documentation, list of pending permits and approvals, a proposed mitigation plan to compensate for impacts, and any necessary fees.

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Addendum to the Biological Resources Technical Report for the Silver Lake Reservoir Complex Storage Replacement Project

Introduction

This Technical Memorandum is an addendum to the *Silver Lake Reservoir Complex Storage Replacement Project Biological Resources Technical Report*, dated May 2004. The Biological Resources Technical Report is incorporated herein by reference.

The purpose of this Addendum is to address additional, recently identified components of the Silver Lake Reservoir Complex (SLRC) Storage Replacement Project (SRP) that have the potential to impact biological resources. These additional Project components were not considered in the Biological Resources Technical Report, and include:

- The lowering of Silver Lake and Ivanhoe Reservoirs for 6 months during activities to remove Silver Lake Reservoir from service
- Excavation for a proposed pipeline immediately to the east of Ivanhoe Reservoir and excavation for cut-and-plug operations at the northeast end of Silver Lake Reservoir
- Potential trenching along West Silver Lake Drive immediately southwest of the Silver Lake Reservoir for the Regulating Station trunk line
- Excavations of two relief stations along Silver Lake Boulevard southeast of the SLRC: one at West Silver Lake Drive and the other at London Street

Existing Environment

The additional Project components are limited to areas that were described in the Biological Resources Technical Report, including Silver Lake and Ivanhoe Reservoirs, and the urban developed or landscaped areas surrounding these facilities, and include the proposed activities along the northeast side of the SLRC (pipeline from Armstrong Avenue to Ivanhoe Reservoir and cut-and-plug activities to the east of Ivanhoe Reservoir).

Existing aquatic biological resources at Silver and Ivanhoe Reservoirs were described in the Biological Resources Technical Report. Terrestrial vegetation at SLRC was also described. The area in the northeast of the SLRC affected by the pipeline and cut and plug consists of landscaped areas with non-native ornamental vegetation, and an area of naturalized ornamental vegetation along Armstrong Drive. Other changes to the Project description would affect roads or landscaped areas surrounding the SLRC that do not support native habitat.

There are no jurisdictional waters of the U.S. under Section 404 of the Clean Water Act, or stream bed and bank jurisdictional waters under Section 1600 of the California Fish and Game Code in the vicinity of new proposed ground-disturbing activities.

Special-status species with potential to occur in the Proposed Project were described in the Biological Resources Technical Report. Within the naturalized woodland east of Ivanhoe Reservoir, nearby where the proposed pipeline would be located, there is habitat for some special-status bird species, including yellow-breasted chat, white-tailed kite, and Cooper's hawk.

Potential Impacts and Mitigation

Lowering of Reservoir Water Levels for Removal of Silver Lake Reservoir from Service

No additional impacts are anticipated from temporary water level reductions in Silver Lake or Ivanhoe Reservoir. Under normal conditions, reducing the depth of water bodies may result in greater primary productivity (i.e., increased algae production), which may in turn support more invertebrates and the wildlife that forage on them. However, the reservoirs are currently treated with approved chemicals to control algae production (primarily chlorine). The application of these chemicals limits primary productivity within the reservoirs, and would continue to do so while the level is reduced during construction. As such, no significant effect to biological resources would be anticipated by temporarily reducing the water level.

Ground-disturbing Activities East of Ivanhoe Reservoir and Northeast of Silver Lake Reservoir

Proposed new construction activities in or adjacent to the naturalized area in the northeast portion of the SLRC may cause disturbance to special-status bird species nesting in the naturalized woodland, such as yellow-breasted chat, white-tailed kite, and Cooper's hawk. The presence of these species would be determined during preconstruction surveys of the SLRC site at this location, prior to ground-disturbing activities. If the species are present, then construction noise and dust could disrupt breeding activities. Impact on breeding special-status birds would represent a significant adverse impact, requiring mitigation. Mitigation for breeding birds was previously described in the Biological Resources Technical Report, and would apply to breeding special-status birds at the naturalized woodland in the northeast portion of the SLRC. With mitigation, potential impacts would be less than significant.

In-Street Construction

Proposed new construction activities in urban streets around the SLRC would not be anticipated to have new adverse effects on biological resources.

Appendix D
Cultural Resources

Silver Lake Reservoir Complex Storage Replacement Project

Cultural Resources Assessment Report

Prepared for

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August 2004

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Acronyms

LADWP SLRC SRP Draft EIR Acronym List

Acronym	Definition
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
City	City of Los Angeles
CPOR	Coalition to Preserve Open Reservoirs
CRHR	California Register of Historical Resources
CSSLR	Committee to Save Silver Lake’s Reservoirs
DHS	California Department of Health Services
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
HCM	Historic-Cultural Monument
HLR	Historic Landscape Report
HWSG	Headworks Spreading Grounds
IS	Initial Study
kV (*small k*)	kilovolt
LA River	Los Angeles River
LADOT	Los Angeles Department of Transportation
LADWP	Los Angeles Department of Water and Power
MG	Million Gallon
LAS	lower aquifer system
MW	Megawatt
MWD	Metropolitan Water District
NOP	Notice of Preparation
NRHP	National Register of Historic Places
PRC	Public Resources Code
RSC	River Supply Conduit
SLRA	Silver Lake Residents Association
SLRC	Silver Lake Reservoir Complex
SRP	Storage Replacement Project

1.0 Introduction

Greenwood and Associates has conducted a cultural resources impact assessment for the proposed Silver Lake Reservoir Complex Storage Replacement Project, located in the City of Los Angeles (City), California. This document assesses the environmental consequences of the project on cultural resources, based on background research and field investigation. The information contained in this report is prepared for use in an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA). The City of Los Angeles, Department of Water and Power (LADWP), as Lead Agency under CEQA, has determined that the project could have a significant impact on the environment and that an EIR will be prepared.

1.1 Project Location and Description

1.1.1 Introduction

The Proposed Project would remove Silver Lake and Ivanhoe Reservoirs from direct service to the LADWP water distribution system. Water storage currently provided by the two reservoirs, together referred to as the Silver Lake Reservoir Complex (SLRC), would be replaced by a 110-million-gallon (MG) underground covered storage reservoir at the former Headworks Spreading Grounds (HWSG) site. The new storage reservoir would be accompanied by a 4-megawatt (MW) hydroelectric power generating facility at the HWSG site to capture energy from the water pressure coming into the reservoir. The addition of a regulator station and a new bypass pipeline would convey water delivery flow to existing service areas, and operation of Silver Lake and Ivanhoe Reservoirs as drinking water storage facilities would change.

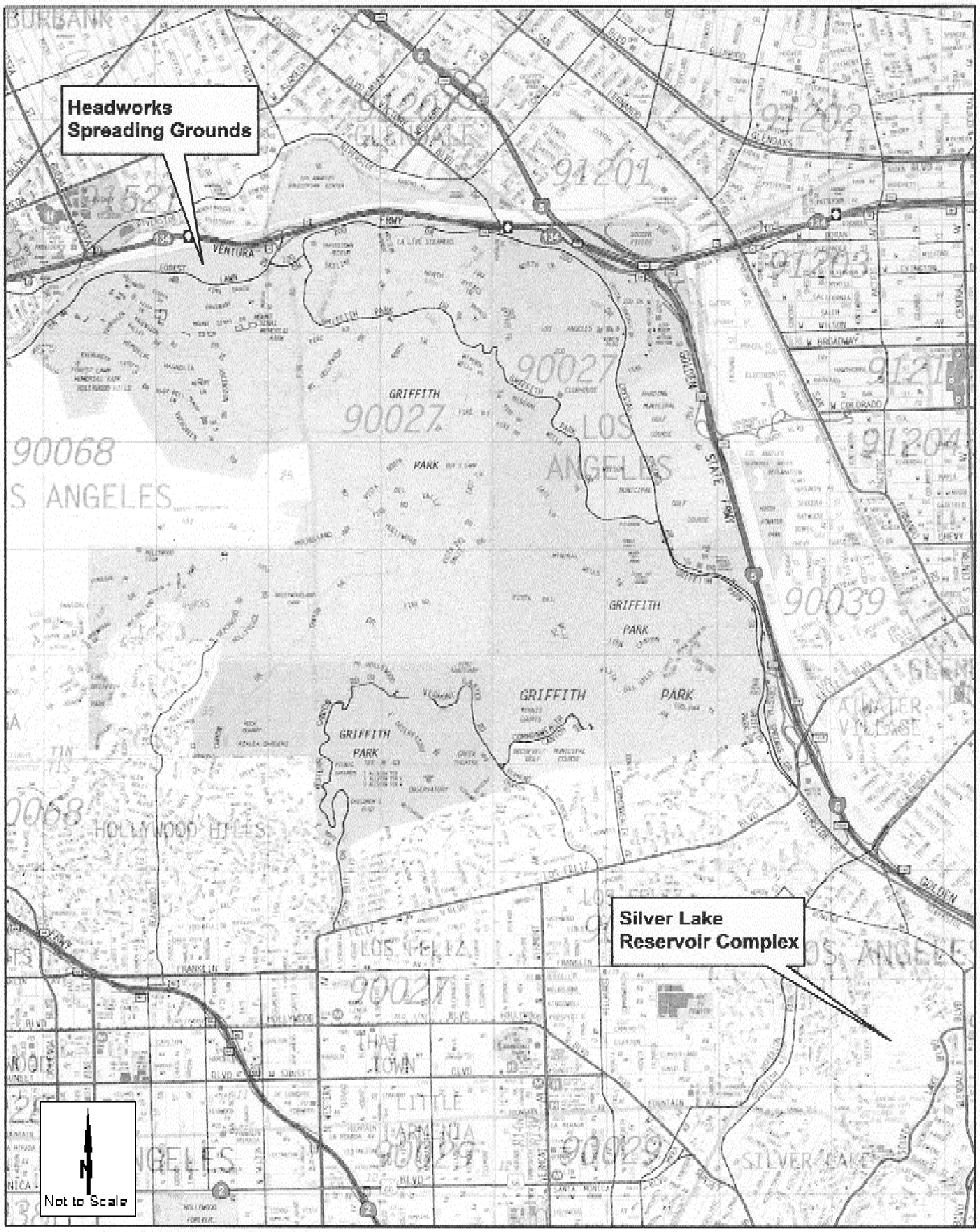
1.1.2 Project Location

The Proposed Project would be located at the HWSG site and at the SLRC, as shown in Figure 1-1. The HWSG site consists of 43 acres of undeveloped land, presently a series of dry shallow basins, adjacent to the Los Angeles River and between the City of Burbank and Griffith Park. It is bounded on the north by the Los Angeles River and the 134 Freeway, and on the east and south by Forest Lawn Drive. The property is owned by the City of Los Angeles Department of Recreation and Parks, and LADWP retains an easement over the entire property. It is located approximately 8.0 miles northwest of the SLRC.

The SLRC is located in the community of Silver Lake and consists of LADWP-owned Silver Lake and Ivanhoe Reservoirs and related facilities. Silver Lake is five miles northwest of downtown Los Angeles and just east of Griffith Park.

1.1.3 HWSG Site Facilities

Facilities to be constructed and operated at the HWSG Site include a 110-MG underground storage reservoir and a 4-MW hydroelectric power generating facility. Construction and operation information for these facilities is described in detail below.



Source: The Thomas Guide: Los Angeles County 2003

Figure 1-1
SLRC SRP
Cultural Resources Assessment
Project Location Map

1.1.3.1 110-MG Underground Storage Reservoir

1.1.3.1.1 Overview

To replace the operational storage from Silver Lake and Ivanhoe Reservoirs, LADWP would construct a 110-MG buried reservoir at the HWSG site. The reservoir would occupy approximately 19 acres on the east side of the HWSG site. The reservoir itself would be 10 acres in area and 40 feet high. Figure 1-2 shows the location of the reservoir within the HWSG site.

The reservoir would include inlets and outlets connecting to the River Supply Conduit, requiring a total of four vaults for inlet and outlet valves. The vaults will be located within the southern slope of the reservoir (Figure 1-2). Each valve vault will be approximately 22 feet by 19 feet and will be buried. Access to each vault will be from a 3-foot by 3-foot steel hatch. An access road along the southern slope of the reservoir with ingress and egress from Forest Lawn Drive would be constructed to provide access to the vaults.

1.1.3.1.2 Construction

Construction activities for the underground storage reservoir would include grading and reservoir site preparation, inlet/outlet and vault construction, construction of the reservoir storage structure, and burying the storage structure. Approximately 470,000 cubic yards of soil material would be excavated for the construction of the reservoir. Of the 470,000 cubic yards, approximately 5 percent, or 23,000 cubic yards, would be disposed offsite due to its unsuitability as fill material.

Excavation for the inlet/outlet and vault construction would be done as part of the grading and reservoir site preparation, as described above. Inlet/outlet and vault construction would require approximately 810 cubic yards of concrete.

Materials required for reservoir tank construction include concrete and gravel. A total of approximately 98,686 cubic yards of concrete would be required. Approximately 11 trucks per day would deliver 99 cubic yards of concrete per day to the site. A total of approximately 18,336 cubic yards of gravel would be required.

Approximately 394,000 cubic yards of fill material would be required to bury the storage structure. Of this amount, 156,000 would be obtained onsite from tank excavation, and 238,000 cubic yards would be imported.

1.1.3.1.3 Reservoir Operation and Maintenance

Following construction, native vegetation would be planted on the side slopes and top of the reservoir. The remainder of the HWSG site that would be disturbed during construction would be returned to its original condition.

During operation of the reservoir, Department staff would check the facility once a week, while security would check the facility daily. The reservoir inlet/outlet valves would be checked once a year. The tanks that make up the reservoir require cleaning once every four years. It is likely that the Department would stagger tank cleaning such that one tank is cleaned every two years. Tank cleaning takes approximately one week and requires a utility truck and possibly a dump truck if there is a significant amount of sand at the bottom of the reservoir.

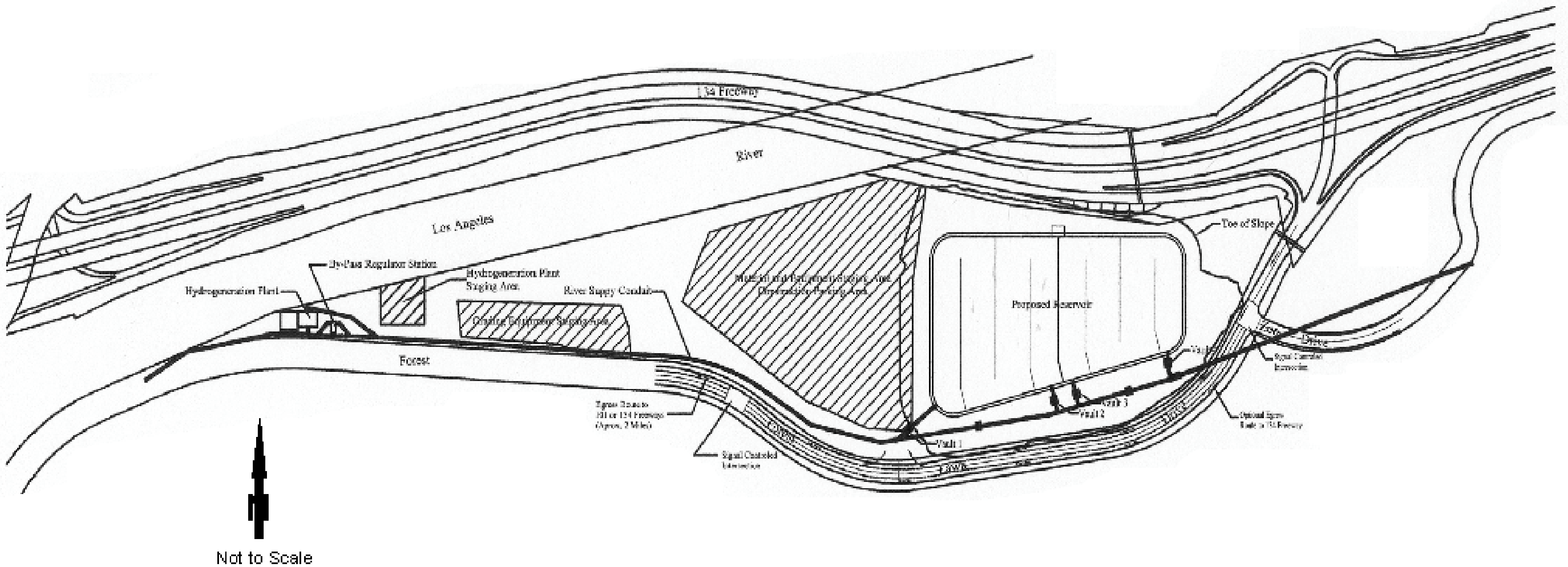


Figure 1-2
SLRC SRP
Cultural Resources Assessment
HWSG Site

1.1.3.2 4-MW Hydroelectric Power Generating Facility

1.1.3.2.1 Overview

To capitalize on a green power opportunity and reduce the water pressure coming into the new storage reservoir, LADWP would construct a 4-MW hydroelectric power generating facility at or near the HWSG site. The hydroelectric facility would require a powerhouse, connection to the existing 35-kilovolt (kV) LADWP distribution system, outdoor substation, and backup emergency generator.

The powerhouse would house the turbine/generator, associated isolation valves, piping, electrical switchgear, controls, and instrumentation. The inlet pipeline connection would be approximately 56 inches in diameter and the outlet would be approximately 68 inches in diameter. The powerhouse would be operated from a remote control center. The powerhouse would be constructed of reinforced concrete and would be approximately 50 feet wide by 70 feet long. The powerhouse would be approximately 30 feet high and would be partially buried, with the highest point roughly 18 feet above ground.

The hydroelectric generated power would be connected to the existing 35 kV LADWP distribution system. The existing 35 kV overhead power line runs along the north side of Forest Lawn Drive. No new power poles would be needed to connect to the existing 35 kV line.

The outdoor substation would consist of a main transformer and related substation equipment and would require a switchyard of 60′ by 60′ chain link fence enclosure. The Department may decide to eliminate the outdoor substation, in which case the electrical equipment would be housed in the powerhouse. In that case, the powerhouse would be increased in size to 50 feet wide by 86 feet long.

For backup station service power, an emergency generator of approximately 125 kW capacity would be housed in a separate enclosure from the powerhouse and switchyard. The enclosure would be either an outdoor metal shed type or a brick building of 30 feet wide by 25 feet long by 10 feet tall.

1.1.3.2.2 Construction

The hydroelectric plant would be constructed at the west end of the HWSG site, as shown in Figure 1-2. Approximately 2 acres would be disturbed during construction.

Approximately 6,000 cubic yards of soil material would be excavated for the construction of the hydroelectric plant. 2,600 cubic yards would be exported and 3,400 cubic yards would be retained onsite for burial of the hydroelectric plant.

1.1.3.2.3 Operation and Maintenance

The hydroelectric facility would not require staff onsite; rather, the facility would be operated remotely, from the Department area control center. A Department operator would visit the facility once a week. Security would check the facility daily. The facility would have video surveillance cameras as well as other security features.

Quarterly preventative maintenance would be performed on the plant ancillary equipment (cooling water system, air compressor, electric motor actuators), requiring one service truck for one day. Once a year, the facility would be shut down for internal and external inspection. This maintenance activity would require 3 service trucks per day for 2 weeks. The facility would be shut down for overhaul once every 5 years. This maintenance activity would require 3 service trucks and one crane per day for 4 weeks.

1.1.4 SLRC Facilities

Facilities to be constructed and operated at or near the SLRC include a bypass pipeline and a regulator station, as shown in Figure 1-3. Construction and operation information for these facilities are described in detail below.

1.1.4.1 Bypass Pipeline

1.1.4.1.1 Overview

A bypass pipeline is needed to convey water through the SLRC to the rest of the system. The bypass pipeline would consist of approximately 4,900 linear feet of 66-inch diameter pipe. The bypass pipeline would be constructed of welded steel encased in concrete.

The pipe would be tunneled beneath various streets beginning at the intersection of West Silver Lake Drive and Armstrong Avenue running south on West Silver Lake Drive for approximately 3,800 feet; turning southeasterly on Redesdale Avenue for approximately 900 feet; turning southwesterly toward the grassy area south of Silver Lake Reservoir dam approximately 100 feet. Redesdale Avenue does not intersect West Silver Lake Drive; it is a paper street and Redesdale Avenue is approximately 85 feet higher than West Silver Lake Drive.

Because the bypass line would need to be a minimum of 30 to 40 feet deep, the method of construction is tunneling. For tunneling operations, jacking (entrance) and receiving (exit) pits would be needed at the ends of the pipe for equipment and to export materials. Construction staging for equipment and materials would take place within the SLRC property, along the east side of the Silver Lake Reservoir (Figure 1-3).

1.1.4.1.2 Construction

Jacking and receiving pits for bypass pipeline tunneling would be located in West Silver Lake Drive. Roughly 5 to 15 feet around each pit would be blocked off, and the traffic around each pit would be reduced to one lane in each direction. An additional jacking pit would be located in the grassy area south of Silver Lake Reservoir dam. The portion of the bypass pipeline within the grassy area south of Silver Lake Reservoir dam would be constructed by trench method. Approximately 6,625 cubic yards of soil would be removed during bypass pipeline construction. This soil would be exported to the HWSG site.

1.1.4.1.3 Operation

The bypass pipeline would not require any maintenance, as its lifespan is approximately 100 years. In the unlikely event of pipeline leakage, the repair would be performed within the pipeline (e.g., excavation of the pipeline would not be required).

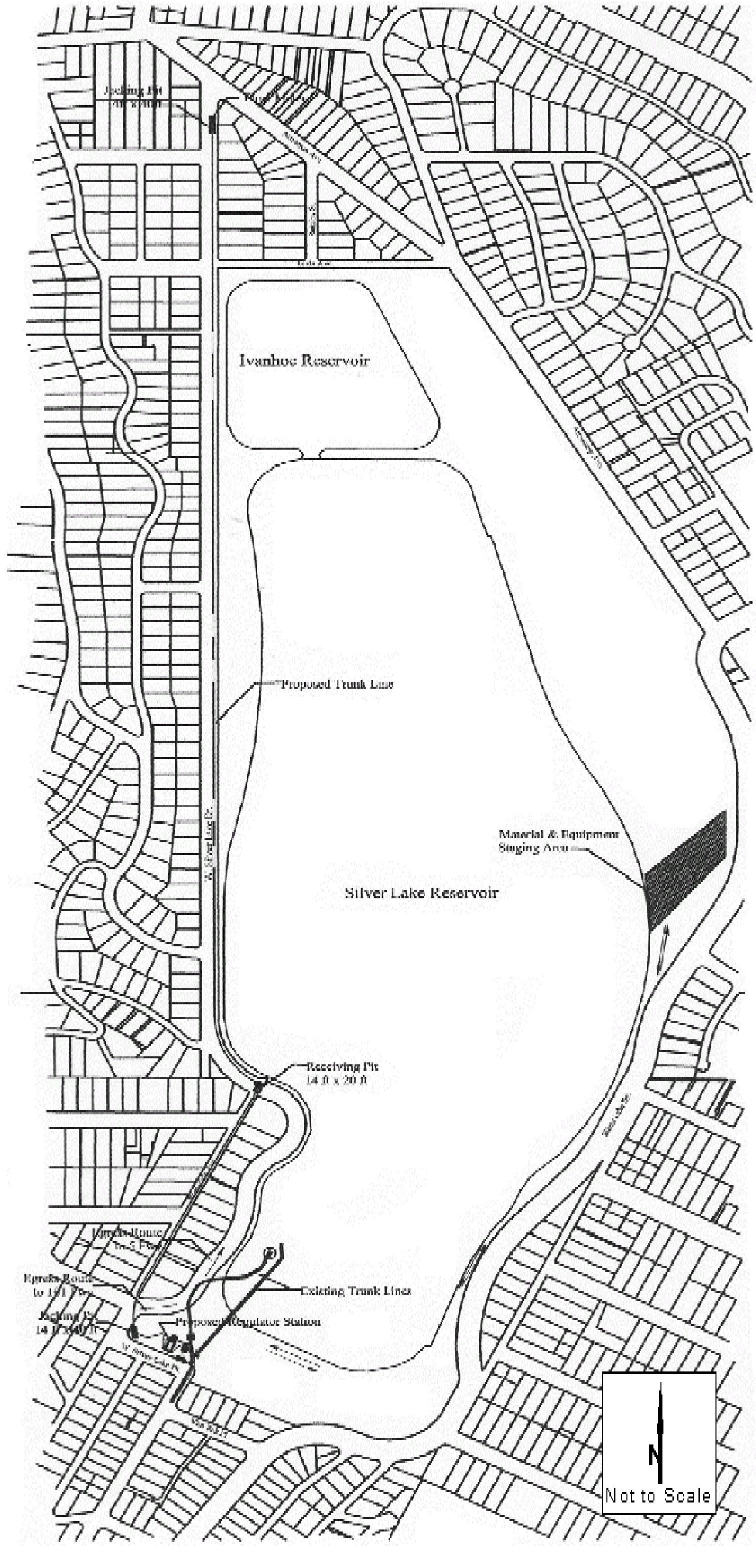


Figure 1-3
SLRC SRP
Cultural Resources Assessment
SLRC Site

Because Silver Lake and Ivanhoe Reservoirs at the SLRC would no longer be used for water supply, day-to-day operations would change. Specifically, the water currently flowing into Silver Lake and Ivanhoe Reservoirs would bypass SLRC as described above. The SLRC facility and property would be maintained consistent with the appearance and condition that LADWP has provided at this facility for several years. Based on the Department's recent positive experience at the Hollywood Reservoirs, the Department would cease chlorination within the Silver Lake and Ivanhoe Reservoirs.

1.1.4.2 Regulating Station

1.1.4.2.1 Overview

A regulating station to control water pressure would be located at the SLRC in the grassy area just south of the Silver Lake Reservoir dam, as shown in Figure 1-4. A bypass valve, relief station, and relief station dissipator, plus an isolation valve for the existing Silver Lake Reservoir outlet line would each be enclosed in buried vaults at the same location. The regulating station would be housed in a vault approximately 45 feet long by 25 feet wide by 14 feet deep that would be buried with grass on top. Access to the vault would be either from two 3-foot by 3-foot steel hatches or two 48-inch diameter lids on each end of the vault. The bypass valve would be housed in a vault approximately 14 feet long by 15 feet wide by 12 feet deep. The relief station would be housed in a 14-foot by 18-foot by 12-foot vault and the relief station dissipator would be housed in two 9-foot by 11.5-foot by 4-foot vaults. The isolation valve would be housed in a 14-foot by 15-foot by 12-foot vault. Access to each vault would be either through a 3-foot by 3-foot steel hatch or a 48-inch diameter lid. In addition, there would be 6 valves housed in a 48-inch diameter by 14-foot high can that is buried and with top access.

Above ground facilities anticipated include two ventilation hoods (4 feet in diameter and 3 feet high), 6 ventilation stand-pipes (1 foot in diameter and 3 feet high) and a control cabinet (4 feet square and 6 feet high). The control cabinet may be located near the existing chlorination building.

The regulating station and associated facilities would be constructed within a 30,000 square foot area within the grassy area just south of Silver Lake Reservoir dam.

1.1.4.2.2 Construction

Approximately 330 cubic yards of concrete would be required for construction of the regulating station. Approximately 5 to 15 trucks per day would deliver up to 130 cubic yards of concrete per day to the site for approximately 5 days. Concrete would be obtained from the Southern California area, specifically Los Angeles and Orange counties. Construction staging for equipment and materials would take place within the SLRC property, along the east side of the Silver Lake Reservoir.

1.1.4.2.3 Operation and Maintenance

During operation, the regulating station would run 24 hours per day. The noise level of the regulating station would be 90 DB inside the vault and approximately 60 DB 100 feet away.

Maintenance of the regulating station would be performed quarterly. Typical activities would include verifying valve settings, checking for debris in the lines and cleaning the vault. This work takes approximately 2 hours and uses a utility truck.

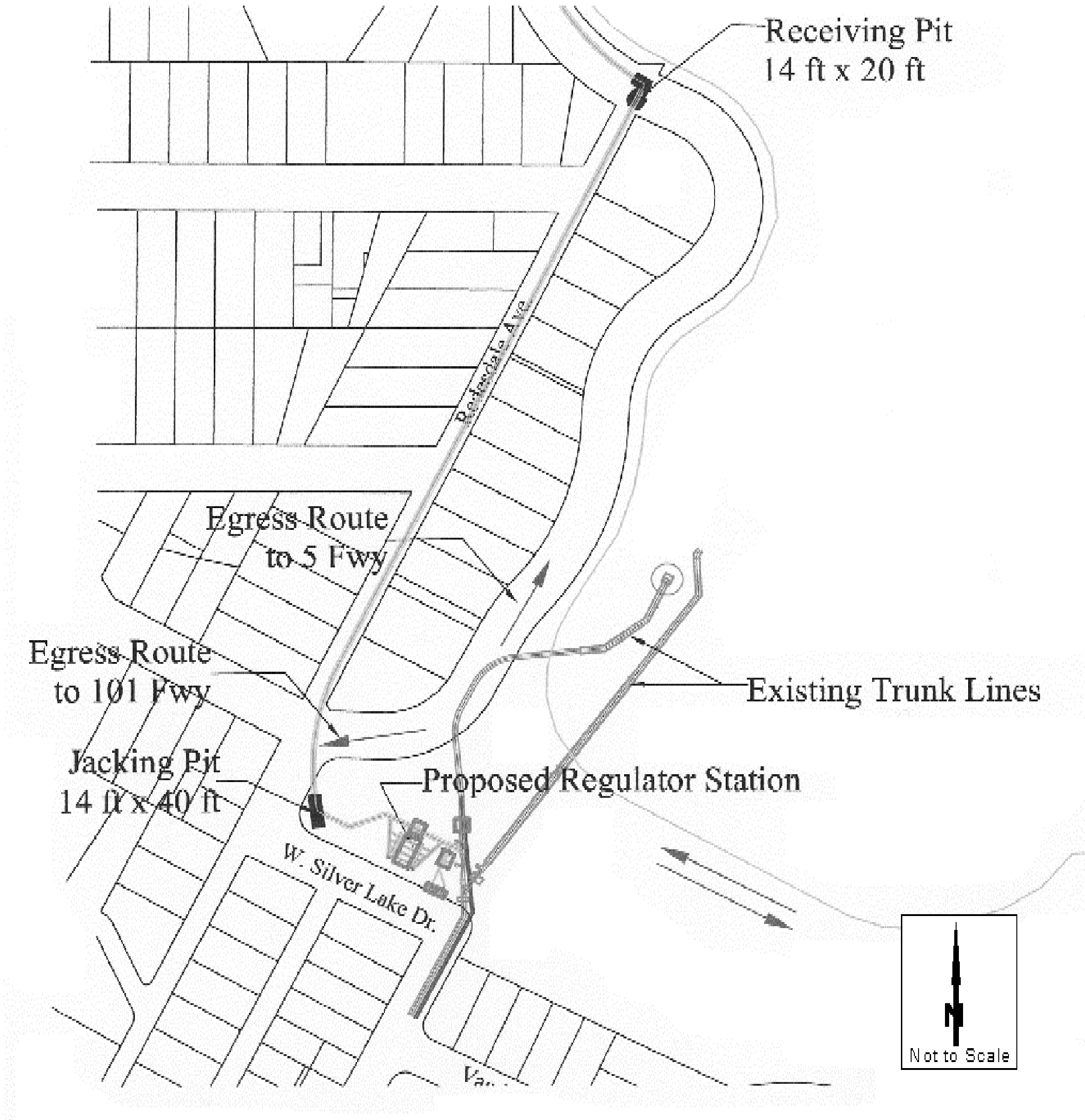


Figure 1-4
SLRC SRP
Cultural Resources Assessment
Proposed Regulating Facility

2.0 Environmental Setting

2.1 Methodology

2.1.1 Area of Study

For this cultural resources investigation, the study area is recognized to include the corridors proposed for construction of pipelines, and parcels identified for construction of facilities (regulating station, hydroelectric power generating facility, underground storage reservoir, etc.), and for staging of construction equipment and materials. As the adjacent Silver Lake and Ivanhoe Reservoirs, collectively, have previously been designated as historic resources (City Historic Cultural Monument [HCM] No. 422), the boundaries of the study area for historical resources includes all property historically associated with the reservoir complex and owned by the City/LADWP. The area is roughly bounded by Silver Lake Boulevard and Armstrong Avenue on the east, Tesla Avenue on the north, West Silver Lake Drive on the west, and West Silver Lake Drive, Silver Lake Boulevard, and Van Pelt Place on the south.

2.1.2 Research Sources Consulted

Greenwood and Associates conducted a California Historical Resources Information System (CHRIS) review of available literature, archaeological site archives, and relevant historical maps and other records for the SLRC site at the South Central Coastal Information Center (SCCIC) on March 16, 2004 by Alice Hale, M.A (File No. 4163). A comparable review for the HWSG site was conducted by the SCCIC on March 29, 2004 (File No. 4200). For both project locations, cultural resources and previous studies located within a one-half mile radius were identified. Results of literature and records search are summarized below.

Specialized listings for cultural resources consulted for this report include the National Register of Historic Places – Listed Properties and Determined Eligible Properties (1988, computer listings 1966 through Jan. 2004 by National Park Service); the California Register of Historical Resources (2003); the California Inventory of Historic Resources (1976); California Historical Landmarks (1996); the California Points of Historical Interest (1992); the *Handbook of North American Indians*, Vol. 8, California (1978); the Directory of Properties in the Historic Property Data File for the City of Los Angeles (2004); and City of Los Angeles Historic-Cultural Monuments (listings through 2004).

Additionally, specialized research was conducted at the City of Los Angeles Department of Water and Power Resource Center, Archives, Survey Section, and Library; City of Los Angeles Department of Building and Safety; Los Angeles Central Public Library; University of California Los Angeles, Young Research Library; and the City of Los Angeles Cultural Heritage Commission. Reference materials secured from internet sources and other project documents were also consulted.

2.1.3 Agencies, Groups, and Individuals Consulted

Greenwood and Associates consulted representatives of various City agencies, including: Paul Liu, LADWP Water Master Planning; Linh Phan, LADWP Water Master Planning; Douglas Sunshine, LADWP Facilities Management; Vee Miller, LADWP Facilities Management; Jay Oren, City of Los Angeles, Cultural Heritage Commission; Isabel Rosas, City of Los Angeles, Cultural Heritage Commission.

2.2 Regional Setting

The following summary is based on the literature search conducted for the vicinities of both the SLRC and HWSG areas. It is designed both to indicate the potential for the presence of cultural resources within the project area, and to provide a context for any cultural data that may be present within the study area.

2.2.1 Environment

The project area lies within central Los Angeles County. Regional vegetation includes <u>Agricultural</u>; <u>Riparian</u> (along natural drainages); <u>Sage-Scrub</u> (within canyon areas); <u>Oak-Woodland</u> (scattered patches mostly on north-facing slopes at lower elevations); and <u>Grassland</u> (grazed lands). The prehistoric Gabrieliño Indians used plants from many biotic communities. Acorns were a staple food and many of the archaeological sites contain portable stone mortars used to grind acorns. Sage, buckwheat, grass seeds, yucca, and elderberry were also extensively eaten. Willow was used in house construction and reeds used for basketry material. Plants used for medicines and dyes include mugwort, poison oak, tobacco, nightshade, and coastal sage.

In prehistoric times, animals were abundant in the area and included mule deer; coyote; bobcat; raccoon; fox; birds (dove, woodpecker, robin, sparrow, hummingbird, jays, golden eagle and condor), and snakes, lizards and frogs. In the hilly areas, grizzly bears, sheep, wolves, and mountain lions were once present. Animals used most often for food included deer, rabbits, and certain rodents; birds and reptiles were eaten less commonly (Bean and Blackburn 1976).

The project vicinity has a Mediterranean climate, lying between the dry climate of the Mojave Desert to the northeast and the humid mesothermal climate of the Pacific Coast to the south. The weather is dominated by warm, dry summers and mild, moderately wet winters. Temperatures range from approximately 100 degrees in July and August, to the low thirties in January. Snowfall is rare, and rainfall occurs normally between November and April. The Los Angeles River and several minor drainages that flow from the Santa Monica Mountains influenced prehistoric and historic settlement patterns.

2.2.2 Prehistory/Ethnography

The archaeological record indicates that sedentary populations occupied the coastal and inland regions of California more than 9,000 years ago. Early periods were characterized by the processing of hard seeds with the *mano* and milling stone and the use of the *atlatl* (dart thrower) to bring down large game, e.g., deer.

The Early Period dates from approximately 8000 to 3350 Before Present (B.P.) – a time roughly corresponding to Rogers' (1929) Oak Grove Culture and Wallace's (1955) Millingstone Horizon. The Early Period is characterized by the use of large flake and core tools, millingstones, and handstones, combined with a lack of bone and shell tools, ornamentation, and refuse. The millingstones indicate grinding of hard seeds, probably gathered from sage plants. Mortars and pestles (used for acorn grinding) were not widely used until late in the Early Period (Glassow et al. 1985). Early Period settlements appear to represent the remains of residential base camps and were usually located on hilltops or knolls (Glassow and Wilcoxon 1988). Cemeteries are associated with permanent settlements.

The Middle Period dates from about 3350 to 800 B.P. and correlates with Rogers' and Harrison's (1964) Hunting People, and Wallace's Intermediate Horizon. This period is characterized by a shift in the economic/subsistence focus from plant gathering and the use of hard seeds, to a more generalized hunting-maritime-gathering adaptation. The shift to the predominance of mortars and pestles for milling implements indicates increased exploitation and dependence on acorns (Glassow and Wilcoxon 1988). Inherited leadership and status differentiation with religious specialists, as shown by mortuary data, were all social elements of the Middle Period. Villages were more permanently occupied, and some satellite sites became differentiated in size and purpose. Middle Period sites are distinguishable into subphases by different types of beads, projectile points, and other diagnostic artifacts. Middle Period sites tend to be small and often contain artifacts that are lighter in weight and more portable than those from earlier sites.

The Middle Period is followed chronologically by the Late Prehistoric Horizon (Wallace 1955, 1978) or Shoshonean Tradition (Warren 1968), beginning around 500 A.D. (Bean and Smith 1978). The Late Period is marked by a dramatic increase in population. Permanent inland settlements of up to 150 people subsisted on the abundant acorns, seed plants, rabbits, and deer. Villages (also known as rancherias) were located near the confluence of watercourses and/or habitats. New tools and ornaments began to occur. Among the recognized archaeological changes were the appearance of arrowheads, soapstone bowls, callus shell beads, steatite effigies, and cremations. These changes have been linked to the arrival of Shoshonean peoples to this area. Some researchers suggest that desiccation around the Salton Sink pushed inland populations toward the coast, creating a ripple effect of changes.

The project area lies within the territorial boundaries of the Gabrieliño Indians. The Gabrieliños were Shoshonean and Takic language speakers, who resided in the general Los Angeles Basin and adjacent San Fernando Valley. Their name is derived from their association with the Mission San Gabriel Archangel. However, these Shoshonean people called themselves *Tong-va* according to Johnston (1962) and today some Gabrieliño have chosen this name (McCawley 1996). The fully developed Gabrieliño culture was a socially and economically complex hunting and gathering society, very advanced in their culture, social organization, religious beliefs, and art and material object production.

Gabrieliño culture underwent dramatic changes following European contact. Introduced diseases weakened and killed large numbers of native peoples, and most Gabrieliño villages were abandoned by 1810. Gabrieliño survivors helped build the Spanish Missions and the Mexican and American ranches that followed (Bean and Smith 1978:538). Today, several thousand individuals in Southern California trace their ancestry to the precontact Chumash. They place a high value on objects and places associated with their past.

2.2.3 Regional History

Spanish and Mexican Periods

Although Spain claimed Alta California (the present day state of California) in the sixteenth century, settlement did not begin until 200 years later. To consolidate the Spanish claim to Alta California, an expedition led by Gaspar de Portolá was dispatched from Mexico City in the summer of 1769. Marching northward from San Diego, Portolá passed through the San Gabriel and San Fernando valleys in 1770. Mission San Gabriel was established in 1771 and by the early nineteenth century, most Gabrieliño were incorporated into the mission. The environs of present day Los Angeles and the current project area were included in the mission's domain. Mission San Fernando was added to the system in 1797 (Baer 1958:95).

The Pueblo de la Reina de Los Angeles was founded in 1781 on the west bank of the Los Angeles River (Rio Porciúncula). Settled by a small group of "*pobladores*" of African, Native American, and Spanish descent, the outpost manifested Spanish colonial ambitions for Alta California, which envisioned a series of civilian pueblos that would function in support of the Missions and *presidios* and expand the region's population (Robinson 1981:9).

Los Angeles remained an isolated settlement for many years, gradually gaining in population and importance as a center of commerce and social exchange. By1800, the pueblo boasted a population of 315. With the demise of the Mission system and abandonment of Mission San Gabriel in the 1830s, the town became the center of trading and economic activity in the region (Robinson 1981:111).

As part of Spain's effort to colonize Alta California, a system of land grants was initiated to induce settlement and long term occupation of the region. The large rancho tracts were bestowed upon a select few, primarily ex-soldiers and others who had provided services to the government. The political change from Spanish to Mexican colony in 1821 and the subsequent secularization of the missions in the 1830s had little effect on land use in pueblo controlled areas and in the San Fernando Valley; it continued as grazing land for cattle and settlement remained light.

American Period

With the United States takeover of California in 1848, the ensuing Gold Rush, and ultimate American statehood in 1850, the pace of settlement in the region expanded rapidly, as did commerce. The discovery of gold in northern California created a boom in the local cattle industry which fed the hordes of miners. Cattle ranching in the region declined during the 1860s after years of drought followed by disastrous floods, but continued to be a major economic activity. The American population of the Los Angeles region continued to rise through the 1860s, as many of the old rancho families lost title to their land, leaving a vacuum that was promptly filled by settlers from the east and mid-west. Most of the vast ranchos were divided and sold off in parcels as agriculture gained in importance. Within Los Angeles, development expanded from the early city center; the street grid was extended as new tracts were surveyed and subdivided. By 1870, the San Fernando Valley had emerged as the regions breadbasket, supplying wheat to Los Angeles and other markets.

The extension of the Southern Pacific Railroad into Southern California in 1876, followed by the Atchison, Topeka and Santa Fe in 1887, set the stage for a massive real estate boom that resulted in the founding of hundreds of new towns and tremendous growth of the City of Los Angeles. The City's population rose from 5,700 in 1870 to 50,000 by 1890 as residential development pushed ever outward. Industrial and commercial expansion, in addition to agricultural growth and advances as a shipping hub, established Los Angeles as a leading West Coast metropolis by the turn of the twentieth century (Fogelson 1968).

2.3 Project Setting

2.3.1 HWSG Site History

The Headworks site lies within the historic boundaries of Rancho Providencia. The property was originally part of a larger rancho, Rancho Portesuela, granted by the Spanish colonial government to Mariano de la Luz Verdugo, a Spanish native, in 1795. Rancho Portesuela encompassed the broad plains of the San Fernando Valley at the base of the Cahuenga Pass, extending eastward to the Verdugo Mountains. The desire for additional grazing lands prompted the fathers of the newly founded Mission San Fernando to displace Verdugo around 1810 (Foster et al. 2000).

Following secularization, the Mexican government conferred a 4,600-acre portion of the rancho, renamed Rancho Providencia, to Vicente de Osa in 1846. De Osa also owned Rancho Encino. The property included land on both sides of the Porciuncula (Los Angeles) River and extended to the crest of the Santa Monica Mountains (Cowan 1977:62). In 1851, de Osa sold the property to Alexander Bell and David Alexander, who became the first American landowners in San Fernando Valley. Bell and Alexander grazed cattle on the rancho, continuing the established pattern of land use (Roderick 2001:31).

Dr. David Burbank, a native of New Hampshire, purchased portions of Rancho Provedencia and Rancho San Rafael to the north in 1867. He raised sheep on the land and occasionally sold off small plots. Completion of the Southern Pacific Railroad across the Valley in 1874 instigated settlement of a number of new towns, including "Burbank," which was laid out northeast of the current project area in 1886. The boundaries of the new community extended as far south as the Los Angeles River. Lands on the opposite side of the river, including the current project area, were acquired by Col. G. J. Griffith and remained open ranch lands. A wealthy mining and real estate investor, Griffith donated 3,500 acres spanning the Santa Monica Mountains to the City of Los Angeles in 1896. Griffith Park was established east of the project area and initially incorporated the Headworks site itself (Eberts 2004). There are no roads or buildings indicated south of the river in the vicinity of the HWSG site on the 1902 USGS map of the area.

The first decades of the twentieth century saw the emergence of the movie industry in the San Fernando Valley. Universal City was established at the mouth of Cahuenga Pass in 1912. *The Birth of A Nation* was filmed in 1914 by D.W. Griffith on the slopes southwest of the project area, now part of Forest Lawn Hollywood Hills Memorial Park. Cecil B. DeMille's Lasky-Famous Players Company leased several hundred acres, known as the Lasky Ranch, along the river between Cahuenga Pass and Burbank. The movie ranch bordered, and may have even included, a portion of the present project area.

The 1921 USGS map indicates that the Los Angeles River's course immediately northeast of the project area had shifted to the south. There were as yet no roads close by. The real estate boom of the 1920s brought many new residents to the Burbank area and the local movie industry continued to expand. Universal was joined by Disney Studios in 1938. The north slopes of the Santa Monica Mountains above the project area remained undeveloped ranch and park land.

Flooding of the Los Angeles River had been a continuing problem since the initial settlement of the region, and the issue of flood control gained importance as development expanded in the early twentieth century. Plans to restrict the flow of the river, including complete channelization, had been pondered since a huge flood in 1914. Major floods in the early 1930s brought renewed planning efforts and, following a devastating flood in March 1938 that destroyed numerous bridges and caused extensive property damage, a program of channelization was implemented almost immediately. The section of river along the north side of Griffith Park and adjacent to the project area was among the first sections channelized in 1939.

The years following World War II saw numerous large-scale civic improvement projects undertaken in the Los Angeles region, and residential development in San Fernando Valley in the post-war era building boom was unprecedented. Orange groves were replaced by tract houses, and continued channelization opened new acreage for building. Channelization resulted in a substantial realignment of the river's course and many of its meanders were eliminated, including in the area adjacent to the project area, where its course was shifted somewhat to the north. A bow north of the present equestrian area, northeast of the project, was also straightened. In 1948, Forest Lawn Hollywood Hills Memorial Park was established on the hillsides south of the project area, on the former Lasky movie ranch property. The postwar era also witnessed the coming of the region's freeway system. Construction of the Ventura (101) Freeway commenced in 1952 and the 134 Freeway, which borders the east end of project area, was opened in 1968 (Roderick 2001:183).

Hollingsworth Drive, later renamed Forest Lawn Drive, which borders the project area on the south, was in place by 1945, its alignment approximating the existing one. Travel Town Museum, with its collection of miniature trains, was established at the northwest corner of Griffith Park, directly east of the project, in 1952. The most recent addition to the area is Mount Sinai Memorial Park, directly south of the Headworks site, which was divided from Forest Lawn Memorial Park in 1954 and developed in the 1960s (Lindsay 2004, pers. com.).

2.3.1.1 Site Specific History

With water supply seasonally unable to meet the demands of the rapidly growing city at the turn of the twentieth century, the Los Angeles Water Department worked diligently to increase the amount of available water. Among the measures undertaken was construction of a new diversion dam and main supply conduit on the northwestern side of Griffith Park, across the Los Angeles River from Burbank, on lands known as the Headworks site (Gumprecht 1999:98).

Two infiltration galleries were installed at the Headworks site in 1905 to capture the river's subsurface flow, and were expanded in 1916. The Crystal Springs Galleries, developed in 1886 on the east side of the park, were also expanded, and together provided the City enough water in 1917 to allow a halt to all surface water diversions (that, unlike the naturally filtered subterranean water, required treatment). The flow soon proved inadequate and a third Headworks gallery was built in 1920. Well development along the river was also intensified and by 1925, there were 14 wells at the Headworks plant. The object of the wells, here and at other locations, was to capture as much usable river water as possible.

Channelization of the Los Angeles River radically altered the nature of the Headworks site. The section of the river spanned by the Headworks was straightened, and the deep, straight-sided, concrete lined channel was moved northward. Spreading basins were constructed along both sides of the river channel, with the principal basins placed to the south at the HWSG site. With construction of the 134 Freeway along the channel in the late 1950s, basins on the north side of the river were eliminated.

Pollution eventually forced the LADWP to eliminate its remaining surface diversions on the river and to discontinue pumping for water all along its course. The Headworks Deep Gallery was shut down in 1972 because of water quality concerns. Diversions from the river into the HWSG were halted in 1983 because of increased discharges of untreated sewage into the river. The last five wells in use at the Headworks plant were shut down in May 1986.

By 1993, treated wastewater had improved the quality of water flowing into the river so much that the LADWP conducted a study to determine whether water diverted from the river to the HWSG and later pumped to the surface by wells would be clean enough to drink. The study found that the extracted water complied with all drinking water standards, however, the project was ultimately abandoned in favor of alternative approaches (Gumprecht 1999:120-129).

2.3.2 Silver Lake History

The southern portion of the SLRC site lies within the four square leagues of land set aside by the Spanish crown for establishment of the Pueblo de Los Angeles in 1781, while the northern half is within the historic boundaries of Rancho Los Feliz. The 1 ½ square league rancho was granted to Vicente Feliz by the Spanish government in 1802. Juan Diego acquired the property prior to the American takeover, and received patent for the 6,647 acres in April 1871. In 1882, J. Griffith, donor of Griffith Park, purchased Rancho Los Feliz.

An open ditch that was a part of the Rancho Los Feliz water supply system passed through the canyon now occupied by Silver Lake Reservoir by the mid 1800s. The ditch was acquired by the Los Angeles Canal and Reservoir Co which in turn, became part of the City’s system in 1868 (Layne 1957:24, 39).

The Silver Lake area was known as "Ivanhoe" before the turn of the twentieth century. Reminded of the rolling green hills of his homeland, Scottish developer Hugo Reid named the area after the famous novel by Sir Walter Scott. Many of the streets in Silver Lake have Scottish names, or names that are related to characters from the novel, such as Herkimer, Rowena, Hawick, Kenilworth, and Ben Lomond. The Ivanhoe community, northwest of the SLRC site, included around a dozen homes in 1893 (USGS 1902).

In the late 1800s, hunters journeyed to the area to seek game that was attracted to the natural ponding condition in Ivanhoe Canyon. Recognizing the value of the land, the Water Department began acquiring land for the SLRC in the 1880s when the surrounding area was primarily undeveloped. By the time the last parcel was acquired in 1904, the area was still largely uninhabited. With the addition of the reservoirs this quickly changed.

Construction of Ivanhoe Reservoir was completed in 1906. Silver Lake Reservoir, named for Herman Silver, a member of Los Angeles' first Board of Water Commissioners, was finished the following year.

City planners soon recognized the potential of a uniquely situated residential development overlooking the reservoirs and made substantial investment in underground utilities and concrete streets. In the 1920's and 1930's private developers were encouraged by the City to build and they were attracted by the rolling hills and blue water views of the focal point that is Silver Lake and Ivanhoe Reservoirs. Probably the most well-known developer was the silent film star Antonio Moreno. He modeled his development (the Moreno Highlands) after a Mediterranean village he had visited. His landmark home, the Canfield-Moreno Estate, set the architectural theme for many of the homes in the hills on the west side of the reservoir.

Silver Lake and adjacent Edendale and Echo Park areas were home to many early motion picture studios. The Mack Sennett Studios, Tom Mix, Disney, Monogram, and Talmadge Studios were located there and drew creative people to the area. Many locations in Silver Lake appeared in early motion pictures. For example, the famous Laurel and Hardy short film "The Music Box" was filmed here, and many of the Keystone Cops chase scenes were shot along Glendale Boulevard. Not only was the area home to many of the early studios, numerous film makers, actors, and directors also lived in Silver Lake. These included Gloria Swanson, Laurel and Hardy, Antonio Moreno, and many others.

"From the mid-1920s through the early 60s, Silver Lake was a showcase for some of California's best known and most innovative and influential architects" (LAT 1984). The area has been noted as having the greatest density of high style historic residences of any in the city. The neighborhood's distinctive character is established by its rich mixture of area residences designed in Mediterranean and other Revival styles of the1920s and 1930s, integrated with important works by major figures in the Modern movement, including Richard Neutra, Rudolf Schindler, Rafael Soriano, Gregory Ain, and John Lautner.

2.3.2.1 SLRC History

Planning for reservoirs at Ivanhoe was one of the first projects undertaken by the newly named Los Angeles Department of Water Superintendent, William Mulholland. Conceived in 1903, the Ivanhoe and Silver Lake reservoirs were to hold 1 billion gallons of surplus water collected during wet months. In September 1905, City voters approved a $1.5 million bond measure to finance the Los Angeles-Owens River Aqueduct project by an overwhelming popular mandate. "From that date on the Water Department bent every effort, both in planning and building within the city limits, for the accommodation and use of the additional water to be received from its new source of supply" (Layne 1957: 75). Excavation work began on the Ivanhoe Reservoir in November 1905. It was to occupy the upper (northern) end of the site planned for the larger Silver Lake Reservoir. The Ivanhoe Reservoir was completed in May 1906, and in August of that year work was begun on Silver Lake Reservoir just below it.

The method employed to construct Silver Lake Reservoir was unique. Under Superintendent Mulholland's plans and supervision, an innovative hydraulic sluicing technique adapted from the mining industry was used to dredge soil from what would become the lake bed and move the material to form the earthen dam to create the reservoir. This was the first time the method had ever been used in the United States. The process proved so successful that engineers came from all parts of the country to study the method. Mulholland served as a consultant on numerous hydraulic fill dams built between 1910 and 1930, including the enormous Gatun Dam in the Panama Canal (Rogers 1995:23). Until 1923, all of the LA Bureau of Water Works and Supply reservoirs were earthen embankments, built using Mulholland's hydraulic sluicing techniques. Silver Lake Reservoir was completed in 1907 with a capacity of 773,000,000 gallons (Layne 1957:85).

Regular improvements to the reservoir complex continued into the 1940s. As part of their water conservation efforts following Owens Valley Aqueduct approval, the Water Department constructed a wooden roof over the new Ivanhoe Reservoir to decrease evaporation in 1911. The concrete pile supported roof required 800 barrels of cement and 750,000 ft of lumber. It remained until 1938, when it was removed "for health and maintenance reasons" (Layne 1957:87; supt. ltr.). Silver Lake has always been an open reservoir.

Prior to 1921, the reservoirs were used for reserve supply only, but the surrounding area's rapid growth through the teens necessitated its improvement for use as a domestic supply distribution reservoir (Layne 1957:184). Historically, water is supplied to the reservoir from the River Supply Conduit through a 60-inch inlet line to Ivanhoe Reservoir, and then into Silver Lake.

Beginning in 1922, fences were placed around the reservoirs, principally to keep out violators of the City's Fishing, Bathing, Boating, and Hunting ordinance. Besides a fence, a diversion ditch, later replaced by a wall, was constructed around Silver Lake Reservoir, which had received drainage from the surrounding hills that were fast becoming covered with residences (Layne 1957:185).

An outlet gate tower was added to Silver Lake in 1937. Located on the site of the present tower, the Classical Revival style structure complimented the existing Chlorine Plant below the dam. In 1944, work commenced on a new River Supply Conduit. Formed of some 41,260 feet of reinforced concrete pipe, the conduit delivered aqueduct water from the North Hollywood Pumping Plant to the Silver Lake reservoirs. It was put into service in March 1949. In 1945 the reservoirs were drained, the earth-filled dams improved, and the Ivanhoe Inlet Tower constructed (Layne 1957:299).

Between 1950 and 1953, a $1.5 million program of improvements was undertaken at Silver Lake and Ivanhoe Reservoirs. Far more extensive that any previous effort, the reservoirs were drained, deepened, their sides regraded and surfaced with asphaltic cement to reduce plant growth and erosion from wave action, and the dams were raised two feet. A 60-inch bypass pipeline was added at the bottom of the reservoirs, and a new 66-inch outlet line was built from the Silver Lake dam south along West Silver Lake Drive. Additionally, a portion of Silver Lake Reservoir known as the "East Cove," where water historically tended to stagnate, was filled in. That area, as well as areas nearest the reservoirs affected by construction, was re-landscaped to restore their natural appearance. The reservoirs were refilled and returned to service in December 1953 (LADWP 1950; 1952;1953).

Most recently in 1976, after a dam of similar design suffered severe damage in the 1971 Sylmar earthquake, Silver Lake dam was reconstructed and seismically strengthened. The outlet tower control house and bridge were renovated at that time as well (*Downtown News*).

2.4 Findings

2.4.1 Cultural Resources Literature Review

2.4.1.1 HWSG Site

The record search revealed that three prior archaeological investigations have been undertaken with a one-half mile radius of the project area. One of these (Beroza 1980) included a portion of the HWSG site. That project reported no cultural resources of any kind within or adjacent to the HWSG project area. The other two previous surveys (McLean 1998; Windmiller 2001) encountered no significant cultural resources.

Two known historic properties are located within a one-half mile radius of the project area. One of these, CA-LAN-22H (19-150414), is located on the north side of the Los Angeles River and the 134 Freeway, and will therefore not be impacted by work in the HWSG area. The other historic property, CA-LAN-23H (19-150415), is located within or immediately adjacent to the HWSG project area.

CA-LAN-22H

The site of "Triunfo's Adobe" was identified from a plat map for Rancho Providencia, surveyed in 1868. Recorded as the rancho house of Rancho Cahuenga, formerly occupied by the "Indian Jose Miguel Triunfo," the structure was in ruins at the time of the survey. It was located approximately one-quarter mile northwest of the project area, near the present site of Disney Studios (Edberg 1978a).

CA-LAN-23H

Identified from a plat map of Rancho Providencia, surveyed in 1868, this is the site of the "Old House of Lopez." Probably an adobe structure, it was recorded as occupied by a man named Lopez at the time of the survey. The site record places this structure in the extreme eastern portion of the HWSG area, although its location is not certain. The house appears to have been located on the north bank of the Los Angeles River, and therefore beyond the limits of the current project area. It is quite possible that it is immediately adjacent to or under the 134 Freeway (Edberg 1978b).

2.4.1.2 SLRC Site

The record search revealed one prior cultural resources survey of the Silver Lake Reservoir Complex, and five previous archaeological surveys located within a one-half mile radius of the reservoirs. The previous survey of the reservoir complex itself (Brown 1990) observed some historic structures that seemed to date to the period of dam construction and artifacts (early 20th century glass) within the perimeter fence of the reservoir. The buildings and landscape features existing on the property have never been recorded in a systematic survey or individually assessed. No prehistoric sites or materials were reported. None of the five surveys within a one-half mile radius of the SLRC (Brechbiel 1998; Duke 1999, 2000; Kuta 1998; Smith 2000) encountered archaeological sites or materials.

A number of historic resources were identified within a one-half mile radius of the SLRC. They include buildings and structures constructed in the first four decades of the twentieth century, as follows:

Garbutt House/Hathaway Mansion

A Mediterranean Revival style structure built in 1926, the Garbutt House/Hathaway Mansion is located 0.25 mile southeast of Silver Lake Reservoir at 1809 Apex Avenue. It was added to the NRHP in 1987 (19-166820).

Glendale-Hyperion Viaduct

The Glendale-Hyperion Viaduct is a concrete arch structure that spans the Los Angeles River, Riverside Drive, and the Golden State Freeway between Ettrick Street and Glendale Boulevard, approximately one-half mile north of the SLRC. Constructed by the City of Los Angeles in 1929, the viaduct was declared City HCM No. 164 in 1976. It was determined NRHP-eligible in 1986.

Site of First Disney Studio

Declared City HCM No. 163 in 1976, the site of the first Walt Disney Studio is located one-quarter mile northwest of the SLRC at 2725 Hyperion Avenue.

Tierman House

Designed by acclaimed local Modern architect Gregory Ain and constructed in 1940, the Tiernam House stands one-quarter mile northwest of the SLRC, at 2323 Micheltorrena Street. It was declared City HCM No. 124 in 1974.

Mack Sennett Studios

One of the first motion picture studios in Los Angeles, the Mack Sennett Studios were built in 1912. Declared City HCM No. 256 in 1982, the structure is located one-half mile southeast of the SLRC at 1712 Glendale Boulevard.

Engine Company No. 56

Built in 1924, Engine Company No. 56 is one of the few remaining unaltered Mediterranean Revival style engine houses in the City of Los Angeles. Located one-quarter mile northeast of the SLRC at 2838 Rowena Avenue, the structure was declared City HCM No. 337 in 1988.

Canfield-Moreno Estate

Also known as the Danziger House, and the Crestmount, this Mediterranean Revival style country villa was designed by Robert Farquhar and constructed in 1923 for Daisy Canfield

Danziger and her actor husband Antonio Moreno. Located at 1923 Micheltorena Street, one-quarter mile west of the SLRC, it was declared City HCM No. 391 in 1988.

Silver Lake and Ivanhoe Reservoirs

Silver Lake and Ivanhoe Reservoirs were designated City HCM No. 422 in March 1989. The nomination refers specifically to only the reservoirs and dams, noting their importance in the growth of the city and to its water system, declaring that "Silver Lake is as much a landmark as any structure of mortar or stucco" (Kanner 1989).

VDL Research House

An International style house designed by noted architect Richard Neutra and originally built in 1932, the house was destroyed by fire in 1963 and reconstructed by Neutra and son, Dion. Located at 2300 Silver Lake Boulevard, adjacent to the east side of the SLRC, it was declared City HCM No. 640 in 1997.

2.4.2 Cultural Resources Field Investigations

2.4.2.1 Field Methods

The two discrete areas of investigation for the proposed project, the Headworks and SLRC sites, were field surveyed by Greenwood and Associates cultural resource specialists Matthew Bandy, Ph.D. (archaeologist) and Dana Slawson, M. Arch. (architectural historian) on March 22, 2004. The cultural resources reconnaissance examined the proposed ground-disturbance footprints for built facilities, pipeline route corridors, and materials and equipment staging areas. Survey methods entailed pedestrian inspection of the areas to be impacted, which were restricted by topography, vegetation cover, modern land use, and general accessibility. All existing features of both facilities were photographed, and architectural details of buildings and structures, as well as landscape features, were recorded. Results are reported below. As the Silver Lake and Ivanhoe Reservoirs have previously been identified as an historical resource (City of Los Angeles HCM No. 422), and the SLRC SRP has a potential to impact contributing features of the reservoir complex, the entire SLRC property was included in the survey of historical resources.

2.4.2.2 HWSG Site

Archaeological Resources

For the purposes of this report, the HWSG site is considered as a single area. Essentially the entire parcel is scheduled to be impacted by construction of large subterranean storage tanks and by related staging and access area. For this reason the entire HWSG area was intensively surveyed for archaeological resources. The lenticular site is bounded on the northwest by the concrete channel of the Los Angeles River, and on the northeast by the 134 Freeway. The southern and eastern boundary of the site is Forest Lawn Drive, which bends southward near its midpoint, then northward as it meets the Rte 134/Zoo Drive interchange. The HWSG site is located on the USGS Burbank Quadrangle 7.5' map.

The site is currently unmaintained, and is covered with a mixture of native and introduced grasses and shrubs. Visibility ranges from very good (>80%) to moderate (~30%). In general, surface visibility is adequate in this entire area to permit surface identification of archaeological remains. However, the entire area has been extensively modified with mechanical equipment. The HWSG area has the form of an elliptical bowl. The center is low, and surrounded on all sides by higher ground. The center (lower portion) of the area has been completely remodeled by earth-moving activity related to creation of the spreading grounds complex. Numerous traces of this remain, including cement-lined ponds and baffles, wells, and other features. The only relatively undisturbed areas of the HWSG are higher patches near the south, east, and west perimeter fences. Even these areas have been modified, however, most prominently by fill related to the construction of Forest Lawn Drive. In short, the entire HWSG area has been extensively disturbed, and the probability of encountering intact archaeological contexts or deposits of any kind is very low.

Historical Resources

Headworks Spreading Grounds encompasses a series of dry shallow basins situated beside the Los Angeles River, near the border between the cities of Los Angeles and Burbank. The east-west oriented, lozenge-shaped site is nearly 0.75 mile in length, and 0.20 mile across at its widest point. The spreading basins are depressed approximately 30 ft below the level of Forest Lawn Drive and generally overgrown with low brush. The configuration of the spreading grounds includes an earthen banked channel roughly 15 ft deep, running east-west through the central section of the site. At the west end of this channel is a concrete gate structure that once allowed Los Angeles River water to flow onto the site. Presently, the channel is dry and a large diameter corrugated metal pipe runs within it. The eastern half to two-thirds of the site is occupied by the actual spreading basins. The westernmost basins are the largest, measuring roughly 500 ft across. The two basins are separated by a central, east-west earthen berm and have bottoms of native sand and gravel. A series of smaller basins to the east also is divided by earthen berms. The side walls of two small basins in the northeast section of the site are lined with gunnite. At the east end of the site, extensive filling has occurred, raising the ground level several feet above the level of the spreading basin berms.

Additional features of the site include a row of 18 well casings that protrude vertically roughly 3 feet above grade, located along the top of the berm between the two large western basins. These are 10 inches in diameter and many are covered by conical caps, presumably to deflect rainwater. These are believed to date to the 1920-1940 period.

There are two small buildings on the site, both of recent construction. The first is a metal clad shed containing electrical equipment located in the south-central section of the site. The second building is located near the west end of the spreading grounds site. It is roofless, with concrete walls that are stepped at the top on two sides, with small decorative penetrations. The structure contains equipment associated with an inflatable Los Angeles River dam. Other features of the site include a series of hand operated geared steel cranks along the top of the river channel, also at the west end of the site. These are thought to be associated with flood gates in the channel directly below. Also, a row of electrical transmission towers parallels the river channel along the north side of the site. These date to the mid-1950s or later.

2.4.2.3 SLRC

The project vicinity has experienced extensive ground disturbance from past and ongoing municipal and residential development, construction of underground utilities, and road infrastructure improvements. The SLRC area is located on the USGS Hollywood Quadrangle 7.5' map. The reservoirs are enclosed by a perimeter fence and bordered on the west by West Silver Lake Drive, on the south southeast by Silver Lake Drive, on the northeast by Armstrong Avenue, and on the north by Tesla Avenue. Three areas of archaeological concern identified in the SLRC area have been given the following designations for ease of discussion: SLRC-1, -2, and –3. Their locations are indicated on Figure 2-1.

2.4.2.3.1 Archaeological Resources

SLRC-1

An area within the reservoir perimeter fence, east of the reservoir itself and south of the prominent landform known locally as "the Knoll." This broad, flat area is scheduled to be used as a staging area for construction materials and machinery. The area was once a part of the reservoir referred to as the East Cove, and seems to be composed primarily of deposits associated with filling completed in the 1950s. At present, it is planted in grass with landscaped islands of ornamental shrubbery. Surface visibility is generally poor (around 10%), being limited to bare patches in the grass, especially on the verges, and areas of rodent disturbance. The probability of archaeological sites existing near the surface in this area is extremely low. The only part of the SLRC-1 that is relatively undisturbed, and is therefore at all likely to have intact archaeological deposits, is the base of the hill to the north (the "Knoll").

This area has been heavily disturbed in the historic period, and the modern surface seems to reflect extensive filling and grading dating to the 1950s. This area was inspected by conventional pedestrian survey techniques, with transects spaced at approximately 20 meter intervals. Surface visibility was not high but was adequate, and no materials or sites of historic or archaeological significance were observed.

SLRC-2

An open public park area adjacent to but outside the reservoir perimeter fence, at the corner of West Silver Lake Drive, near the southwest corner of the reservoir itself, is the projected location of regulating station. It has been extensively landscaped and modified by mechanical means in the recent past. The park is planted with grass and a few trees. Visibility is slightly better than in SLRC-1, due to the higher rate of rodent activity, but remains low (around 15%). Most exposures are the result of rodent burrowing. The probability of encountering intact archaeological remains in SLRC-2 is very low, due to the extensive recent landscaping and other disturbance in this area.

This area has been extensively landscaped in its history as a public park. Further, its proximity to the face of the earthen Silver Lake dam suggests that it may have been subject to disturbance at the time the dam was constructed. It was inspected using judgmentally-spaced transects located opportunistically in order to take advantage of patches of rodent disturbance or high surface visibility. Surface visibility was poor but generally adequate. No materials or sites of historic or archaeological significance were observed.

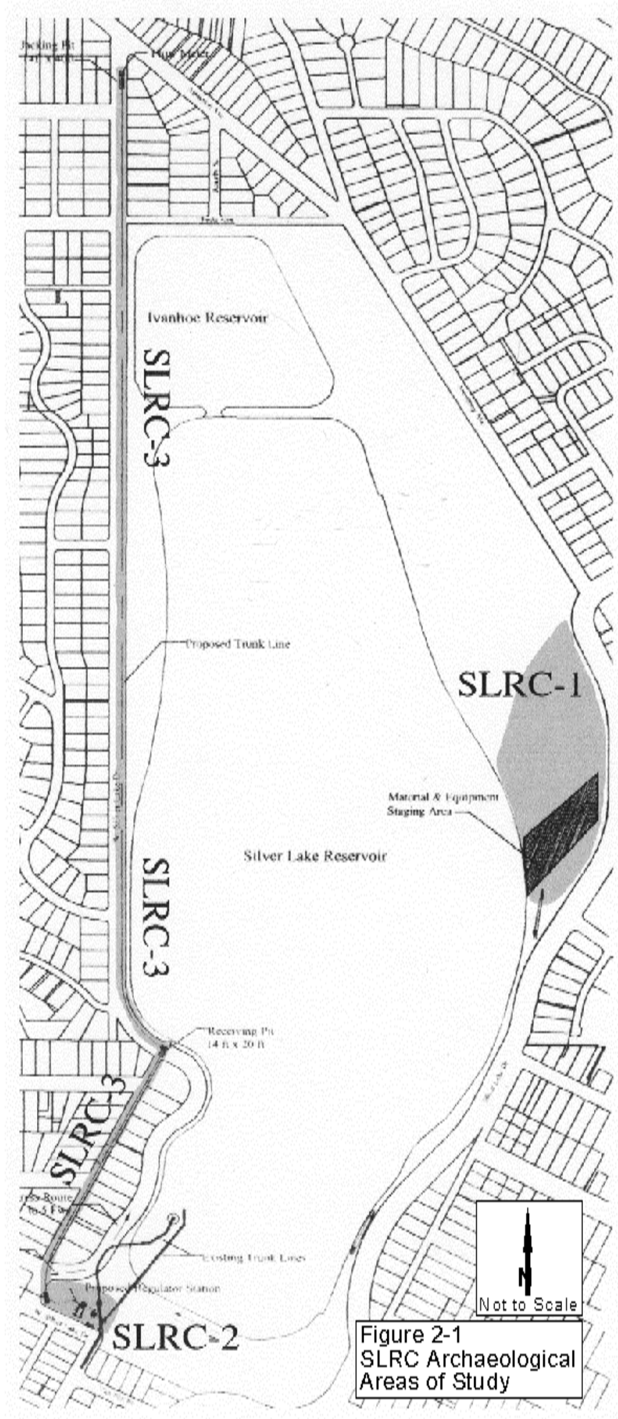


Figure 2-1
SLRC Archaeological
Areas of Study

SLRC-3

A series of jackpits, receiving pits, and underground conduits are scheduled for construction along the west edge of the SLRC area, on West Silver Lake Drive and Redesdale Avenue. This entire area is paved at present and surface visibility is zero. This being the case, it is impossible to evaluate the presence or absence of cultural resources.

2.4.2.3.2 Historical Resources

Ivanhoe Reservoir and Dam

Built at the summit of Ivanhoe Canyon in 1906, Ivanhoe Reservoir is of the double earthen dam type. Its original capacity was about 154 acre ft. In 1907 Silver Lake Reservoir was constructed directly south of Ivanhoe (Figure 2-2). The two reservoirs were originally connected by a 36 inch cast iron pipe beneath the fill of the separating dam. Somewhat west of center of the dam between the two reservoirs is a reinforced concrete spillway. Added in 1944, the open channel type spillway is rectangular in section and measures 84 ft long and 53 ft wide. In 1952 Ivanhoe Reservoir was deepened 10 ft and paved with an asphaltic cement lining. Its present capacity is 174.78 acre ft. In 1993 the reservoir was re-paved and a 72 inch bypass pipeline was installed in the south end of the reservoir. This bypass was installed to add the capability to bypass both Silver Lake and Ivanhoe reservoirs concurrently. The Ivanhoe Reservoir has a capacity of 59 million gallons and covers an area of 7.84 acres. The top of the dam is 451 feet above sea level (LADWP n.d.a).

Ivanhoe Reservoir Inlet Tower

Rising from the waters of the Ivanhoe Reservoir near the center of its north bank, the inlet tower is formed from a vertical, large diameter steel pipe which is covered by a conical steel roof (Figure 2-3). A steel deck wraps the structure well above the high water line. It is accessed via a steel I-beam bridge with pipe railings. The inlet tower was constructed in 1933, concurrent with improvements to the River Supply Conduit. It is essentially unaltered and retains integrity of design.

Silver Lake Reservoir and Dam

Silver Lake Reservoir was constructed by the City of Los Angeles Water Department and placed in service in 1907 (Figure 2-4). It was constructed at an initial cost of $115,547; however, considerable work was done on the reservoir in the years that followed, bringing the total investment by the end of the 1930s to $271,107. The reservoir is formed by two earth fill dams – one at the south, and one at the north that separates it from Ivanhoe Reservoir. The irregularly shaped reservoir has a capacity 658 million gallons and covers an area of 78.2 acres. The Silver Lake dam is roughly 900 feet in length and the dam crest is at an elevation of 451 feet above sea level. Asphaltic cement paving was applied to the steep sides of the reservoir in 1953, and a 20 foot wide paved perimeter road encircles the structure (LADWP n.d.b). The south face of the Silver Lake dam is planted in shrubs and ornamental grasses.

Silver Lake Outlet Tower

The outlet gate control tower for the Silver Lake Reservoir rises from the waters of the reservoir near its southwest corner. Constructed in 1937 in the Renaissance Revival style, the tower was extensively altered during reservoir renovations completed in the mid 1970s. The outlet tower is of cast-in-place reinforced concrete construction. It is square in plan and covered by a flat roof with overhanging eaves. At each corner of the control house is a buttress-like feature that rises to the structure's roof. These are supported from below by brackets. Extending from the west shore to the tower is a steel plate girder bridge that provides the only access to the structure. At the end of the bridge is a steel double door with single-light glazing.

Silver Lake South Outlet Chlorination Station

Situated roughly 100 feet south of the toe of the Silver Lake dam, near its west end, is the Silver Lake South Outlet Chlorination Station (Figure 2-5). It is a single-story Mediterranean Revival style building with a front-gabled rectangular main block and a lower wing that wraps the south and east sides. The structure is covered by a red shingle tile roof and the walls are smooth-finished stucco over cast-in-place reinforced concrete. Classical detailing includes narrow molded cornice trim beneath the closed eaves, with cornice returns at the gables and a molded water table. Impressions from the board formwork are visible in the area below the water table. The focus of the facade of the front gabled portion is a large multi-paneled wooden garage door surmounted by a small rectangular vent (now covered). The principal entrance is located in the street facade of the shed wing. It features a molded six-panel door with squared label mold trim incorporating a stylized keystone and corbel stops. Except for a small vent opening in the south elevation, the building is without windows. Designed by LADWP staff, the chlorination station was constructed in 1947 as a replacement for a 1920s structure at the opposite end of the dam. The structure is stylistically similar to many of the water system-related utilitarian facilities constructed by the LADWP during the 1910s through the 1940s. It is presently used by LADWP for storage.

Silver Lake Meter House

Standing off the southwest corner of the chlorination station, nearer the street, is the Silver Lake Meter House (Figure 2-5). The small one-story Mediterranean Revival style building corresponds architecturally with the adjacent chlorination station. It is square in footprint and covered by a pyramidal hipped roof clad with red Spanish tiles. Of cast-in-place concrete construction, the walls are finished with rough-troweled stucco with a narrow molded cornice beneath closed eaves. The windowless building is accessed by a steel clad door in its east elevation.

The meter house was designed by LADWP Bureau of Water Works and Supply staff and was likely completed in late 1927 or early 1928, about 20 years before the adjacent chlorination station. It originally contained a single outlet flow meter. The structure's exterior is essentially unaltered.

The chlorination station and meter house lot is enclosed by a low chain link fence and attractively landscaped with ficus trees and topiary, ivy ground cover, yucca, and neatly trimmed holly shrubs.

Silver Lake Chemical/Chlorine Plant

Situated between Silver Lake Boulevard and the toe of the Silver Lake Dam near its eastern terminus, the Chlorine Plant is a small, 22 x 14 ft, rectangular one-story building constructed of cast-in-place reinforced concrete with hip roof (Figure 2-6). The Renaissance Revival style structure is typical of water system-related utilitarian buildings erected by LADWP during the 1910s through the 1930s. Characteristic of the style, the building displays symmetrical elevations with corner pilasters, water table, and simplified entablature that frame the wall planes. Its walls show the impressions left by the horizontal board concrete formwork. The street elevation features a centrally placed Classical entrance with squared pilasters supporting a stylized entablature. Flanking the entrance on either side are large rectangular window openings that are presently covered. The west elevation also displays two symmetrical window openings; both other elevations are without windows or doors. Red Spanish tiles cover the building's hip roof, which has a slight eave overhang. Currently, the chlorine plant is used for equipment storage. The plant stands within the grounds of the reservoir complex amid landscaped lawn, trees, and bushes. Chain link boundary fencing extends from either end of the building's facade.

Referred to as a "Chemical Plant" on architectural drawings and a "Chlorine Plant" on other maps, the building is believed to have been erected around the time that the Silver Lake and Ivanhoe Reservoirs went into use for domestic water supply (1920). Plans dating to 1927 depict the building much as it presently appears, but with a glazed and paneled front door and 12-light sash windows. The structure was functionally replaced in 1947 by the chlorination station at the west end of the dam. It is presently used for storage.

Caretaker's Residence

Located directly east of the Ivanhoe dam, the caretaker's residence is thought to have been constructed around the time of completion of the Ivanhoe and Silver Lake Reservoirs, between 1906 and 1910 (Figure 2-7). It is a modest single-story wood frame vernacular cottage with a hip roof. Clad with false clapboard wooden siding accented with cornerboards, the dwelling is roughly rectangular in footprint with a partial-width enclosed porch projecting from the front (east) elevation. Its medium pitched roof is clad with composition shingles and has moderately overhanging open eaves with rafter tails exposed beneath, and an extension of the principal roof shelters the front porch. Centered in the south wall is an external stucco-clad chimney. Fenestration is typically one-over-one double hung sash placed singly, paired, and in multi-window groups. Several aluminum sliding sash windows have been added on the south and east sides, but these do not detract significantly from the overall historic character of the house. Other alterations include addition of an entrance porch with a pipe-framed roof and concrete steps, and attic ventilators. Associated landscaping includes mature palm, olive, and willow trees, plus various ornamental bushes and vines.

Garage

Associated with the caretaker's residence, the garage stands to the northeast of that structure, adjacent to the principal reservoir access road (Figure 2-8). A small bathroom building stands adjacent to its north. The garage is a vernacular one-story wood frame building with a medium pitched front-gabled roof and a rectangular footprint. It appears somewhat later in its construction than the residence, perhaps dating to the 1920s (no permits or records were uncovered). Cut into the hill slope, it rests on a concrete foundation and has walls clad with horizontal channel wooden drop siding. Composition shingles cover the roof, which has open overhanging eaves with rafter ends exposed. There is a single four-light wood casement window with plain, medium width trim in either side elevation. The street facade features a large paneled metal overhead garage door, a recent modification. The door has wide lugged wood trim and is surmounted by a sunburst motif slatted vent opening in the gable peak.

Bathroom Building

Located immediately north of the garage, the bathroom building is a small wood frame structure, nearly square in plan, and covered by a medium-pitched front-gabled roof (Figure 2-9). It rests on a concrete foundation and has a clapboard wall finish. The bathroom has a five-panel wooden door with medium width lugged trim on the front (east) side, shielded by a latticework screen. A single one-over-one double hung sash window in the north elevation, also with lugged trim, comprises the only fenestration. The building's roof is clad with composition shingles and it displays moderately overhanging eaves with exposed rafter ends. It is believed to date to the 1906-1930 period.

Sheds

To the rear (west) of the garage and north of the caretaker's residence, there are three single-story wood framed sheds associated with the residence (Figure 2-10). The northernmost of these is recently constructed, with painted plywood walls and a shed roof. The two other sheds appear roughly contemporaneous with the garage, bathroom, and house. The easterly shed is rectangular in plan and has a medium-sloped gabled roof with open eaves and composition shingles, and walls sheathed with painted corrugated sheet metal panels. It rests on a concrete foundation. There is a two-over-two double hung sash window with lugged trim centered in the north elevation. Based on its size and placement, this shed may represent an earlier garage.

The smaller westerly shed is also rectangular in plan. It is sheltered by a shed roof covered with roll roofing and its walls are finished with vertical tongue and groove planks. The single window visible has jalousie sash placed within the original window frame with lugged trim. It has a cast-in-place concrete foundation.

Landscape Building

The landscape building stands to the east of the Ivanhoe dam and approximately 300 feet south of the caretaker's residence, along the west side of the primary reservoir access road (Figure 2-11). It is a wood frame vernacular utility building with a side-gabled roof and redwood clapboard siding. The original portion of the building has a rectangular footprint. A full width shed annex has been added to the rear (west) side. The structure is believed to have originally housed reservoir related equipment and supplies, and dates to the 1906-1930 period. At the center of the landscape building's principal (east) façade is a large sliding freight door with diagonal bracing. The open eaves of the composition shingle clad roof overhang considerably, and the eave above the freight door is raised to allow access to taller equipment. There is an original four-panel personnel door with lugged trim to the left of the freight door, and two original windows in the south elevation are presently boarded, but plain, medium width trim is visible. A pair of rectangular louvered vents in the north gable end and a mushroom type metal ventilator along the ridgeline appear original to the building. The structure rests on a cast in place concrete foundation. An office has been added within the north end of the building, and a modern door, aluminum sash windows, and a small louver-sided shed containing AC equipment have been installed in that area. Although the landscape building has had a number of modifications, it continues to manifest its historic character and the feeling of its period of significance.

Chlorination Station (Ivanhoe)

To the north of the caretaker's residence and its outbuildings, on the east side of the Ivanhoe Reservoir, is a former chlorination station (Figure 2-12). It is presently used by LADWP as a work shop. It is believed to date to ca. 1937, when a bypass pipeline was built from the Fletcher Drive pumping plant, northeast of the SLRC, to the reservoir. Displaying Art Moderne elements, it is a single-story, cast-in-place concrete structure with a two level parapeted flat roof. Its walls are exposed concrete with regularly spaced horizontal channels. A narrow rectilinear cornice caps the roof parapet. There is a metal roll-up door on the building's west elevation, and a metal clad personnel door on the south side. The exterior of the chlorination station appears to be unaltered.

Laboratory Building

The laboratory building stands to the east of the caretaker's residence, near Armstrong Avenue. Designed by LADWP staff in 1955, it is a Modern one-story, wood frame structure, rectangular in plan, and covered by opposed two-level shed roofs. The structure is clad with wood weatherboards and rests on a concrete slab. Fenestration is typically one-over-one double-hung sash.

Stone Retaining Walls

East of Ivanhoe Reservoir, adjacent to the east, uphill, side of the primary reservoir access road, and also along both sides of driveways extending from Armstrong Avenue to the perimeter road, are low stone retaining walls (Figure 2-13). Typically between two and three feet in height, the walls are of mortared random rubble construction, incorporating both rough-dressed stone and natural cobbles. In one location, opposite the landscape building, a three riser stone stair is cut into the wall. The stone retaining walls are thought to be early features of the reservoir complex, dating to the 1906-1940 period.

Concrete Retaining Walls

Following the reservoir's conversion to use for domestic water supply in 1921, there was heightened awareness of the facility's vulnerability to contamination from hillside runoff. To allay this problem, open perimeter ditches along the west and north sides of the site were constructed. These were replaced by the existing concrete retaining wall along West Silver Lake Drive in the 1930s. The walls are typically two feet high and topped by chain link fencing.

Trees and Other Landscape Features

The intent of the designers of the Silver Lake and Ivanhoe Reservoirs was to create natural looking bodies of water in a richly landscaped sylvan setting that would both attract development to the surrounding area and exist as a verdant enclave in the midst of the expanding city. To this end, portions of the reservoir property were left with their original natural topography and vegetation, while other areas were planted in a naturalistic way with trees, shrubs, and other vegetation. Some alterations to the original landscaping were necessitated by the various reservoir improvement projects beginning in the 1930s and continuing through the present day. Reservoir improvements of the early 1950s in particular resulted in changes in the appearance of the reservoir and landscaping of directly adjacent areas. In-filling of the East Cove resulted in a substantial level area planted in lawn referred to as the “meadow.” Currently the reservoir complex incorporates numerous mature trees of both native and introduced species, including live oak, eucalyptus, California sycamore, various species of pines, cedars, and palms, bottlebrush, olive, pepper, and magnolia. Additionally, the well maintained park-like setting is enhanced by areas of shrubs and bushes interspersed within expanses of open lawn and low vegetation such as the “meadow.” Silver Lake’s south dam is also attractively landscaped with ornamental grasses, wildflowers, and other ground cover.

3.0 Environmental Impacts

3.1 Standards of Significance

Adopted standards of significance that are applicable to cultural resources are provided in the CEQA Guidelines (2002) and the Draft City of L.A. CEQA Thresholds Guide (1998). Significance criteria considered for the cultural resources impact analysis are provided below.

3.1.1 Historical Resources

As defined by Section 15064.5(a) of the State CEQA Guidelines, the term "historical resource" includes the following:

- A resource listed in, or determined eligible for, listing in the California Register of Historical Resources (PRC Sections 5024.1);
- A resource included in a local register of historical resources, or identified as significant in an historical resource survey meeting the requirements of Section 5024.1(g) of the PRC. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant;
- Any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the historical record.

Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (PRC Section 5024.1[a]) including the following:

- It is associated with events that have made a significant contribution to the broad patterns of California history and cultural heritage;
- It is associated with the lives of persons important in our past;
- It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, important information in prehistory or history.

3.1.1.1 California Register of Historical Resources

As provided in California Public Resources Code Section 5020.4, the California Legislature established the CRHR in 1992. The CRHR is used as a guide by state and local agencies, private groups, and citizens to identify the state historical resources and to include which properties are to be protected, to the extent prudent and feasible, from substantial adverse change. The CRHR, as instituted by the California Public Resources Code, automatically includes all California properties already listed in the NRHP. It also includes those formally determined to be eligible for listing in the NRHP (Categories 1 and 2 in the State Inventory of Historical Resources), as well as specific listings of the State Historical Landmarks and in the State Inventory of Historical Resources, and specific listings of State Historical Landmarks and State Points of Historical Interest. The CRHR may also include various other types of historical resources that meet the criteria for eligibility, including the following:

- Individual historic resources
- Resources that contribute to a historic district
- Resources identified as significant in historic resource surveys
- Resources with a significance rating of Category 3 through Category 5 in the State Inventory (Categories 3 and 4 refer to potential eligibility for the NRHP; Category 5 indicates a property with local significance)

The CRHR follows the lead of the NRHP in utilizing the 50-year threshold. A resource is usually considered for its historical significance after it reaches the age of 50 years. This threshold is not absolute, but was selected as a reasonable span of time after which a professional evaluation of historical value/importance can be made.

Historic Districts

Historic districts are unified geographic entities which contain a concentration of historic buildings, structures, objects, or sites united historically, culturally or architecturally. Historic districts are defined by precise geographic boundaries. Therefore, districts with unusual boundaries require a description of what lies immediately outside the area, in order to define the edge of the district and to explain the exclusion of adjoining areas. The district must meet at least one of the criteria for significance discussed in Section 4852 (b)(1)-(4).

Those individual resources contributing to the significance of the historic district will also be listed in the California Register. For this reason, all individual resources located within the boundaries of an historic district must be designated as either contributing or as noncontributing to the significance of the historic district.

3.1.1.2 City of Los Angeles Historic Designation

In 1962, City Ordinance 162102 of the Los Angeles Administrative Code established the City Cultural Heritage Commission and created criteria for Historic-Cultural Monument (HCM) designation. The criteria formulated for HCM listing correspond closely with criteria established for State and National Register eligibility, and are as follows:

- any site (including significant trees and other plant life located thereon), building or structure of particular historic or cultural significance to the City of Los Angeles, such as historic structures or sites in which the broad cultural, political, economic or social history of the nation, state, or community is reflected or exemplified,

- any site, building or structure which is identified with historic personages or with important events in the main currents of national, state or local history, or;
- any site, building or structure which embodies the distinguishing characteristics of an architectural-type specimen, inherently valuable for a study of a period style or method of construction, or a notable work of a master builder, designer, or architect whose individual genius influenced his age.

3.1.2 Archaeological Resources

An archaeological resource shall be considered by the lead agency to be an "important" resource as defined by CEQA, if it:

- Is associated with an event or person of recognized importance in California or American prehistory or of recognized scientific importance in prehistory
- Can provide information which is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable archaeological research questions
- Has a special or particular quality, such as the oldest, best, largest, or last surviving example of its kind
- Is at least 100-years-old and possesses substantial stratigraphic integrity
- Involves important research questions that historical research has shown can be answered only with archaeological methods

3.1.3 Threshold for Significant Impacts

3.1.3.1 Historical Resources

Criteria presented in the Draft City of L.A. CEQA Thresholds Guide (1998) are consistent with state criteria noted above. Under the Draft L.A CEQA Thresholds, a project would have a significant impact on historical resources if it would result in a substantial adverse change in the significance of an historical resource. A substantial adverse change in significance occurs if the project involves:

- Demolition of a significant resource;
- Relocation that does not maintain the integrity and significance of a significant resource;
- Conversion, rehabilitation, or alteration of a significant resource which does not conform to the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings; or,
- Construction that reduces the integrity or significance of important resources on the site or in the vicinity.

3.1.3.2 Archaeological Resources

The project would have a significant impact upon archaeological resources if it would disturb, damage, or degrade an important archaeological resource or its setting.

3.2 Evaluation of Significance

3.2.1 HWSG Site

Because continuous changes to the Headworks Spreading Ground site over the course of its 100 year history have resulted in a loss of integrity of design, character, and setting, such that it no longer reflects associations with the early development of the Los Angeles water supply system, the HWSG site and its various constituents do not appear eligible for state or city historic designation.

3.2.2 SLRC

The Silver Lake Reservoir Complex, comprised of both the Ivanhoe and Silver Lake Reservoirs and surrounding city-owned property, appears eligible for listing in the California Register as an historic district. The Silver Lake Reservoir and Dam was the first facility built by Superintendent William Mulholland and the Water Department using a unique water sluicing technique. The reservoir complex is part of a broad integrated system of water supply developed by the Department during the first decades of the twentieth century. Among the largest systems in the world, it continues to serve the city well nearly 100 years later.

The LADWP made a conscious effort to achieve a pleasing aesthetic appearance at the facilities. The initial design of the reservoir property and subsequent renovations have sought to provide a richly landscaped, natural appearance. The buildings associated with the reservoir complex, in keeping with LADWP's philosophy of facilities design of the era, were attractively rendered to integrate with and enhance the adjacent residential neighborhoods. Referring to Department chlorine stations, the *Intake* in 1932 took pride in stating that, "Beauty is combined with utilities in buildings of the Department of Water and Power" (LADWP 1932:4).

The SLRC is eligible for the CRHR for its contribution to the broad patterns of history. Construction of the reservoirs transformed a forgotten corner of the city into one of its most desirable neighborhoods. Silver Lake district underwent a period of rapid development during the 1920s and 1930s, in large part due to the development of the reservoirs and water delivery infrastructure there. Additionally, the aesthetic appeal resulting from LADWP's creation of a natural appearing "lake" amid trees and lush native and introduced vegetation functioned as a magnet for private development of the hillsides overlooking the reservoirs. From its beginnings, this "blue jewel" attracted the City's elite, including numerous Hollywood personalities. The Silver Lake neighborhood emerged as an enclave of the work of many of the region's most renowned architects, and the area has been noted as having the greatest density of high style historic residences of any area in the city. The neighborhood's distinctive character is established by its rich mixture of residences designed in Mediterranean and other Revival styles of the 1920s and 1930s by architects such as Pierpont and Walter Davis and Robert Farquhar, among others, integrated with important works by major figures in the Modern movement, including Richard Neutra, Rudolf Schindler, Rafael Soriano, Gregory Ain, and John Lautner. Noted architectural historians David Gebhard and Robert Winter have observed that, "For so small a district, the Silver Lake area has a high concentration of first-rate architecture, making it one of the most important places to visit in the city….Obviously, the view (of the hills and the reservoir) was the attraction, and the architects have played up to it" (Gebhard and Winter 1994:177-178). The district boundaries take in the all facilities associated with the historic functioning of the complex and the surrounding landscaped property owned by the City/LADWP and confined by the city street grid established after completion of the reservoirs, by the1920s.

The SLRC is also significant for its association with William Mulholland. Mulholland was a larger than life personality in the annals of southern California history, who by force of character was able to make his vision of water supply for southern California a reality. He is the person most responsible for the current water management system of the Los Angeles Basin. Mulholland was responsible for conceiving the construction of the Los Angeles-Owens Valley Aqueduct, which transformed the face of the region, enabling Los Angeles' expansion to major city proportions, in addition to increasing agricultural production. Mulholland, who headed the Department of Water and Power for 42 years, oversaw the design and construction of the aqueduct, which, at roughly 240 miles in length, was the most grandiose of its day and an engineering marvel. He was also responsible for developing the system of pipelines, reservoirs, and dams that provided the region with a dependable and inexpensive supply of water. William Mulholland was intimately involved in the development of the Ivanhoe and Silver Lake Reservoirs beginning with the selection of the site. Mulholland himself designed the reservoirs and dams, and he was responsible for developing the unique construction technique employed (Kanner 1989).

The SLRC is also eligible for the CRHR for the significance of its design and aspects of its engineering. Silver Lake Reservoir and dam were the first structures in the country to utilize the hydraulic sluicing technique of excavation and puddled earth dam construction. This method later became commonplace throughout the country and beyond. It is the first built and the only surviving example of a hydraulically sluiced reservoir in the Los Angeles water supply system, the others being either mechanically excavated earthen structures, or concrete. The DWP designers worked diligently to create a dam in Ivanhoe Canyon that would be not merely functional, but aesthetically pleasing for the thousands who would live on the "seven hills" overlooking it. While the various features of the reservoirs have been changed and upgraded over the course of its 100 year history, it continues to manifest its historic appearance, character and association with William Mulholland and the Department of Water and Power. The present appearance of the reservoirs reflects changes in technology through their functional life and evolution of the water supply system during their period of significance, established as 1906-1953. This period represents initial construction through the improvement program of the early 1950s.

Table 3-1 summarizes the elements of the SLRC and identifies the status of the various features. Noncontributing features have typically been identified as such because of their a) recent construction; or b) loss of integrity. The locations of SLRC contributing features are indicated on Figure 3-1.

TABLE 3-1
SLRC Historic District
Status of Historic Resources at the SLRC

Element	Status	
	Contributing	Noncontributing
Silver Lake Reservoir	x	
Silver Lake Dam	x	
Silver Lake Outlet Tower		x
Ivanhoe Reservoir	x	
Ivanhoe Dam	x	
Ivanhoe Inlet Tower	x	
Silver Lake South Outlet Chlorination Station	x	
Silver Lake Meter House	x	
Chemical/Chlorine Plant	x	
Caretaker's House	x	
Garage	x	
Bathroom Building	x	
Sheds (2)	x	
Landscape Building	x	
Chlorination Station (Ivanhoe)	x	
Laboratory Building		x
Nursery School (temporary buildings)		x
Landscape elements, including stone and concrete retaining walls, perimeter road, trees, shrubs, and other vegetation	x	

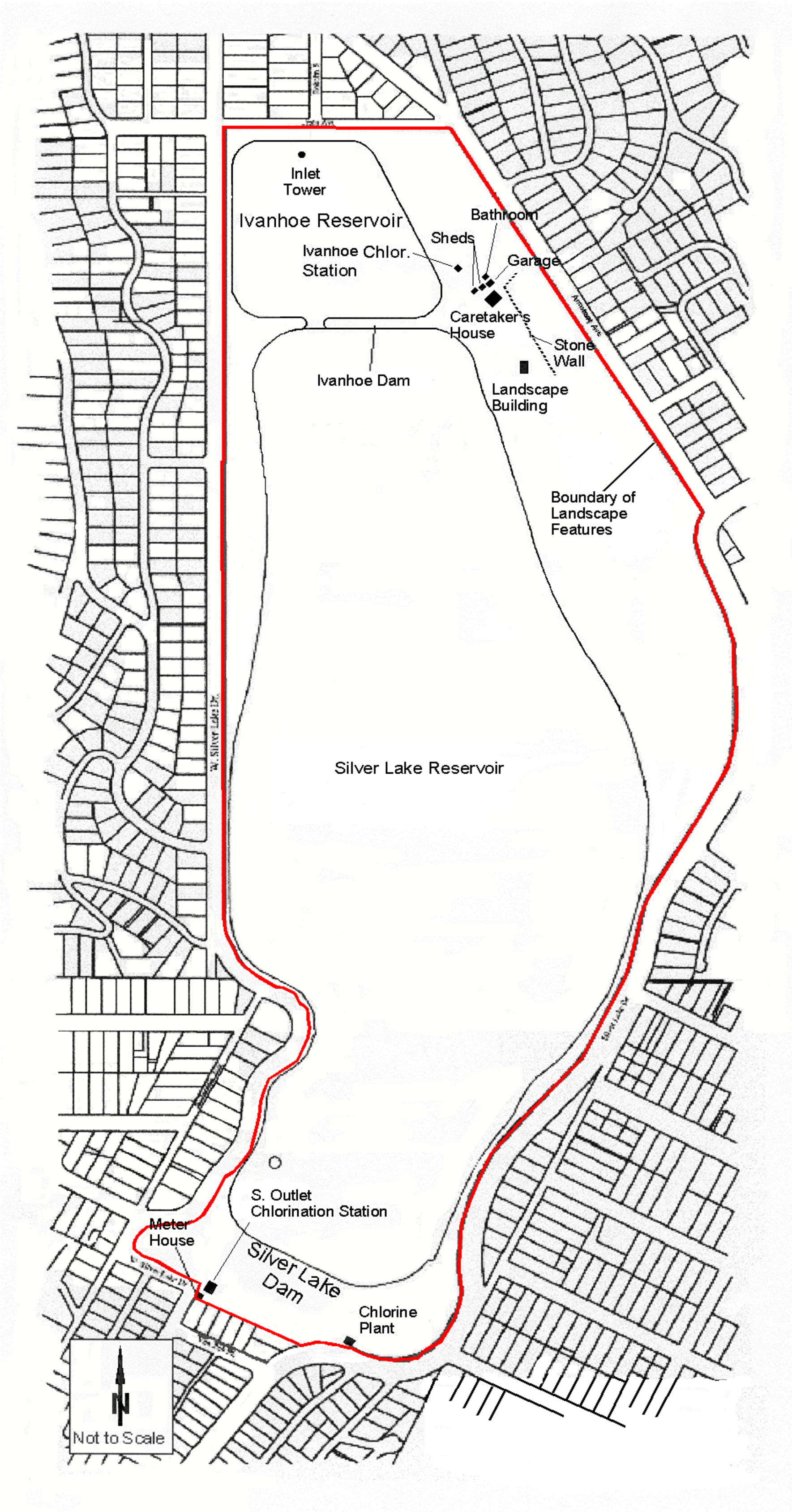


Figure 3-1
SLRC SRP
Contributing Historic Resources

3.3 HWSG Site Impacts

Facilities proposed for the HWSG Site include a 110-MG underground storage reservoir and a 4-MW hydroelectric power generating facility. The reservoir would occupy approximately 19 acres on the east half of the HWSG site. The reservoir itself would be 10 acres in area and 40 feet high. Following construction, native vegetation would be planted on the side slopes and top of the reservoir. LADWP also proposes to construct a 4-MW hydroelectric power generating facility at or near the HWSG site. The powerhouse would be approximately 50 feet wide, 70 feet long, and 30 feet high, and would be partially buried, with the highest point roughly 18 feet above ground. The remainder of the HWSG site that would be disturbed during construction would be returned to its original condition.

3.3.1 Construction/Short-term Impacts

Given the highly disturbed nature of the HWSG site, no impacts to historical resources associated with construction of the underground storage reservoir and hydroelectric power generating facility at the HWSG site are anticipated and no additional measures are necessary.

The potential for discovery of prehistoric or historical archaeological sites on the parcel is considered to be low. However, implementation of Mitigation Measure 2 would ensure that potential impacts would be less than significant.

3.3.2 Operation/Maintenance/Long-term Impacts

There will be no impacts to archaeological or historical resources associated with operation of the underground storage reservoir and hydroelectric power generating facility at the HWSG site and no additional measures are necessary.

3.4 SLRC Site Impacts

3.4.1 Construction/Short-term Impacts

3.4.1.1 Materials and Equipment Staging Area (SLRC-1)

Implementation of the proposed project would entail storage of various construction materials and equipment on an approximately 5 acre area presently a well maintained grass lawn interspersed with banks of low shrubs and small trees. Use of the area for this purpose would result in removal and/or degradation of the existing landscaping. Dating to the early to mid-1950s when a portion of the reservoir that extended into this area was in-filled, the existing landscape features do not relate to the early development of the reservoir complex. However, the “meadow” has existed for 50 years or more, is in keeping with the historic landscaping of the reservoir complex which incorporates other areas of open lawn, and contributes to the overall historic character of the resource. Therefore, project related impacts to the area are considered potentially significant. These impacts may be reduced to a less than significant level through implementation of Mitigation Measure 1.

3.4.1.2 Regulating Station (SLRC-2)

Construction of the Regulating Station and associated facilities will involve excavation and grading of an approximately 30,000 square foot area at the southwest corner of the SLRC property. This work will result in the removal of grass and trees presently located within the construction site. The existing landscape features include approximately eight California sycamore trees 10-18 inches in diameter, that are believed to date to LADWP improvements between 1951 and 1977. Several pine trees on the periphery of the site are considerably older. While not associated with the early development of the reservoir complex, the sycamore trees are in keeping with the character of the historic landscaping, and they contribute to the overall historic qualities of the reservoir complex. Removal of the sycamore trees and other landscape features will result in a potentially significant adverse impact to historical resources without mitigation. Implementation of Mitigation Measure 1 will reduce this impact to less than significant.

The potential for discovery of prehistoric or historical archaeological sites on the parcel is considered to be low. However, if encountered during construction, unavoidable impacts can be mitigated to a less than significant level by implementation of Mitigation Measure 2.

3.4.1.3 Silver Lake Bypass Pipeline (SLRC-3)

Initial LADWP assessments indicate that, with the proposed techniques, tunneling for the Silver Lake Bypass Pipeline at a depth of between 30 and 100 feet below grade and off-set laterally from building footprints by a minimum of 30 ft will not result in noise or vibration levels likely to result in impacts to existing residential construction and related features along the west side of West Silver Lake Drive, along Redesdale Avenue, or to contributing elements of the SLRC. Further, none of the buildings located along West Silver Lake Drive adjacent to the tunnel alignment is now a locally, state or federally designated historical resource.

Excavations for the north jacking pit and one receiving pit will be located within the travel lanes of the existing streets. A second jacking pit will be placed on a corner of the SLRC that is presently a landscaped public park area. Impacts related to these excavations will be temporary, and project specifications call for restoration of affected areas to their preconstruction appearance.

Existing trees and other landscaping on SLRC property at the corner of W. Silver Lake Drive and Redesdale Avenue are believed to date to the 1951-1977 period, with older (pine) trees located on the slope to the north. While generally not associated with the early development of the reservoir complex, the landscaping is in keeping with the historic character and function of this portion of the SLRC property and contributes to the historic resource. Impacts associated with removal of vegetation in this area are considered potentially significant without mitigation. Impacts will be reduced to less than significant with implementation of Mitigation Measure 1.

Because soils in these areas could not be examined, the potential for existence of archaeological resources could not be fully assessed. Impacts to cultural resources resulting from excavation/unanticipated discovery would be mitigated to insignificance through implementation of Mitigation Measure 2.

3.4.2 Operation/Maintenance/Long-term Impacts

3.4.2.1 Silver Lake Bypass Pipeline (SLRC-1)

There will be no direct impacts related to operation of the bypass pipeline. As a result of the project, Silver Lake and Ivanhoe Reservoirs at the SLRC would no longer be used for water supply and day-to-day operations would change. Specifically, the water currently flowing into Silver Lake and Ivanhoe Reservoirs would bypass SLRC. Provided that current project specifications, which call for the SLRC facility and property to be maintained consistent with the appearance and condition that LADWP has provided at this facility for several years, project impacts related to the change in function of the Silver Lake and Ivanhoe Reservoirs are not considered to be potentially significant adverse and no additional measures are necessary.

3.4.2.2 Regulating Station (SLRC-2)

There will be no impacts to archaeological or historical resources associated with operation of the regulating station at the SLRC and no additional measures are necessary.

3.4.2.3 Materials and Equipment Staging Area (SLRC-3)

Use of the meadow area will be limited to the construction phase of the SLRC-SRP and there will be no operational impacts to known archaeological or historical resources.

4.0 Mitigation Measures

4.1 Construction/Short-term Impacts

Potential adverse environmental impacts on cultural resources during construction will be addressed by implementing the following mitigation measures:

Mitigation Measure 1

Landscaping of the 30,000 square foot park area located at the southwest corner of the SLRC, the proposed location of a jacking pit, pipeline, concrete vaults for a regulating station, and other new facilities, shall be returned to an appearance approximating the pre-construction conditions, in so far as is possible, prior to decommissioning of the SLRC for domestic water supply usage. Where avoidance or transplantation of on-site trees and other vegetation is not possible, the proposed regulating station area (SLRC-2) should be landscaped with mature, healthy trees and plant material of comparable species, in keeping with the historic character and appearance of these portions of the reservoir complex. In areas where planting of trees and other large vegetation would impede operation of the new facilities, grass will be replanted over the buried structures, approximating the current appearance of the site in as much as that is practicable. In so far as is possible, landforms shall be returned to their pre-construction topography. The *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Cultural Landscapes* should be employed to mitigate potential impacts to the existing landscaping resulting from construction activities.

The same mitigation measures shall be employed for impacts related to the removal or degradation of landscaping in the area designated for equipment and material staging (SLRC-1), within the former East Cove area.

Mitigation Measure 2

The impact to cultural resources related directly or indirectly to the project-related activities shall be reduced to below the level of significance through the recovery or treatment of archaeological resources encountered during any archaeological site investigations or monitoring of ground-disturbing activities (construction) in areas with the potential to contain archaeological resources.

When investigations identify unique archaeological resources as defined in Section 21083.2 of the Public Resources Code, the site shall be subject to specified requirements for treatment. Where any respective element of the project is expected to require earthmoving, the following program shall be implemented and the requirement duly noted in project plans and specifications:

- Retain a qualified archaeologist to implement a monitoring and recovery program in any area identified as having the potential to contain unique archaeological resources.

- A qualified archaeologist shall monitor earth-moving activities in areas that are likely to contain unique archaeological resources. The archaeologist shall be authorized to halt construction, if necessary, in the immediate area where buried cultural remains are encountered. Prior to the resumption of grading activities in the immediate vicinity of the cultural remains, the project proponent shall provide the archaeologist with the necessary resources to identify and implement a program for the appropriate disposition as specified by Section 15064.5(e) of the CEQA Guidelines.
- The selected archaeologist shall be required to secure a written agreement with a recognized museum repository regarding the final disposition and permanent storage and maintenance of any unique archaeological resources recovered as a result of the archaeological monitoring. This would also include corresponding geographic site data that might be recovered as a result of the specified monitoring program. The written agreement for the disposition of recovered artifacts shall specify the level of treatment (preparation, identification, curation, cataloging) required before the collection would be accepted for storage.
- The selected archaeologist shall attend a preconstruction meeting to provide information regarding regulatory requirements for the protection of unique archaeological resources. Construction personnel shall be trained on procedures to be followed in the event that a unique archaeological resource is encountered during construction. In addition, the archaeologist shall ensure that the preconstruction meeting participants are trained to notify the Los Angeles County Medical Examiner (coroner) within 24 hours of the discovery of human remains. Upon discovery of human remains, there shall be no further excavation or disturbance of the site or any reasonably nearby area suspected to overlie adjacent human remains until the following conditions are met:
  - The Los Angeles County Medical Examiner has been informed and has determined that no investigation of the cause of death is required, and if the remains are of Native American origin, the descendants of the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.

If archaeological sites are encountered during construction of the proposed project, an evaluation of significance will be made by the selected archaeologist. Those sites that are determined to be eligible for listing in the CRHR shall be treated in accordance with one of the three feasible measures described in the “CEQA and Archaeological Resources,” CEQA Technical Advice Series:

- Capping (covering) the site with a level of soil prior to construction over the site
- Incorporation into open space areas of the project site
- Excavation where the first two measures are not feasible.

For eligible sites, the City of Los Angeles shall, prior to construction, implement the applicable treatment plan.

With implementation of these measures, construction of the proposed SLRC SRP would not result in significant cultural resources impacts.

4.2 Operation/Maintenance/Long-term Impacts

No adverse environmental impacts to cultural resources are expected during routine operation of the proposed project, provided that the SLRC facility and property are maintained consistent with the appearance and condition that LADWP has provided at this facility for several years. As such, no mitigation measures are required.

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Figures

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Addendum to the Cultural Resources Assessment Report for the Silver Lake Reservoir Complex Storage Replacement Project

Introduction

This Technical Memorandum is an addendum to the *Silver Lake Reservoir Complex Storage Replacement Project – Cultural Resources Assessment Report* (CRAR) prepared by Greenwood and Associates in August 2004. The CRAR is incorporated herein by reference. This Technical Memorandum was prepared by CH2M HILL's cultural resources specialist, Dr. Jim Bard.

The purpose of this Addendum is to address additional, recently identified changes to the Project and their implications for the management and protection of cultural resources. These additional project components were not considered in the CRAR and include:

- Excavation for a proposed pipeline immediately to the east of Ivanhoe Reservoir
- Excavation for cut-and-plug operations at the northeast end of Silver Lake Reservoir
- Trenching along West Silver Lake Drive immediately southwest of the Silver Lake Reservoir for the Regulating Station Trunk Line
- Excavations for two Relief Stations along Silver Lake Boulevard southeast of the SLRC, one at West Silver Lake Drive and the other at London Street

Analysis

Construction activities necessary to remove Silver Lake and Ivanhoe Reservoirs (excavation east of Ivanhoe Reservoir and northeast of Silver Lake Reservoir) would take place in areas previously investigated by Greenwood and Associates. No historic buildings would be affected. Potential impacts associated with the area referred to as SLRC-1 would apply to this area. The potential for discovery of prehistoric or historical archaeological sites in this area is considered to be low. However, if encountered during construction, unavoidable impacts would be mitigated to a less-than-significant level by implementation of Mitigation Measure 2. Adverse impacts to historic landscaping are not likely to be significant in this area; however, to ensure that potential impacts would be less than significant, Mitigation Measure 1 would also be implemented.

Potential construction of the trunk line for the regulating station in West Silver Lake Drive, immediately south of the location for the regulating station, would be unlikely to result in adverse impacts to any archaeological resources that might be present because existing streets and underground utilities have likely already disturbed such resources. However, to ensure that impacts are less than significant, Mitigation Measure 2 would be implemented.

The two separate relief stations would be constructed belowground within existing streets; no historic buildings would be affected. Construction for the relief stations would be unlikely to result in adverse impacts to any archaeological resources that might be present because existing streets and underground utilities have likely already disturbed such resources. However, to ensure that impacts are less than significant, Mitigation Measure 2 would be implemented.

Conclusions

The addition of project elements identified above does not affect the findings and conclusions presented in the CRAR prepared by Greenwood and Associates. Implementation of Mitigation Measures 1 and 2 in the CRAR would ensure protection of any archaeological resources that might be inadvertently encountered during construction and will ensure restoration of the historic character of the landscaping and setting once construction has been completed.

Appendix E
Paleontological Resources

Final Draft

Silver Lake Reservoir Complex Storage Replacement Project

Paleontologic Resource Inventory/ Impact Assessment

Prepared for

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May 2004

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1.0 Introduction

1.1 Background

This technical report summarizes the results of the paleontologic resource inventory and impact assessment that was conducted by Paleo Environmental Associates, Inc. (PEAI), on behalf of the Los Angeles Department of Water and Power (LADWP) and in support of the proposed Silver Lake Reservoir Complex (SLRC) Storage Replacement Project (SRP) environmental impact report (EIR). The SLRC SRP site consists of two sites, including the SLRC and the headworks spreading grounds (HWSG) site.

Paleontologic resources, including fossil remains, associated specimen data and corresponding geologic and geographic site data, fossil localities, and the fossil-bearing strata, are a limited, nonrenewable, and sensitive scientific and educational resource and, particularly with regard to fossil localities, are afforded protection under the following state environmental legislation (see California Office of Historic Preservation, 1983).

- **California Environmental Quality Act of 1970 (CEQA) (Division 13, California Public Resources Code: 21000 *et seq*.).** Requires that a public agency or private interest identify the environmental consequences of its proposed project on any object or site of significance to the scientific annals of California (Division I, Public Resources Code: 5020.1 [b]).
- **Guidelines for the Implementation of CEQA, as amended May 10, 1980, and March 29, 1999 (Title 14, Chapter 3, California Administrative Code: 15000 *et seq*.).** Define procedures, types of activities, persons, and public agencies required to comply with CEQA, and include definitions of significant impacts on a fossil locality (Section 15023, Appendix G [5.c]).
- **California Public Resources Code, Section 5097.5 (Statute 1965, Chapter 1136, Paragraph 2792).** Defines any unauthorized disturbance or removal of a fossil locality or remains on public land as a misdemeanor.
- **California Public Resources Code, Section 30244.** Requires reasonable mitigation of adverse environmental impacts that result from development of public land and affect paleontologic resources.

In response to CEQA and subsequent acts, many regulatory agencies in California, including the LADWP, also have developed environmental guidelines for protecting paleontologic resources in areas under their respective jurisdictions. Under its guidelines, a CEQA lead agency can require a paleontologic resource inventory/impact assessment of an area to be adversely impacted by a discretionary project deemed nonexempt under its guidelines. As part of such an assessment, the agency can require an inventory and the mapping of fossil-bearing rock units and previously recorded and newly documented fossil localities by a qualified paleontologist in the area to be affected Such an assessment would include an evaluation of the scientific importance of these resources, a determination of the adverse environmental impacts that might arise from the project and an appraisal of their significance, and the formulation of measures to mitigate these impacts to an insignificant level. The LADWP has required that this resource inventory and impact assessment be conducted because of the potential for fossil localities and remains being encountered by earth-moving activities associated with the SLRC SRP. This paleontologic resource assessment technical report, particularly with regard to the mitigation measures presented below, is in compliance with Society of Vertebrate Paleontology (SVP, 1995) standard measures for assessing the scientific importance of paleontologic resources in an area of potential environmental effect, and for mitigating significant adverse construction-related environmental impacts on these resources (see Appendix A). These measures (SVP, 1996) also include conditions for the acceptance of a paleontologic monitoring program fossil collection by a museum repository (see Appendix B).

1.2 Personnel

This technical report was prepared by Dr. E. Bruce Lander, a paleontologist with PEAI, Altadena, California. Dr. Lander has a Ph.D. degree in paleontology and has conducted research, authored published scientific contributions, and prepared environmental impact review documents on the paleontologic resources of California in support of other major construction projects, including a number of pipeline and reservoir projects. Dr. Lander conducted the literature review, archival search, and field surveys for this report.

2.0 Environmental Setting

The SLRC lies at the northern corner of the unnamed hills that lie immediately southeast of the southeastern corner of the Santa Monica Mountains and southwest of the Los Angeles River, while the HWSG site lies between the northern edge of the Santa Monica Mountains and the Los Angeles River channel, both sites lying in Los Angeles (see Figures 1-1, 1-2). Topographic map coverage of the SLRC and the HWSG site is provided at a scale of 1:24,000 by the United States Geological Survey Hollywood (1966, photorevised 1981, minor revision 1994) and Burbank (1966, photorevised 1972, minor revision 1994) Quadrangles, California, 7.5-Minute Series (Topographic).

Paleontologic resources of the SLRC SRP sites include rock units that immediately underlie the surface and have a potential for yielding particular types of fossil remains because they have yielded similar fossil remains at previously recorded fossil localities near the project sites. Fossils, the remains or indications of once-living organisms, are an important scientific resource because of their use in 1) documenting the evolution of particular groups of organisms, 2) reconstructing the environments in which they lived, and 3) in determining the ages of the strata in which they occur and of the geologic events that resulted in the deposition of the sediments constituting these strata.

2.1 Methodology

The following tasks were conducted to develop a baseline paleontologic resource inventory of the SLRC and the HWSG site by rock unit, and to assess the potential paleontologic productivity and the paleontologic or scientific importance of each rock unit, these assessments being based on the fossil remains previously recorded from the rock unit in the vicinities of the SLRC and the HWSG site. These tasks were completed in compliance with SVP (1995) guidelines for assessing the scientific importance of the paleontologic resources in an area of potential environmental effect.

2.1.1 Stratigraphic Inventory

Geologic maps and reports covering the surficial geology of the SLRC and the HWSG site were reviewed 1) to determine the rock units exposed at the both sites, particularly those rock units known to be fossiliferous, and 2) to delineate their respective areal distributions.

2.1.2 Paleontologic Resource Inventory

Published and unpublished geologic and paleontologic literature was reviewed to document the number and locations of previously recorded fossil localities at and near the SLRC and the HWSG site from each rock unit exposed at either site, and the types of fossil remains the rock unit has produced locally. The literature review was supplemented by an archival search conducted at the Natural History Museum of Los Angeles County Vertebrate Paleontology Department (LACMVP) for additional information regarding the occurrences of fossil localities and remains at and near the SLRC and the HWSG site. Field surveys of the SLRC and the HWSG site were conducted to determine the condition of any previously recorded fossil locality, if any, as well as to document the presence of any previously unrecorded fossil locality and strata suitable for containing fossil remains.

2.1.3 Paleontologic Resource Assessment Criteria

The paleontologic importance (high, low, none) of a rock unit exposed at the SLRC or the HWSG site is the measure most amenable to assessing the scientific importance of the paleontologic resources of the sites because the areal distribution of a rock unit can be delineated on a topographic map. The paleontologic importance of a rock unit reflects 1) its potential paleontologic productivity and 2) the scientific importance of the fossils it has produced locally.

The potential paleontologic productivity (high, moderate, low, none, undetermined) of a rock unit exposed at the SLRC or the HWSG site is based on the abundance or densities of fossil specimens or previously recorded fossil localities in exposures of the unit at and near either site. Exposures of a specific rock unit at the SLRC or the HWSG site are most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the unit at and near the site. The criteria for establishing the potential paleontologic productivity of a rock unit exposed at the SLRC or the HWSG site are described below.

- **High potential.** Rock unit contains comparatively high density of previously recorded fossil localities and has produced numerous fossil remains at and/or near SLRC or HWSG site, and is likely to yield additional similar remains at either site.
- **Low potential.** Rock unit contains no or comparatively low density of previously recorded fossil localities and has yielded very few or no fossil remains near SLRC or HWSG site, and is not likely to yield any remains at either site.
- **No potential.** Unfossiliferous artificial fill and igneous and high-grade metamorphic rock units with no potential for containing any unrecorded fossil locality or yielding any fossil remains.

A fossil specimen is considered scientifically important if it is 1) identifiable, 2) complete, 3) well preserved, 4) age diagnostic, 5) useful in environmental reconstruction, 6) a type or topotypic specimen, 7) a member of a rare species, 8) a species that is part of a diverse assemblage, and/or 9) a skeletal element different from, or a specimen more complete than those now available for its respective species. Identifiable fossil land mammal remains, for example, are considered scientifically important because of their potential use in providing very accurate age determinations and environmental reconstructions for the rock units in which they occur. The geologic ages of some younger fossil remains can be determined by carbon-14 dating analysis. Moreover, land mammal and plant remains are comparatively rare in the fossil record.

Using the definitions presented above, the paleontologic importance of a rock unit exposed at the SLRC or the HWSG site would be assessed using the following criteria.

- **High importance.** Rock unit has comparatively high potential for containing fossil localities and for yielding scientifically important fossil remains at SLRC or HWSG site similar to those previously recorded from rock unit at and/or near either site.

- **Low importance.** Rock unit has comparatively low potential for containing any fossil locality or for yielding any scientifically important fossil remains at SLRC or HWSG site.
- **No importance.** Unfossiliferous artificial fill and igneous and high-grade metamorphic rock units having no potential for containing any fossil locality or for yielding any fossil remains.

Note, however, that any fossil locality containing identifiable fossil remains and the fossil-bearing layer are considered paleontologically important, regardless of the paleontologic importance of the rock unit in which the locality and layer occur.

The following tasks were completed to establish the paleontologic importance of each rock unit exposed at the SLRC or the HWSG site.

- The scientific importance of fossil remains recorded from a rock unit exposed at the SLRC or the HWSG site was assessed.
- The potential paleontologic productivity of the rock unit was assessed, based on the density of fossil remains and/or previously recorded and newly documented fossil localities it contains at and/or near the SLRC or the HWSG site.
- The paleontologic importance of the rock unit was assessed, based on its documented and/or potential fossil content at the SLRC or the HWSG site.

This method of resource assessment is the most appropriate for an areal paleontologic resource investigation of the SLRC and the HWSG site because, based on data acquired as a result of the literature review and archival search, discrete levels of paleontologic importance can be delineated on a topographic/geologic map.

2.2 Regional Setting

Regional surficial geologic mapping of the SLRC SRP sites and their vicinities is provided by Jennings and Strand (1969) at a scale of 1:250,000, while larger-scale (1:24,000) geologic mapping of the site and its immediate vicinity is provided by Dibblee (1991). The SLRC lies adjacent to the eastern end of the Santa Monica Mountains and is in an area in which mountains and hills are composed mostly of Mesozoic plutonic and consolidated Miocene marine sedimentary rock units that have been highly folded, faulted, and eroded, while the valley floors are underlain mostly by unconsolidated and comparatively flat-lying, undisturbed, and undissected alluvial deposits (see Dibblee, 1991).

An inventory of the paleontologic resources of the rock units exposed at the SLRC SRP sites is presented below and the scientific importance of these resources is assessed. Although the literature review, archival search, and the field surveys conducted for this inventory did not document any previously recorded fossil locality as occurring at the project sites, a number of previously recorded fossil localities were documented as occurring in areas mapped as being underlain by one or more these rock units near the project sites. Surficial geologic maps of the SLRC SRP sites showing the paleontologic importance of each rock unit are presented in Figures 1-1 (SLRC) and 1-2 (HWSG).

2.3 HWSG Site

Geologic mapping of the HWSG site by Dibblee (1991) indicates that virtually the entire site is underlain by Holocene stream channel deposits, which are composed of unconsolidated sand and gravel. As mapped by Dibblee (1991), the embankment forming the southeastern periphery of the HWSG site north of (below) Forest Lawn Drive and west of Zoo Drive is composed of alluvium. However, an inspection of the embankment during the field survey of the site that was conducted in support of this paleontologic resource inventory indicates that much, if not all, of the embankment actually is composed of quartz diorite, an igneous rock type that also is exposed extensively along and above the southern side of Forest Lawn Drive.

2.3.1 Quartz Diorite

Because of its origin from a molten state deep in the earth's crust, the quartz diorite is unfossiliferous and of no paleontologic importance.

2.3.2 Stream Channel Deposits

At and near the surface, the stream channel deposits probably are too young to contain remains old enough to be considered fossilized. Moreover, the deposits possibly are too coarse grained to contain any fossil remains. For these reasons, the stream channel deposits are considered to be of only low paleontologic importance because there probably is only a low potential for scientifically highly important fossil remains being encountered by earth-moving activities at previously unrecorded fossil localities.

2.4 SLRC

Geologic mapping of the SLRC by Dibblee (1991) indicates that the site periphery is underlain by two late Cenozoic rock units, including the sandstone facies of the middle to late Miocene marine Monterey Formation (lower [member of] Modelo Formation of earlier workers in Santa Monica Mountains) and late Pleistocene to Holocene alluvium, while the dam is composed of historic artificial fill. The sandstone facies of the Monterey Formation consists mostly of light gray, semi-friable sandstone layers interbedded with thin layers of micaceous silty clay shale that constitute the Elysian submarine fan, while the alluvium is made up of clay, sand, and gravel (Dibblee, 1991), and the artificial fill is composed of sediments and debris substantially disturbed by human activity.

Boring for the trunk line will pass through the Monterey Formation and possibly alluvium. Excavation for the northern jacking pit, the flow meter, and the receiving pit will encounter alluvium, but also might encounter the Monterey Formation at depth. Excavation for the southern jacking pit and the regulator station will encounter artificial fill, but also might encounter alluvium and/or the Monterey Formation at depth.

2.4.1 Monterey Formation

Although no previously recorded fossil locality is reported as occurring in the sandstone facies of the Monterey Formation at the SLRC, fossilized skeletons representing extinct species of marine fishes were recovered at previously recorded fossil localities in this rock unit approximately 1.2 to 2.2 miles southeast of the SLRC in Elysian Park (LACMVP locality 4967; David, 1943) and approximately 2.5 miles east of the SLRC on the southwestern side of Mount Washington (LACMVP locality 3320). In the Santa Monica Mountains, the lower (member of the) Modelo Formation has yielded fish scales and skeletons, as well as fossilized tests representing extinct species of benthic marine foraminifers (shelled amoebae) assignable to the Mohnian Benthic Foraminiferal Stage (Hoots, 1931; David, 1943; Pierce, 1956; see Blake, 1991).

The occurrence of a number of previously recorded fossil localities near the SLRC suggests that there is a high potential for additional similar, scientifically important fossil remains being encountered by earth-moving activities in the sandstone facies of the Monterey Formation, particularly in the clay shale layers. Identifiable fossil remains recovered from the sandstone facies at the SLRC would be particularly important if they represented a new or rare species; geologic (temporal) and/or geographic range extension; new taxonomic record for the formation; age-diagnostic and/or environmentally sensitive species; and/or a skeletal element different from, or a specimen more complete than those now available for its respective species. There is a potential for encountering remains representing species rarely if ever recorded from the sandstone facies at or in the vicinity of the SLRC. The recovery of remains representing age-diagnostic species would be critical in refining or corroborating previous estimates for the age of the sandstone facies. The recovery of remains representing environmentally sensitive species would be critical in paleoenvironmental reconstruction. Moreover, the remains would contribute to a more comprehensive documentation of the diversity of marine life that existed at and near the SLRC during the middle to late Miocene Epoch. Finally, marine vertebrate remains also are scientifically highly important because such remains are comparatively rare in the fossil record. For these reasons, the sandstone facies of the Monterey Formation is considered to be of high paleontologic importance.

2.4.2 Alluvium

At and near the surface, the alluvium probably is too young to contain remains old enough to be considered fossilized. For this reason, the alluvium is considered to be of only low paleontologic importance at shallower depths because there probably is only a low potential for scientifically highly important fossil remains being encountered by earth-moving activities at previously unrecorded fossil localities at depths less than 5 feet below grade in the alluvium.

However, the alluvium has yielded a diversity of fossilized remains, including the shells of fresh-water snails and clams and land snail shells, fresh-water ostracod (bivalved crustacean) valves, continental vertebrate bones and teeth, and the wood (including logs) and pollen of land plants, all of which were recovered at a number of fossil localities in the alluvium at depths approximately 45 to 60 feet below grade in the Metro Red Line Universal City station excavation as a result of a paleontologic monitoring program, the wood having been determined to be 7,850 to 10,500 years (early Holocene) in age on the basis of carbon-14 dating analysis (Lander, 2000). Additional fossilized wood was recovered from the alluvium at a depth 16 feet below grade at the Metro Red Line North Hollywood station site (Lander, 2000). Fossilized wood and pollen also were recovered from the alluvium at a depths up to approximately 22 feet below grade at several localities in the Metropolitan Water District of Southern California headquarters facility excavation at Union Station as a result of a paleontologic monitoring program, the wood having been determined to be 5,020 years (middle Holocene) in age on the basis of carbon-14 dating analysis (Lander, 1997).

The occurrence of a number of previously recorded fossil localities near the SLRC suggests that there is a high potential for additional similar, scientifically important fossil remains being encountered at depth by earth-moving activities at previously unrecorded fossil localities in the alluvium. Identifiable fossil remains recovered from this rock unit at the SLRC would be particularly important if they represented a new or rare species; geologic (temporal) and/or geographic range extension; new taxonomic record for the rock unit; age-diagnostic and/or environmentally sensitive species; and/or a skeletal element different from, or a specimen more complete than those now available for its respective species. There is a potential for encountering remains representing species rarely if ever recorded from the rock unit at or in the vicinity of the SLRC. The recovery of remains representing age-diagnostic species or whose age can be determined by carbon-14 dating analysis would be critical in refining or corroborating previous estimates for the age of the rock unit. The recovery of remains representing environmentally sensitive species would be critical in paleoenvironmental reconstruction. Moreover, the remains would contribute to a more comprehensive documentation of the diversity of life that existed at and near the SLRC during the earlier part of the Holocene Epoch. Finally, continental vertebrate and invertebrate and land plant remains also are scientifically highly important because such remains are comparatively rare in the fossil record. For these reasons, the alluvium is considered to be of high paleontologic importance at depths greater than 5 feet below grade.

2.4.3 Artificial Fill

Artificial fill is of no paleontologic importance because it consists of historic sediment substantially disturbed by human activity. Fossil remains in artificial fill lack associated data regarding their geologic or geographic provenance.

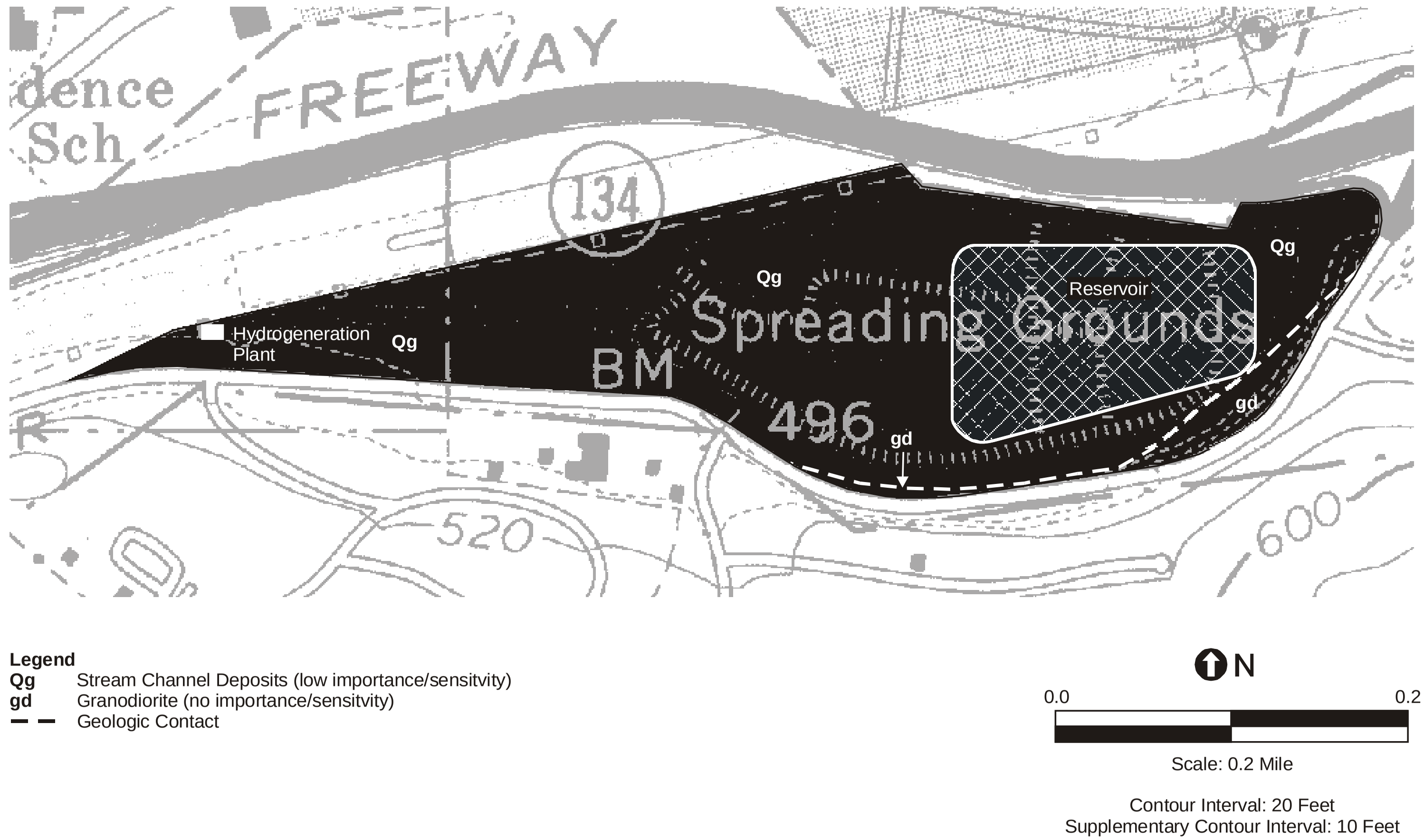
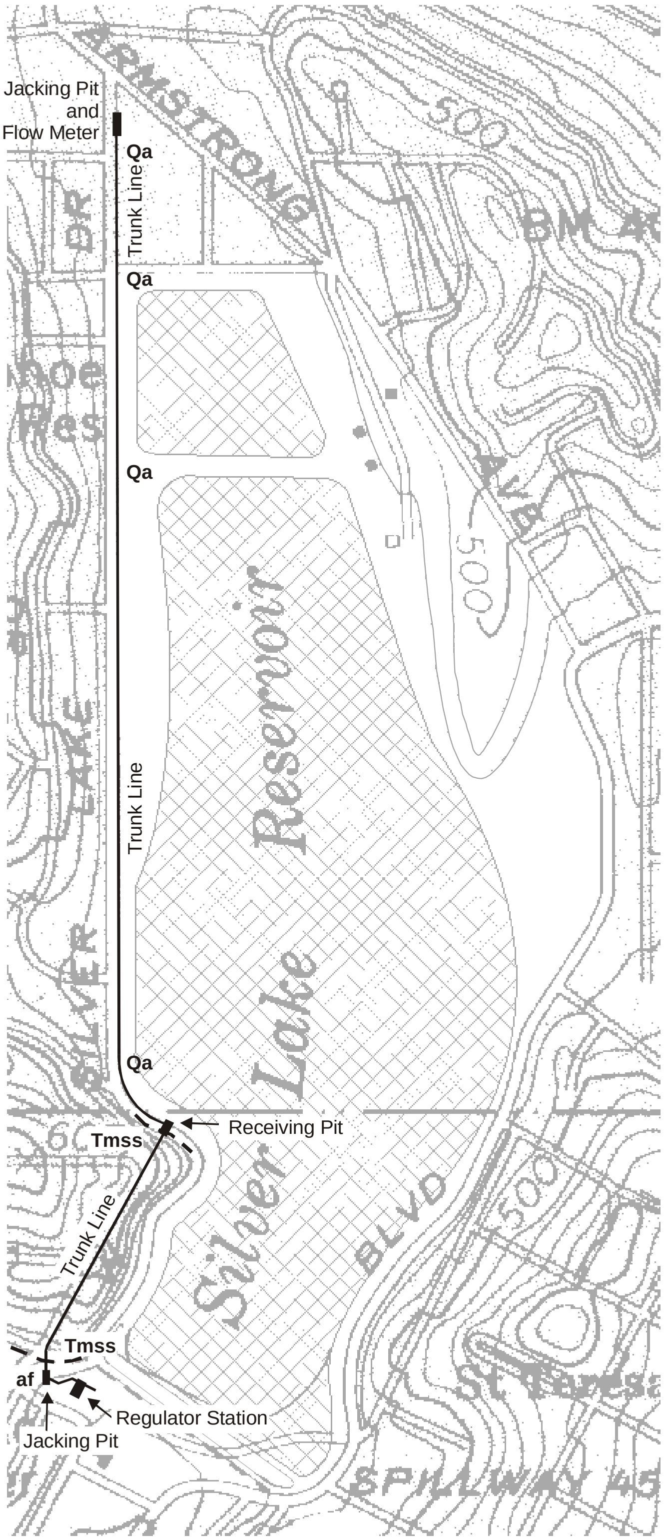


Figure 1-1
SLRC SRP
Paleontologic Resource Assessment and Impact Sensitivity Map of HWSG Site

SOURCE: Modified from Dibblee (1991)

silver lake.cdr-1G/1A, 250/4



Legend

af Artificial Fill (no importance/sensitvity)

Qa Alluvium (low importance/sensitvity at/near surface, high importance/sensitvity at depth)

Tmss Monterey Formation, Sandstone Facies (high importance/sensitvity)

Geologic Contact

N

0.0 0.2

Scale: 0.2 Mile

Contour Interval: 20 Feet
Supplementary Contour Interval: 10 Feet

Figure 1-2
SLRC SRP
Paleontologic Resource Assessment and Impact Sensitivity Map of SLRC

SOURCE: Dibblee (1991)

silver lake.cdr-1G/1A, 250/4

3.0 Environmental Impacts

3.1 Standards of Significance

Paleontologic resources, including fossil remains and fossil localities; associated specimen data and corresponding geologic and geographic site data, could be adversely affected by (i.e., would be sensitive to) the significant direct and indirect environmental impacts resulting from earth-moving activities associated with the SLRC SRP.

Direct impacts would result mostly from earth-moving activities in previously undisturbed strata. Although earth-moving activities would be comparatively short term, the possible accompanying loss of some fossil remains, unrecorded fossil localities, associated specimen data and corresponding geologic and geographic site data, and fossil-bearing strata is a potentially significant long-term adverse environmental impact.

Easier access to fresh exposures of fossiliferous strata or to excavated debris, and the accompanying potential for unauthorized fossil collecting by construction personnel, rock hounds, and amateur and commercial fossil collectors might result in the loss of some additional fossil remains, unrecorded fossil localities, and associated specimen data and corresponding geologic and geographic site data. The loss of these paleontologic resources is another potentially significant long-term environmental impact.

The paleontologic significance (high, low, none) of the potential adverse impacts of earth-moving activities on the paleontologic resources of each rock unit at the SLRC SRP sites was assessed. This assessment was conducted in compliance with SVP (1995) guidelines for assessing the significance of construction-related adverse environmental impacts on paleontologic resources, or the paleontologic sensitivity of a particular rock unit to adverse impacts. The assessment reflects the paleontologic importance/impact sensitivity of the rock unit, which, in turn, primarily reflects the potential for fossil remains and fossil localities being encountered by these activities. Any impact on a fossil locality and the fossil-bearing layer would be considered significant paleontologically, regardless of the paleontologic importance of the rock unit in which the locality and layer occur. A paleontologic resource impact sensitivity assessment of the SLRC SRP sites is presented below and on the surficial geologic maps of the project sites that are presented as Figures 1-1 and 1-2.

3.2 HWSG Site

3.2.1 Construction/Short-term Impacts

Construction impacts on the paleontologic resources of the HWSG site would result mostly from excavation for the reservoir in the stream channel deposits, but also from excavation for valves and any other subsurface facility that might occur in these deposits. However, any such impact on paleontologic resources probably would be of low significance because the stream channel deposits probably are too coarse grained to contain fossil remains and, at and near the surface, probably are to young to contain remains old enough to be considered fossilized.

There would be no impact on paleontologic resources if earth-moving activities encountered unfossiliferous quartz diorite.

3.2.2 Operation/Maintenance/Long-term Impacts

There would be no adverse environmental impact on paleontologic resources resulting from operation or maintenance at the HWSG site if there were no earth-moving activity.

3.3 SLRC

3.3.1 Construction/Short-term Impacts

Construction impacts on the paleontologic resources of the SLRC would result mostly from boring for the trunk line, but also from excavation for the jacking and receiving pits, the regulator station, and the flow meter. Any impact on the paleontologic resources of the Monterey Formation as a result of boring for the trunk line and, if to a depth sufficient to encounter this formation below any alluvium or artificial fill, excavation for the jacking and receiving pits, flow meter, and regulator station, and would be of high significance because of the high potential for fossil remains being encountered by these activities.

At depths less than 5 feet below grade, any impact on the paleontologic resources of the alluvium as a result of excavation for the receiving and northern jacking pits and the flow meter would be of low significance because, at and near the surface, the alluvium probably is to young to contain remains old enough to be considered fossilized. However, at depths greater than 5 feet below grade, the impact of excavation for these structures and, if to a depth sufficient to encounter this rock unit below any artificial fill, for the southern jacking pit and the regulator station, would be of high significance because of the high potential for encountering remains old enough to be considered fossilized.

There would be no impact on paleontologic resources as a result of excavation for the southern jacking pit and the regulator station if this activity encountered only unfossiliferous artificial fill.

3.3.2 Operation/Maintenance/Long-term Impacts

There would be no adverse environmental impact on paleontologic resources resulting from operation or maintenance at the SLRC if there were no earth-moving activity.

4.0 Mitigation Measures

The following measures constitute a monitoring program that, if implemented, would mitigate environmental impacts on paleontologic resources that would accompany earth-moving activities associated with the SLRC SRP. The program would be supervised by a qualified vertebrate paleontologist approved by the LADWP, and would allow for the recovery of some of the fossil remains that might be encountered by these earth-moving activities, and for the recording of associated specimen data and corresponding geologic and geographic site data; their preservation at the LACMVP; and their availability for future study by qualified scientific investigators. Identifiable fossil remains would provide a more comprehensive paleontologic resource inventory of the project sites and their vicinities than now is available or would have been available without the project. Without mitigation, any such specimens and data would be lost to the earth-moving activities and to unauthorized fossil collecting. Specimen and data recovery would be a beneficial effect of the SLRC SRP and would be allowed under CEQA Appendix G (5.c). The monitoring program would be conducted in compliance with LADWP environmental guidelines and SVP (1995, 1996) standard guidelines for mitigating adverse construction-related impacts on paleontologic resources, and with LACMVP requirements for the acceptance of a monitoring program fossil collection.

Mitigation will include the following measures.

- Earth-moving activities that have a potential for disturbing previously undisturbed strata identified as being paleontologically important will be monitored by a paleontologic construction monitor. If fossil remains are encountered, they will be recovered, along with associated specimen data and corresponding geologic and geographic site data. The level of monitoring will reflect the paleontologic importance/ impact sensitivity of the rock unit underlying the area of disturbance and the type of earth-moving activity (see Figures 1-1, 1-2).
- If fine-grained strata with a potential for containing microfossils or small fossil remains are encountered, rock/sediment samples will be collected and processed to allow for the recovery of these fossil remains.
- If necessary, earth-moving activities will be diverted temporarily around a fossil/sampling locality until the fossil remains/sample has been removed.
- If warranted, rock/sediment or fossil samples will be submitted to commercial laboratories for microfossil and pollen identification, or radiometric dating analysis.
- Recovered fossil remains will be prepared to the point of identification, identified by knowledgeable paleontologists, curated, catalogued with LACMVP fossil specimen and locality numbers, and transferred to the LACMVP for permanent storage.
- A final technical report of results and findings will be prepared by the paleontologist.

4.1 HWSG Site

4.1.1 Construction/Short-term

No monitoring will be conducted in any area underlain by granodiorite.

Monitoring will be conducted on a spot-check basis once excavation for the reservoir and any ancillary facility has reached a depth 5 feet below grade in the stream channel deposits. If fossil remains are encountered by excavation, the monitoring level will be increased to half time.

4.1.2 Operation/Maintenance/Long-term

No mitigation measure would be necessary if there were no earth-moving activity associated with operation or maintenance at the HWSG site.

4.2 SLRC

4.2.1 Construction/Short-term

Monitoring will be conducted on a full-time basis once excavation for the northern jacking pit, the flow meter, and the receiving pit has reached a depth 5 feet below grade in the alluvium.

Inspection of debris generated by boring for the trunk line will be conducted on a half-time basis. If fossil remains are encountered by boring, the inspection level will be increased to full time.

Monitoring will be conducted on a full-time basis if excavation for the southern jacking pit and the regulator station encounter alluvium or the Monterey Formation below the artificial fill.

4.2.2 Operation/Maintenance/Long-term

No mitigation measure would be necessary if there were no earth-moving activity associated with operation or maintenance at the SLRC.

5.0 Acronyms

CEQA	California Environmental Quality Act
HWSG	headworks spreading grounds
LACMVP	Natural History Museum of Los Angeles County Vertebrate Paleontology Department
LADWP	Los Angeles Department of Water and Power
PEAI	Paleo Environmental Associates, Inc.
SVP	Society of Vertebrate Paleontology
SLRC	Silver Lake Reservoir Complex
SRP	Storage Replacement Project

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Appendix A
SVP Guidelines (1995)

ASSESSMENT AND MITIGATION OF ADVERSE IMPACTS TO NONRENEWABLE PALEONTOLOGIC RESOURCES: STANDARD GUIDELINES

Robert E. Reynolds, Chairman
Conformable Impact Mitigation Guidelines Committee

Society of Vertebrate Paleontology
News Bulletin
Number 163

January 1995

INTRODUCTION

Vertebrate fossils are significant nonrenewable paleontologic resources that are afforded protection by federal, state, and local environmental laws and guidelines. The potential for destruction or degradation by construction impacts to paleontologic resources on public lands (federal, state, county, or municipal) and land selected for development under the jurisdiction of various governmental planning agencies is recognized. Protection of paleontologic resources includes: (a) assessment of the potential for property to contain significant nonrenewable paleontologic resources which might be directly or indirectly impacted, damaged, or destroyed by development, and (b) formulation and implementation of measures to mitigate adverse impacts, including permanent preservation of the site and/or permanent preservation of salvaged materials in established institutions. Decisions regarding the intensity of the Paleontological Resource Impact Mitigation Program (PRIMP) will be made by the Project Paleontologist on the basis of the paleontologic resources, not on the ability of an applicant to fund the project.

ASSESSMENT OF THE PALEONTOLOGICAL POTENTIAL OF ROCK UNITS

Sedimentary rock units may be described as having (a) high (or known) potential for containing significant nonrenewable paleontologic resources, (b) low potential for containing nonrenewable paleontologic resources, or (c) undetermined potential.

It is extremely important to distinguish between archaeological and paleontological (= fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontologic sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontologic potential in each case. Paleontologists can thus develop maps which suggest sensitive areas and units that are likely to contain paleontological resources. These maps form the bases for preliminary planning decisions. Lead agency evaluation of a project relative to paleontologic sensitivity maps should trigger a “request for opinion" from a state paleontologic clearing house or an accredited institution with an established paleontological repository.

The determination of a site's (or rock unit's) degree of paleontological potential is first founded on a review of pertinent geological and paleontological literature and on locality records of specimens deposited in institutions. This preliminary review may suggest particular areas of known high potential. If an area of high potential cannot be delimited from the literature search and specimen records, a surface survey will determine the fossiliferous potential and extent of the sedimentary units within a specific project. The field survey may extend outside the defined project to areas where rock units are better exposed. If an area is determined to have a high potential for containing paleontologic resources, a program to mitigate impacts is developed. In areas of high sensitivity, a pre-excavation survey prior to excavation is recommended to locate surface concentrations of fossils which might need special salvage methods.

The sensitivity of rock units in which fossils occur may be divided into three operational categories.

I. HIGH POTENTIAL. Rock units from which vertebrate or significant invertebrate fossils or significant suites of plant fossils have been recovered are considered to have a high potential for containing significant non-renewable fossiliferous resources. These units include, but are not limited to, sedimentary formations and some volcanic formations which contain significant nonrenewable paleontologic resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical, and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas which contain potentially datable organic remains older than Recent, including deposits associated with nests or middens, and areas which may contain new vertebrate deposits, traces, or trackways are also classified as significant.

II. UNDETERMINED POTENTIAL. Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials. Field surveys by a qualified vertebrate paleontologist to specifically determine the potentials of the rock units are required before programs of impact mitigation for such areas may be developed.

III. LOW POTENTIAL. Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections. These deposits generally will not require protection or salvage operations.

MEASURES TO MITIGATE ADVERSE IMPACTS RESULTING FROM DEVELOPMENT

Measures for adequate protection or salvage of significant nonrenewable paleontologic resources are applied to areas determined to have a high potential for containing significant fossils. Specific mitigation measures generally need not be developed for areas of low paleontological potential. Developers and contractors should be made aware, however, that it is necessary to contact a qualified paleontologist if fossils are unearthed in the course of excavation. The paleontologist will then salvage the fossils and assess the necessity for further mitigation measures, if applicable.

Areas of High Potential.

In areas determined to have a high potential for significant paleontologic resources, an adequate program for mitigating the impact of development should include:

(1) a preliminary survey and surface salvage prior to construction;

(2) monitoring and salvage during excavation;

(3) preparation, including screen washing to recover small specimens (if applicable), and specimen preparation to a point of stabilization and identification;

(4) identification, cataloging, curation, and storage; and

(5) a final report of the finds and their significance after all operations are complete.

All phases of mitigation are supervised by a professional paleontologist who maintains the necessary paleontologic collecting permits and repository agreements. The Lead Agency assures compliance with the measures developed to mitigate impacts of excavation during the initial assessment. To assure compliance from the start of the project, a statement that confirms the site's potential sensitivity, confirms the repository agreement with an established institution, and describes the program for impact mitigation, should be deposited with the Lead Agency and contractors before work begins. The program will be reviewed and accepted by the Lead Agency's designated vertebrate paleontologist. If a mitigation program is initiated early during the course of project planning, construction delays due to paleontologic salvage activities can be minimized or avoided.

RECOMMENDED GENERAL GUIDELINES

These guidelines are designed to apply to areas of high paleontologic potential.

Assessment Before Construction Starts.

Preconstruction assessment will develop an adequate program of mitigation. This may include a field survey to delimit the specific boundaries of sensitive areas and pre-excavation meetings with contractors and developers. In some cases it may be necessary to conduct field survey and/or a salvage program prior to grading to prevent damage to known resources and to avoid delays to construction schedules. Such a program may involve surface collection and/or quarry excavations. A review of the initial assessment and proposed mitigation program by the Lead Agency before operations begin will confirm the adequacy of the proposed program.

Adequate Monitoring.

An excavation project will retain a qualified project paleontologist. In areas of known high potential, the project paleontologist may designate a paleontologic monitor to be present during 100% of the earth-moving activities. If, after 50% of the grading is completed, it can be demonstrated that the level of monitoring should be reduced, the project paleontologist may so amend the mitigation program.

Paleontologists who monitor excavations must be qualified and experienced in salvaging fossils and authorized to temporarily divert equipment while removing fossils.

They should be properly equipped with tools and supplies to allow rapid removal of specimens.

Provision should be made for additional assistants to monitor or help in removing large or abundant fossils to reduce potential delays to excavation schedules. If many pieces of heavy equipment are in use simultaneously but at diverse locations, each location may be individually monitored.

Macrofossil Salvage.

Many specimens recovered from paleontological excavations are easily visible to the eye and large enough to be easily recognized and removed. Some may be fragile and require hardening before moving. Others may require encasing within a plaster jacket for later preparation and conservation in a laboratory. Occasionally specimens encompass all or much of a skeleton and will require moving either as a whole or in blocks for eventual preparation. Such specimens require time to excavate and strengthen before removal and the patience and understanding of the contractor to recover the specimens properly. It is thus important that the contractors and developers are fully aware of the importance and fragility of fossils for their recovery to be undertaken with the optimum chances of successful extraction. The monitor must be empowered to temporarily halt or redirect the excavation equipment away from the fossils to be salvaged.

Microfossil Salvage.

Many significant vertebrate fossils (e.g., small mammal, bird, reptile, or fish remains) are too small to be visible within the sedimentary matrix. Fine-grained sedimentary horizons and paleosols most often contain such fossils. They are recovered through concentration by screen washing. If the sediments are fossiliferous, bulk samples are taken for later processing to recover any fossils. An adequate sample comprises 12 cubic meters (6,000 lbs or 2,500 kg) of matrix for each site horizon or paleosol, or as determined by the supervising paleontologist. The uniqueness of the recovered fossils may dictate salvage of larger amounts. To avoid construction delays, samples of matrix should be removed from the site and processed elsewhere.

Preservation of Samples.

Oriented samples must be preserved for paleomagnetic analysis. Samples of fine matrices should be obtained and stored for pollen analysis. Other matrix samples may be retained with the samples for potential analysis by later workers, for clast source analysis, as a witness to the source rock unit and possibly for procedures that are not yet envisioned.

Preparation.

Recovered specimens are prepared for identification (not exhibition) and stabilized. Sedimentary matrix with microfossils is screen washed and sorted to identify the contained fossils. Removal of excess matrix during the preparation process reduces storage space.

Identification.

Specimens are identified by competent qualified specialists to a point of maximum specificity. Ideally, identification is of individual specimens to element, genus, and species.

Batch identification and batch numbering (e.g., "mammals, 75 specimens") should be avoided.

Analysis.

Specimens may be analyzed by stratigraphic occurrence, and by size, taxa, or taphonomic conditions. This results in a faunal list, a stratigraphic distribution of taxa, or evolutionary, ecological, or depositional deductions.

Storage.

Adequate storage in a recognized repository institution for the recovered specimens is an essential goal of the program. Specimens will be cataloged and a complete list will be prepared of specimens introduced into the collections of a repository by the curator of the museum or university. Adequate storage includes curation of individual specimens into the collections of a recognized, nonprofit paleontologic specimen repository with a permanent curator, such as a museum or a university. A complete set of field notes, geologic maps, and stratigraphic sections accompany the fossil collections. Specimens are stored in a fashion that allows retrieval of specific, individual specimens by researchers in the future.

Site Protection.

In exceptional instances the process of construction may reveal a fossil occurrence of such importance that salvage or removal is unacceptable to all concerned parties. In such cases, the design concept may be modified to protect and exhibit the occurrence with the project's design, e.g., as an exhibit in a basement mall. Under such circumstances, the site may be declared and dedicated as a protected resource of public value. Associated fragments recovered from such a site will be placed in an approved institutional repository.

Final Report.

A report is prepared by the project paleontologist including a summary of the field and laboratory methods, site geology and stratigraphy, faunal list, and a brief statement of the significance and relationship of the site to similar fossil localities. A complete set of field notes geological maps, stratigraphic sections, and a list of identified specimens accompany the report. The report is finalized only after all aspects of the program are completed. The Final Report together with its accompanying documents constitute the goals of a mitigation project. Full copies of the Final Report are deposited with the Lead Agency and the repository institution.

Compliance.

The Lead Agency assures compliance with measures to protect fossil resources from the beginning of the project by:

(1) requesting an assessment and program for impact mitigation which includes salvage and protection during the initial planning phases,

(2) by arranging for recovered specimens to be housed in an institutional paleontologic repository, and

(3) by requiring the Final Report.

The supervising paleontologist is responsible for:

(1) assessment and development of the program for impact mitigation during initial planning phases,

(2) the repository agreement,

(3) the adequacy and execution of the mitigation measures, and

(4) the Final Report.

Acceptance of the Final Report for the project by the Lead Agency signifies completion of the program of mitigation for the project. Review of the Final Report by a vertebrate paleontologist designated by the Lead Agency will establish the effectiveness of the program and adequacy of the report. Inadequate performances in either field comprise noncompliance, and may result in the Lead Agency removing the paleontologist from its list of qualified consultants.

DEFINITIONS

A QUALIFIED VERTEBRATE PALEONTOLOGIST is a practicing scientist who is recognized in the paleontologic community and is proficient in vertebrate paleontology, as demonstrated by:

(1) institutional affiliations or appropriate credentials,
(2) ability to recognize and recover vertebrate fossils in the field,
(3) local geological and biostratigraphic expertise,
(4) proficiency in identifying vertebrate fossils, and
(5) publications in scientific journals.

A PALEONTOLOGICAL REPOSITORY is a publicly supported, not-for-profit museum or university employing a permanent curator responsible for paleontological records and materials. Such an institution assigns accession and catalog numbers to individual specimens which are stored and conserved to ensure their preservation under adequate security and climate control. The repository will also retain site lists of recovered specimens, and any associated field notes, maps, diagrams, or associated data. It makes its collections of cataloged specimens available to researchers.

SIGNIFICANT NONRENEWABLE PALEONTOLOGIC RESOURCES are fossils and fossiliferous deposits here restricted to vertebrate fossils and their taphonomic and associated environmental indicators. This definition excludes invertebrate or botanical fossils except when present within a given vertebrate assemblage. Certain plant and invertebrate fossils or assemblages may be defined as significant by a project paleontologist, local paleontologist, specialists, or special interest groups, or by Lead Agencies or local governments.

A SIGNIFICANT FOSSILIFEROUS DEPOSIT is a rock unit or formation which contains significant nonrenewable paleontologic resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals, e.g., trackways, or nests and middens which provide datable material and climatic information). Paleontologic resources are considered to be older than recorded history and/or older than 5,000 years BP.

A LEAD AGENCY is the agency responsible for addressing impacts to nonrenewable resources that a specific project might generate.

PALEONTOLOGIC POTENTIAL is the potential for the presence of significant nonrenewable paleontological resources. All sedimentary rocks, some volcanic rocks, and some metamorphic rocks have potential for the presence of significant nonrenewable paleontologic resources. Review of available literature may further refine the potential of each rock unit, formation, or facies.

PALEONTOLOGIC SENSITIVITY is determined only after a field survey of the rock unit in conjunction with a review of available literature and paleontologic locality records. In cases where no subsurface data are available, sensitivity may be determined by subsurface excavation.

Addendum to the Paleontologic Resources Inventory/Impact Assessment for the Silver Lake Reservoir Complex Storage Replacement Project

Introduction

This Technical Memorandum is an addendum to the *Paleontologic Resources Inventory/ Impact Assessment for the Silver Lake Reservoir Complex Storage Replacement Project* (PRIA) prepared by Dr. E. Bruce Lander of Paleo Environmental Associates, dated May 2004. This PRIA is incorporated herein by reference. This Technical Memorandum was prepared by CH2M HILL's paleontologist, Dr. Geoffrey Spaulding, whose qualifications are listed in Attachment 1.

The purpose of this Addendum is to address additional, recently identified components of the Silver Lake Reservoir Complex (SLRC) Storage Replacement Project (SRP) that have the potential to impact nonrenewable paleontologic resources (fossils). These additional project components were not considered in the PRIA and include:

- Excavation for a proposed pipeline immediately to the east of Ivanhoe Reservoir
- Excavation for cut-and-plug operations at the northeast end of Silver Lake Reservoir
- Trenching along West Silver Lake Drive immediately southwest of the Silver Lake Reservoir for the Regulating Station Trunk Line
- Excavations of two Relief Stations along Silver Lake Boulevard southeast of the SLRC, one at West Silver Lake Drive and the other at London Street

In addition, the removal of Silver Lake and Ivanhoe Reservoirs from service, and the lowering of their water levels during construction, were considered in the context of the potential of this proposed action to affect paleontologic resources.

Stratigraphic and Paleontologic Resource Inventory

The records search and literature review performed for the PRIA extends over a sufficiently broad area to encompass the additional project components listed above. A number of fossil sites has been recorded from the geologic units that are known to underlie, or occur close by, the Project area. These geologic units are listed below.

- The middle to late Miocene Monterey Formation (Dibblee, 1991), a marine sedimentary unit that has yielded scientifically significant fossils elsewhere in the area. The Monterey Formation as used herein includes the Modelo and Puente Formations of other authors. This geologic unit is composed primarily of sandstone with interbedded siltstone and shale.

- Unnamed marine strata of Dibblee (1991) of probable late Miocene age. This unit stratigraphically overlies the Monterey Formation, and is typified by light gray bedded clay shale. It is included in the Modelo Formation by some authors.
- Late Quaternary (Late Pleistocene and Holocene) Alluvium, including channel fill deposits.

Sites within 3 miles of the Project area have yielded the skeletons of fish and marine invertebrates from the marine sedimentary rocks in this area. These marine sediments, therefore, are considered to have High Paleontologic Potential because they are paleontologically productive; and fossils from these units can yield scientifically significant information.

Holocene plant remains, wood, fossil pollen, freshwater mollusks, and the remains of terrestrial vertebrates have been recovered from Quaternary alluvium in the area. Quaternary alluvium, therefore, also is assigned High Paleontologic Potential at depths greater than 5 feet. At and near the surface, the alluvium likely contains remains that are too young to be considered fossil resources; and the surficial component of the Quaternary alluvium in the area, therefore, is considered to have low paleontologic importance.

Other geologic units identified in the immediate Project area have low to no potential to yield fossils and, therefore, have been assigned a correspondingly low paleontologic potential (near-surface channel deposits) or no paleontologic potential (artificial fill).

Environmental Impacts

Potential adverse effects to paleontologic resources are restricted to short-term impacts due to construction-related disturbance of fossiliferous sediments. Long-term impacts from operation and maintenance of these facilities would not occur due to the absence of further activities that would disturb paleontologically sensitive sediments.

The Standards of Significance applied to assess impacts to nonrenewable paleontologic resources are those employed in the PRIA. Potential impacts were assessed by examining geologic maps and cross sections prepared by the City of Los Angeles Department of Water and Power (LADWP, 1978) prior to reconstruction of the Silver Lake Reservoir dam, as well as the local geologic map prepared by Dibblee (1991).

Installation of the Proposed Pipeline East of Ivanhoe Reservoir

This action will result in impacts to Quaternary Alluvium, and possibly to the Monterey Formation at depth. At depths of less than 5 feet below surface, impacts to paleontologic resources would be of low significance because the material would be too young to yield scientifically significant remains. At depths greater than 5 feet, significant impacts would potentially occur from excavation because of the fossiliferous nature of sediments at depth, and the potential to encounter paleontologic resources.

Excavation for Cut-and-Plug Operations, Northeast End of Silver Lake Reservoir

Excavations in this area are expected to encounter only fill. Because they are expected to occur entirely within artificial fill possessing no paleontologic sensitivity, impacts to paleontologic resources are not expected to occur from this activity.

Trenching Along West Silver Lake Drive for the Bypass Pipeline

This area is near the margin of the bedrock ridge that forms the west edge of the arroyo in which the reservoir is situated. Quaternary alluvium occurs here at depth, and below that is the Miocene Monterey Formation. Therefore, excavations below 5 feet depth are expected to have significant impacts to paleontologic resources, if present.

Excavations of the Silver Lake Boulevard Relief Stations

Both of these relief stations will be installed along the pipeline that follows the original course of the arroyo in a generally southwest direction from the Silver Lake Reservoir. Beneath artificial fill, the arroyo contains Quaternary alluvium overlying Miocene marine rocks.

West Silver Lake Drive. Excavations here would, at depths greater than 5 feet, potentially affect Quaternary alluvium with a High Paleontologic Potential. Therefore, impacts to paleontologic resources, if present, would be significant.

London Street. This locality is less than 200 feet west of an outcrop of Dibblee's (1991) "unnamed marine strata" of probable late Miocene age. Quaternary alluvium underlies the proposed construction area, with marine rocks present at a greater, but currently unknown, depth. Excavations to depths greater than 5 feet at this site would potentially result in significant impacts to paleontologic resources, if present.

Mitigation Measures

Implementation of the paleontologic resources monitoring program stipulated in the PRIA would be employed to mitigate impacts on paleontologic resources occurring from the construction of these facilities. Construction-phase monitoring would be supervised by a qualified paleontologist. This monitoring would include the scientific recovery of fossil specimens that may be discovered during the course of excavations and the collection of sediment samples that have the potential to yield microfossils should they be unearthed. Preparation and identification of specimens would precede their curation into the collections of the Los Angeles County Museum of Vertebrate Paleontology. A final technical report on the results and findings would be prepared by the paleontologist at the end of the Project.

References

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Los Angeles Department of Water and Power. 1978. *Silver Lake Reservoir Final Geologic Report.* City of Los Angeles Department of Water and Power, Report AX 211-19.

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Attachment 1

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W. Geoffrey Spaulding

Paleontologic Resources Specialist/Senior Scientist

Education

Ph.D., Geology (Paleobiology), University of Arizona, 1981
M. S., Geology (Palynology & Vertebrate Paleobiology), University of Arizona, 1974
B. A., Anthropology, University of Arizona, 1972
Captain, Signal Corps, U. S. Army Reserve (Retired)

Distinguishing Qualifications

- Specialist Paleontologic Resources Management
- Nationally Recognized Expert in Paleoecology of Western North America
- Specialist in Site Formation Processes, Quaternary Paleobiology, Geoarchaeology, Paleohydrology
- Senior Manager, Environmental Compliance & Permitting

Certifications

- Approved Paleontological Resources Manager by the California Energy Commission, State of California
- Qualifications as Paleontological Resources Expert Witness accepted by the Attorney General of the State of Washington

Relevant Experience

Dr. Spaulding is a senior scientist and paleontologist with CH2M HILL with extensive experience in paleobiology, paleontology, and paleoecology. He also is accomplished in the study of site formation processes, and the age determinations of archaeological and paleontologic sites in the western United States. He has more than three decades of technical experience in the Earth and Life sciences focusing on the deserts of western North America and on California. Representative projects that he has managed in the last 12 years are listed below. Prior to joining private industry, he was on the faculty of the University of Washington, Seattle.

Paleontologic and Cultural Resources Management

Client Task Oversight and Expert Witness Testimony On Paleontologic Resources Sensitivity. Review and develop discovery and mitigation plans, and provide testimony to the Attorney General of the State of Washington. On the paleontologic data potential and impacts to Middle Tertiary age fossil resources in the Columbia Basin, and on potential project-related impacts pursuant to Washington’s Energy Facility Siting and Environmental Certification process, on behalf of Olympic Pipeline Corporation.

Paleontologic Resources Specialist, AES Pacific’s Highgrove Energy Center. Develop a Paleontologic Resources Assessment and prepare appropriate documentation on paleontologic resources for the projects’ Application for Certification before the California Energy Commission. Determine the relative levels of paleontologic sensitivity of Mesozoic through Quaternary rock units in the context of the geological history of the Perris Plain and Riverside area, develop the scope for and direct the field survey, and prepare the resource specific documentation.

Paleontologic Resources Specialist, San Francisco Public Utility Commission's San Francisco Electric Reliability Center. Develop a Paleontologic Resources Assessment and prepare appropriate documentation on paleontologic resources for the projects' Application for Certification before the California Energy Commission. Review the complex literature and determine the relative levels of paleontologic sensitivity for marine and terrestrial sedimentary units rock units in the San Francisco Bay area. Prepare the resource specific documentation including impacts assessment and mitigation measures.

Paleontologic Resources Specialist, Turlock Irrigation District's Walnut Energy Facility. Develop and manage paleontologic resources monitoring and mitigation program for the construction of the Walnut Energy Center south of Modesto, California. Prepare Paleontologic Resources Management and Discovery Plans, the Paleontologic Resources Module of the worker education program, and visual aids for worker education. Direct the recovery of discovered paleontologic resources (Quaternary vertebrate remains), and consult with the California Energy Commission on the adequacy of mitigation efforts. Develop site-specific stratigraphic framework to identify paleontologically sensitive sediments, and to provide client and the CEC with guidance regarding what construction activities need and need not be monitored.

Paleontologic Resources Management Services, Southern California. Perform paleontologic resources assessments, develop management and monitoring plans, review and amend subconsultant scopes of work, and provide audit services to clients for paleontologic resources management work. Multiple contracts for the City of San Diego, the Regional Transportation Commission, Riverside County Transportation Commission, and the Counties of San Diego and Orange. Formations addressed included Quaternary terrestrial and lacustrine units, and Tertiary marine and estuarine sediments.

Paleontologic Resources Assessment and Mitigation Plan Development, McKittrick Tar Pits, central California. Review the extensive literature; develop a resources assessment and preliminary management plan for paleontologic resources in the vicinity of the renowned McKittrick Tar Pits in the Central Valley for a confidential client interested in the development of the oil-rich diatomites and sands of the area.

Duke Energy of North America, Paleontologic Support Services for The Potrero and Contra Costa Applications For Certification. Conduct literature reviews, record searches, and site surveys; and prepare appropriate sections of Applications for Certification according to the format and data requirements of the California Energy Commission. Respond to CEC staff questions and requests for additional data. Provide cost-control strategies to client. In support of the relicensing efforts for two power plants in the Bay Area of California.

Owens Lake Air Quality Mitigation Program, Paleontologic Resources Review and Strategy Development. Review resource assessments and draft mitigation plans on the clients behalf to assure that mitigation measures called for are consistent with the resources that may be found in the project area. Audit of consultant work to assure economy of scale in mitigation requirements.

Kern River Pipeline Cultural and Paleontologic Resources Compliance, California, Nevada, and Utah. Coordination and implementation of cultural resources mitigation and monitoring efforts along a 678-mile pipeline corridor involving up to 160 personnel operating in three states. Consult with state and federal agencies (FERC, Advisory Council on Historic Preservation Bureau of Land Management), and coordinate with client representatives. Direct and participate in state-wide field compliance programs. Participate in and direct technical studies of sites ranging in age from Paleoindian to Formative Periods. Manage the preparation of reports perform the task of senior report editor.

Metropolitan Water District of Southern California, West Valley Lateral and Eastside Reservoir Projects, Cultural and Paleontologic Resources Support Services. Design and conduct archaeobotanical, paleoecological, and paleoclimatic studies in support of paleontologic and cultural resources testing and mitigation programs for a large reservoir development program. Manage and participate in paleobotanical and archaeobotanical research programs; direct subconsultants in palynological investigations. Develop pioneering reconstructions of inland southern California's climatic and ecological history over the last 40,000 years; consider these in the context of regional environmental changes and the archaeological record.

Los Angeles Department of Water and Power, Mead/McCullough - Victorville/Adelanto Transmission Line. Manage cultural and paleontologic resources monitoring and mitigation in conjunction with the construction of a 500 kV power line extending through Nevada and California. Assess levels of significance of paleontologic sites discovered during survey and monitoring, implement mitigation measures for affected sites, manage analyses, prepare reports.

City of Mesquite Cultural and Paleontologic Resource Compliance. Design and manage resource surveys for linear-facilities rights of way and BLM land exchanges. Bureau of Land Management consultation on mitigation and avoidance measures, coordinate data recovery and analyses, and prepare final reports on discovered Pliocene paleontologic sites.

Nellis Air Force Range Three Lakes Valley Archaeological Survey and Subsistence Modeling. Site formation analysis and paleohydrologic modeling and, in cooperation with project archaeologists, the development of an integrated subsistence and site formation model to predict the occurrence and density of prehistoric sites in a large desert valley. Managed the subsequent survey of an approximately 3,000 acre area to test and refine the predictive model, and relate site occurrences to Holocene pluvial climatic events.

Molycorp, Inc., Mountain Pass Mine Cultural Resources Monitoring and Mitigation. Plan for and manage cultural resources surveys and Phase 2 Testing and Evaluations for a large project involving over 30 Archaic to Late Prehistoric archaeological sites within a presently dry lake bed. Develop and implement special studies in geoarchaeology, paleohydrology, and paleoenvironmental reconstruction. Manage biological resources surveys and monitoring in support of a multiyear remediation effort; consult with land management agencies to assure compliance on behalf of the client.

Pacific Gas & Electric, Pit 3,4,5 Project, Cultural Resources Support Services. Archaeobotanical, paleoecological, and paleohydrologic studies in support of cultural resource mitigation efforts in the vicinity of Lake Britton, California. Develop a 7,000-year paleoecological record directly applicable to the study area. Contract and direct subconsultants in the development of a 1,000-year dendrohydrologic reconstruction of the flow of the Middle Pit River. Compare and contract paleoenvironmental and archaeologoical records to determine possible environmental drivers of cultural change.

U.S. Geological Survey Yucca Mountain Site Characterization Studies. Multiple contracts for field and laboratory research, report preparation and review focusing on the timing and magnitude of past hydrologic and climatic changes in the Nevada Test Site, Yucca Mountain, and the Amargosa Desert. Assessment of millennial scale variability of groundwater levels and their potential effect on performance criteria for a high-level nuclear waste repository, as well of geomorphic process affecting paleoenvironmental data.

Yosemite National Park Cultural Resources Management Plan & Research Design. Assist in the preparation of the twenty-year update of the National Park Service's *Archaeological Research Design*. Review, evaluate, and provide a comprehensive summary of research in paleoecology, geoarchaeology, Quaternary geology, and tephrachronology. Prepare chapters on for the *Research Design* for NPS use.

National Academy of Sciences, National Research Council Panel On Coupled Hydrologic, Tectonic, and Hydrothermal Processes. Appointed by the National Academy of Sciences to a three-year tenure as an expert panel member to review research and evaluate evidence for changes in water-table elevation in the vicinity of the proposed Yucca Mountain Nuclear Waste Repository.

Clark County Regional Flood Control District Environmental Services. Prepare NEPA compliance documents; design and implement cultural and paleontologic resources monitoring and mitigation plans. Assess significance of discovered resources, manage excavations, consult with agency and client representatives, and conduct multidisciplinary data recovery. Direct the preparation of public displays of recovered fossils.

Nellis Air Force Range Complex, Rock Art Inventory. Manage and participate in the development and execution of recording of twelve Archaic to Late Prehistoric rock art sites in remote areas of the U.S. Air Force’s Nellis Range. Included in this effort was the contracting and management of specialist subconsultants, development of illustration techniques, and preparation of draft and final reports in consultation with the Base Archaeologist.

Yosemite National Park, Upper Tuolumne Meadows Archaeological Testing and Evaluation Program. Field and laboratory studies, and report preparation, focused on geochronology, tephrachronology, and site formation processes in support of Yosemite National Park’s visitor services expansion program. Identification and characterization of accelerated colluvial depositional processes following volcanic ash fall-out in prehistoric times, and possible effects on human occupation of the area.

Other Representative Projects

California Desert District’s Imperial Sand Dunes Recreation Area Management Plan NEPA Compliance Program. Manage a complex and fast-track NEPA compliance program, direct and participate in the preparation of a Draft Environmental Impact Statement addressing a highly visible and controversial recreational area management measures proposed by the Bureau of Land Management. Direct the final preparation of a Biological

Assessment of the project. Organize and attend public meetings as a client representative, including presenting components of the project to the public on behalf of the BLM.

Reliant Energy Southern Nevada Development Program Environmental Compliance and Permitting Services. Initial services include the performance of fatal flaw analyses for multiple siting options in Clark County, consultations with client representatives and land management agencies; preparation of site-specific cost projections for NEPA, ESA, and NHPA compliance programs, as well as State and local permits and entitlements. Continuing services include coordinating Nevada Power Company/Sierra Pacific Resources and Southwest Gas efforts, scheduling tasks and activities for permitting at different sites, and tracking consultant performance on behalf of the client.

Environmental Compliance Services to Del Webb Corporation. Manage and participate in the preparation of multiple NEPA, NHPA, and ESA compliance documents, consult with agencies, and direct the compliance efforts for a complex land exchange program involving properties throughout the State of Nevada. Provide a wide range of support services including biological and cultural resources assessments, preparation of use plans, and assessments of air quality impacts, municipal budgets, and economic effects.

Apex Heavy Use Industrial Park Environmental Compliance and Permitting Assistance. Consult with agencies and facilitate client interests on critical environmental issues including air quality impacts and water resources. Prepare NEPA compliance documents for a 11,200 acre land sale, and assist subsequent infrastructure development.

IXC-McCullough Liberty Fiber Optics Project, southern Nevada. Manage cultural and biological field operations and coordinate local agency consultation for compliance procedures to facilitate the stringing of a new fiber optics cable.

ENOVA Power Development, El Dorado Energy Facility. Identify environmental constraints, consult on compliance measures, design and manage cultural resources assessments, manage biological resource assessments, and prepare compliance documents for pipelines and transmission lines to service a planned power generation facility.

Hanford Nuclear Reservation Barrier Development Program Peer Review Panel. Reviewing research strategies, team organization, and prototype designs for protective barriers intended for use on high-level and mixed waste repository sites. Reviewing studies of past and potential future environmental change.

U.S. Nuclear Regulatory Commission, Advisory Committee on Nuclear Waste. Preparation of briefing documents, participation in panel meetings, and presentation of oral evaluations of governmental studies on the characterization, data acquisition, and model evaluation of climatic and hydrologic conditions at the proposed Yucca Mountain Nuclear Waste Repository.

Professional History

Environmental Compliance Manager and Senior Scientist, CH2M HILL, Las Vegas, 2001 to present

Manager, Division of Planning and Compliance, URS Corporation, Las Vegas, 2000-2001

Manager, Environmental Services, Dames & Moore, Las Vegas, 1990-2000

Research Professor of Botany, Director of the Laboratory of Arid-lands Paleoecology, Quaternary Research Center, University of Washington, Seattle, 1983-1990

Adjunct Professor, Remote Sensing Laboratory, Department of Geosciences, University of Washington, Seattle, 1985-1990

Post-Doctoral Research Associate, College of Forest Resources, University of Washington, Seattle, 1979-1983

Graduate Research Assistant, Laboratory of Paleoenvironmental Studies, Department of Geosciences, University of Arizona, Tucson, 1974-1978

Countries Worked In

United States, Mexico, Australia

Professional Affiliations

American Association for The Advancement of Science

Selected Publications

2004 - Development of Vegetation in the Central Mojave Desert of California during the Late Quaternary. (with P. A. Koehler and R. S. Anderson). *Palaeogeography, Palaeoclimatology, Palaeoecology* 215:297-311.

2004 – Distribution map of the range for Utah agave (*Agave utahensis*) (with K.L. Cole, W. Hodgeson, and K.A. Thomas). U.S. Geological Survey, Southwest Biological Science Center.

2001 – Ploidy Race Distributions since the Last Glacial Maximum in the North American Desert Shrub, *Larrea tridentata* (with K.L. Hunter, J.L. Betancourt, B.R. Riddle, T.R. Van Devender, and K.L. Cole). *Global Ecology & Biogeography* 10: 521-533.

2000 – A Molecular Analysis of Ground Sloth Diet through the Last Glaciation (with M. Hofreiter, H. N. Poinar, K. Bauer, P.S. Martin, G. Possnert, and S. Paabo). *Molecular Ecology* 9: 1975-1984.

1999 – Middle to Late Quaternary Climatic Changes in Death Valley and Vicinity. In *Proceedings of Conference on Status of Geologic Research and Mapping in Death Valley National Park*. U.S. Geological Survey Open-File Report 99-153, pp. 121-124.

1999 – Environmental Imperatives Reconsidered: Demographic Crises in Western North America During The Medieval Climatic Anomaly (with T. L. Jones, G. M. Brown, L. M. Raab, J. L. McVickar, D. J. Kennett, A. L. York, and P. L. Walker). *Current Anthropology* 40(2): 137-170.

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1996 – Paleobiotic and isotopic analysis of mollusks, fish, and plants from Core OL-92: Indicators for an open or closed lake system (with J. R. Firby, S. E. Sharpe, J. F. Whelan, and G. R. Smith). In *An 800,000-year paleoclimatic record from Owens Lake, California*, edited by G. I. Smith and J. L. Bischoff, pp. 143-160. Geological Society of America Special Paper 317.

1995 – Environmental change, ecosystem responses, and the Late Quaternary development of the Mojave Desert. In *Quaternary Environments and Deep Time: Papers in Honor of Paul S. Martin* (D. S. Steadman and J. I. Mead, eds.), pp 225-256. Fenske Printing, Inc., Rapid City, South Dakota.

1995 – Pika (*Ochotona*) and the Late Quaternary paleoecology of the Great Basin (with J. I. Mead). In *Quaternary Environments and Deep Time: Papers in Honor of Paul S. Martin* (D. S. Steadman and J. I. Mead, eds.), pp 257-283. Fenske Printing, Inc., Rapid City, South Dakota.

1993 – Climatic changes in the western United States since 18,000 yr. B.P. (with R. S. Thompson, C. Whitlock, P. J. Bartlein, and S. P. Harrison) In *Global climates since the last glacial maximum*, edited by H. E. Wright, Jr., J. E. Kutzbach, T. Webb, III, W. F. Ruddiman, F. A. Street-Perott, and P. J. Bartlein, pp. 468-513. University of Minnesota Press, Minneapolis.

1992 – An alternative perspective on Mojave Desert prehistory (with J. H. Cleland). *Society for California Archaeology Newsletter* 26: 1-6.

1992 – *Ground water at Yucca Mountain: How high can it rise?* (with members of the NAS, NRC Panel on Coupled Hydrologic/Tectonic/Hydrothermal Processes at Yucca Mountain). National Academy Press, Washington, D.C.

1992 – Ecological characterization of fossil plants (with S. J. Mazer, T. L. Phillips, R. E. Taggert, and B. H. Tiffney). In *Terrestrial ecosystems through time: Evolutionary paleoecology of terrestrial plants and animals*, edited by A.K. Behrensmeyer *et al.*, pp. 139-180. University of Chicago Press.

1992 – Late Cenozoic terrestrial ecosystems (with R. E. Taggart, J. A. Harris, B. Van Valkenberg, L. D. Martin, J. D. Damuth, and R. Foley). In *Terrestrial ecosystems through time: Evolutionary paleoecology of terrestrial plants and animals*, edited by A. K. Behrensmeyer *et al.*, pp. 419-541. University of Chicago Press.

1992 – Glacial/Interglacial 13C/12C ratios of atmospheric CO2 inferred from carbon in C4 plant cellulose (with B. D. Marino, M. B. McElroy, and R. J. Salawitch). *Nature* 357: 461-466.

1991 – A middle Holocene vegetation record from the Mojave Desert and its paleoclimatic significance. *Quaternary Research* 35: 427-437.

1991 – Pluvial climatic episodes in North America and North Africa: Types and correlation with global climate. *Palaeogeography, Palaeoclimatology, Palaeoecology* 84: 217-227.

1991 – Comparison of pollen and macrofossil based reconstructions of Late Quaternary vegetation in western North America. In *Proceedings of the 7th International Palynological Congress, Brisbane, Australia*, edited by E. M. Truswell and J. A. K. Owen, pp. 359-366. Elsevier, Amsterdam.

1990 – Packrat middens: Their composition and methods of analysis (with K. L. Cole, J. L. Betancourt and L. K. Croft. In *Packrat middens: The last 40,000 years of biotic change*, edited by J. L. Betancourt, P. S. Martin, and T. R. Van Devender, pp. 59-84. University of Arizona Press, Tucson.

1990 – Environments of the last 50,000 years in the vicinity of Yucca Mountain, central-southern Nevada. *High Level Radioactive Waste Management* 2: 1251-1258.

1990 – Vegetation dynamics during the last deglaciation, southeastern Great Basin, U.S.A. *Quaternary Research* 33: 188-203 (1990).

1990 – Vegetational and climatic development of the Mojave Desert: The last glacial maximum to the present. In *Packrat middens: The last 40,000 years of biotic change*, edited by J. L. Betancourt, P. S. Martin, and T. R. Van Devender, pp. 166-199. University of Arizona Press, Tucson.

1988 – Climatic changes of the last 18,000 years: Observations and model simulations (with COHMAP Project Members). *Science* 241: 1043-1052.

1986 – The last pluvial climatic episodes in the deserts of southwestern North America (with L. J. Graumlich). *Nature* 320:441-444.

1985 – *Vegetation and Climates of the last 45,000 years in the vicinity of the Nevada Test Site, south-central Nevada*. U. S. Geological Survey Professional Paper No. 1329.

1983 – Late Wisconsin paleoecology of the American southwest (with E. B. Leopold and T. R. Van Devender). In *The late Pleistocene of the United States*, edited by S.C. Porter, pp. 259-293. University of Minnesota Press, Minneapolis.

1983 – Late Wisconsin macrofossil records of desert vegetation in the American southwest. *Quaternary Research* 19: 256-264.

1979 – Development of vegetation and climate in the western United States (with T. R. Van Devender). *Science* 204: 701-710.

Representative Reports

2002 – *Draft Environmental Impact Statement, Imperial Sand Dunes Recreation Area Management Plan*. Prepared for the U.S. Bureau of land Management, California Desert District.

1999 – *Environmental Assessment Proposed Del Webb Phase II Land Exchange.* Prepared for the Bureau of Land Management, Las Vegas Field Office. Dames & Moore, Las Vegas.

1998 – *Environmental Assessment Proposed Apex Land Sale.* Prepared for the Bureau of Land Management, Las Vegas Field Office. Dames & Moore, Las Vegas.

1998 – *Molycorp. Inc. Mountain Pass Mine Cultural Resources Investigations Testing And Evaluation Report for Three Prehistoric Archaeological Sites Ivanpah Dry Lake, San Bernardino County, California* (with M. C. Robinson and S. Flint). Applied EarthWorks, Hemet, CA & Dames & Moore, Las Vegas, NV.

1998 – *Environmental Assessment Del Webb & Perma Bilt/American Land Conservancy Land Exchanges - Proposed Inclusion of The Marlette Creek/Whittel Estate Property.* Prepared for the Bureau of Land Management, Las Vegas Field Office. Dames & Moore, Las Vegas.

1998 – *Geochronological and Paleoenvironmental Studies of a Latest Pleistocene Mastodon Site on the Perris Plain, Southern California, Final Report.* Prepared for the San Bernardino County Museum, on behalf of the Metropolitan water District of Southern California. Dames & Moore, Las Vegas.

1997 – *Environmental Assessment Del Webb Land Exchange Proposal*. Prepared for the Bureau of Land Management, Las Vegas Field Office. Dames & Moore, Las Vegas.

1996 – Chronostratigraphy and Evidence for Late Quaternary Faulting of the Las Vegas Formation. In *Seismic Hazards in the Las Vegas Region*. Field Trip Guidebook, Association of Engineering Geologists, Southwest Section, Las Vegas.

1996 – *Report of the Recovery and Treatment of Discovered Paleontologic Resources: The Southern Nevada Water Facilities Improvement Project.* Prepared for the Bureau of Land Management, Las Vegas District. Dames & Moore, Las Vegas.

1996 – *The Quaternary Paleoecology and Paleohydrology of the Eastern Mojave Desert* (with Jay Quade). Field Trip Guidebook (co-leader), American Quaternary Association Biennial Meeting and Field Trip, Flagstaff, Arizona.

1996 – *Rock Art Sites on the Nellis Range Complex, Nellis Air Force Base, Nevada* (with A. L. York, R. E. McMullen, and P. deLespinasse). Dames & Moore, Las Vegas.

1995 – *Mead/McCullough - Victorville/Adelanto Transmission Project Paleontologic Resources Post-Construction Compliance Report*. Prepared for Los Angeles Department of Water and Power. Dames & Moore, Santa Barbara.

1995 – *Nellis Air Force Base, Nevada, Archaeological Relocation and Re-recordation Survey, Nellis Range Complex.* Dames & Moore, Las Vegas.

1995 – *Monitoring and Mitigation of Paleontologic Resources in the Right-of-Way of the Mesquite Municipal Landfill Access Road*. Prepared for the Bureau of Land Management, Las Vegas District. Dames & Moore, Las Vegas.

1995 – *Nellis Air Force Base, Nevada, Archaeological relocation and re-recordation survey, Nellis Range Complex*. Dames & Moore, Las Vegas.

1995 – *Archaeological Survey of the Indian Springs Air Force Auxiliary Field, Nellis Air Force Base, Clark County, Nevada*. With R. E. McMullen, A. L. York, P. deLespinasse. Dames & Moore, Las Vegas.

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1995 – *Phase II Archaeological Investigations at Sites 26CK4856, 26CK4864, and 26CK4867 Within the Main Cantonment, Nellis Air Force Base, Clark County, Nevada* (with A. L. York). Dames & Moore, Las Vegas.

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Appendix B
SVP Guidelines (1996)

SOCIETY OF VERTEBRATE PALEONTOLOGY--
CONDITIONS OF RECEIVERSHIP FOR PALEONTOLOGIC SALVAGE COLLECTIONS
[final draft]

Robert E. Reynolds, Chairman
Conformable Impact Mitigation Guidelines Committee

Society of Vertebrate Paleontology
News Bulletin
Number 166

February 1996

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1. The repository museum and its curator maintain the right to accept or refuse the materials.
2. The materials received must fit with the repository museum's mission and policy requirements.
3. All repository arrangements must be made with the curator in advance of receipt. All arrangements for inventory numbers and locality numbers must be made in advance. "Museums are not a dumping ground."
4. The museum will act as the trustee for the specimens. A deed of gift from the land owner or agent must be provided. A loan form or M.O.U. must be prepared for specimens from governmental lands.
5. Specimens must receive discrete locality numbers. Locality data must be to the maximum specificity available and plotted on 7.5 minute topographic maps, and as specific as allowed by stratigraphic collecting and field mapping. The repository may require the repositor to bear the cost of entering locality data into computerized data files.
6. All reports prepared to meet mitigation requirements, field notes, and photographs must be provided at the time of transfer to the repository museum.
7. Specimens must be delivered to the repository fully prepared and stabilized. Standards of stabilization and modern conservation techniques must be established prior to preparation and must be acceptable to the repository institution. Details of stabilizing materials and chemicals must be provided by the repositor. For microvertebrates, this means sorting and mounting. For large specimens, including whales, this means removal of all unnecessary materials and full stabilization. Fossiliferous matrix must be washed and processed. Earth-quake-proofing includes inventory numbers on corks and in vials. In storage, specimens must be insulated or cushioned to protect each from contact or abrasion. Oversized specimens must be stored on shelves or on racks developed to fit existing constraints of the repository museum. The repositor must provide for all nonstandard materials for storage.

8. Specimens must be individually inventoried in accordance with the established system at the repository museum. The specimen inventory must be acceptable to and meet the requirements of the lead agency. Specimens must be identified to element and to maximum reasonable taxonomic specificity. Batch or bulk cataloging must be avoided.
9. Specimens must be cataloged in accord with the repository system so that specimens are retrievable to curators and to researchers. The repository museum may require that the repositor bear the cost of having repository staff catalog specimens into computerized data bases.
10. The repository may require the repositor to bear the cost for completing preparation and stabilization, completing inventory, and completing cataloging.
11. There will be a one-time fee charged by the repository for permanent storage of specimens. This fee will be used to compensate the repository for storage space, cabinets or shelves, access or aisle space, a retrievable catalog system, additional preparation, specimen filing, and labor involved in the above. The repository reserves the right to charge the repositor for unpacking and placement of specimens in approved storage cabinets.

Appendix F
Traffic and Transportation

REVISED DRAFT

TRAFFIC STUDY
FOR THE
SILVER LAKE RESERVOIR COMPLEX
STORAGE REPLACEMENT PROJECT

LOS ANGELES, CALIFORNIA

JULY 2004

PREPARED FOR

CH2M HILL

PREPARED BY

KAKU ASSOCIATES
A Corporation

REVISED DRAFT

TRAFFIC STUDY
FOR THE
SILVER LAKE RESERVOIR COMPLEX
STORAGE REPLACEMENT PROJECT

LOS ANGELES, CALIFORNIA

July 2004

Prepared for:

CH2M HILL

Prepared by:

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I. INTRODUCTION

This report documents the assumptions, methodologies, and findings of a study conducted by Kaku Associates, Inc. to evaluate the potential traffic impacts of the proposed construction of the Silver Lake Reservoir Complex Storage Replacement Project (Project) located in the Silver Lake Community of Los Angeles north of Griffith Park. The study was conducted for the Los Angeles Department of Water and Power (LADWP) as part of the Environmental Impact Report (EIR) for the proposed project.

PROJECT DESCRIPTION

The proposed project would remove the Silver Lake and Ivanhoe Reservoirs from direct service to the LADWP water distribution system. Water storage currently provided by the Silver Lake Reservoir Complex (SLRC) would be replaced by a 110-million-gallon (MG) underground covered storage reservoir at the former Headworks Spreading Grounds (HWSG). The new storage reservoir would be accompanied by a four-megawatt (MW) hydroelectric power generating facility at the HWSG site to capture energy from the water pressure flowing into the reservoir. The addition of a regulating station and a new bypass pipeline would convey water delivery flow to existing service areas and operation of Silver Lake and Ivanhoe Reservoirs as drinking water storage facilities would change. Figure 1 illustrates the locations of the two separate sites in relation to their surrounding street systems.

The SLRC site is located in the community of Silver Lake and consists of LADWP-owned Silver Lake and Ivanhoe Reservoirs and related facilities. It is five miles northwest of downtown Los Angeles. Facilities to be constructed and operated at or near this site include a bypass pipeline and a regulating station. Figure 2 shows the construction site plan for these facilities.
Primary access to the site would be provided at the southwest corner of the property on West Silver Lake Drive near Van Pelt Place. Construction working hours for all activities would be between 7 a.m. to 8 p.m. (schedule is based on 10 hour working day), Monday through Friday.

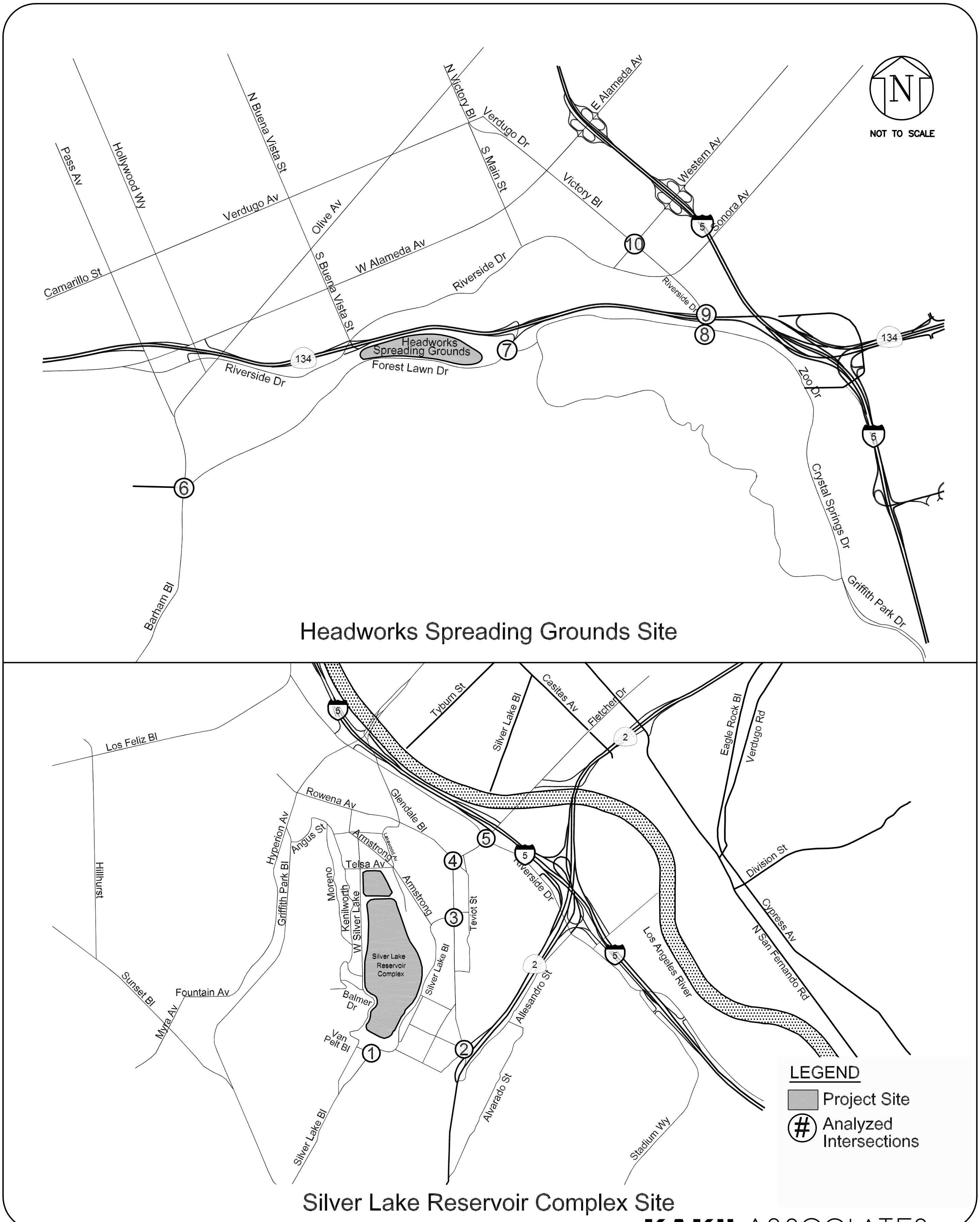

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FIGURE 1
LOCATION OF STUDY AREA & ANALYZED INTERSECTIONS

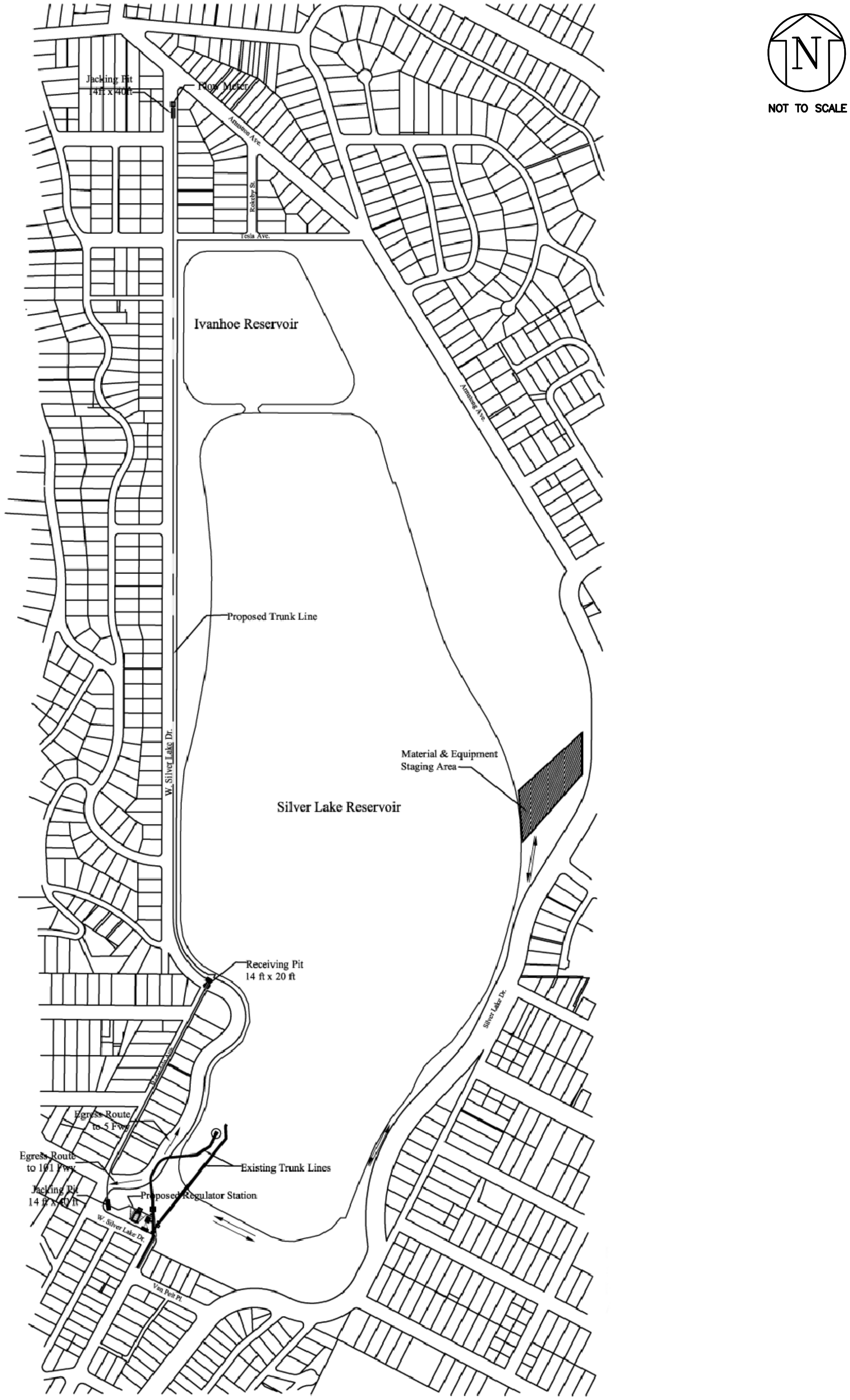

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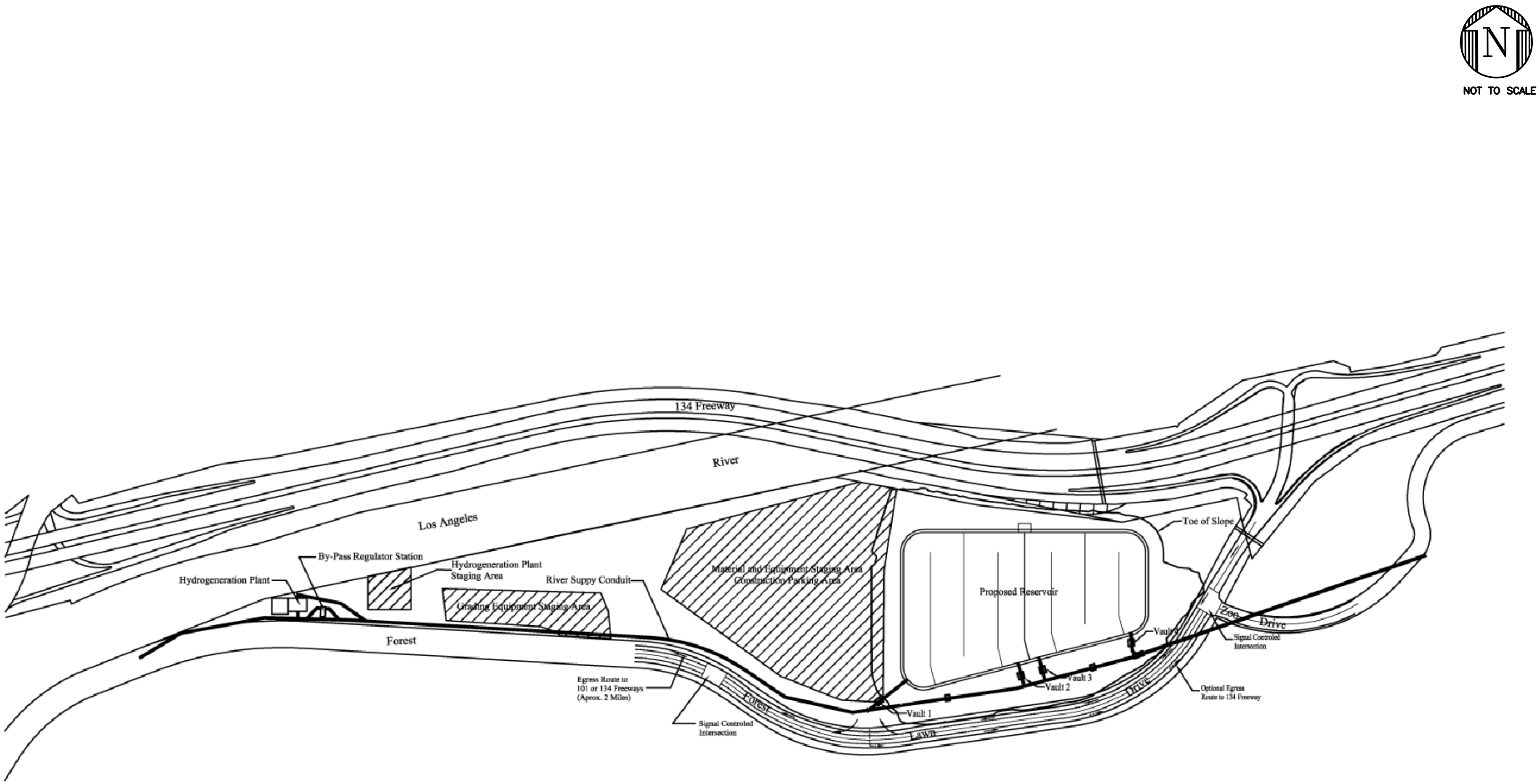
FIGURE 2
SITE PLAN FOR SLRC SITE

Construction of the bypass pipeline and regulating station are not anticipated to overlap. The bypass pipeline would be constructed between May 2007 and April 2009. The proposed construction of regulating station would take place approximately from April through October 2009.

As for the HWSG site, the 43-acre undeveloped site is adjacent to the Los Angeles River and between the City of Burbank and Griffith Park. It is bounded on the north by the Los Angeles River and the 134 Freeway, and on the east and south by Forest Lawn Drive. The property is owned by the City of Los Angeles Department of Recreation and Parks. LADWP retains an easement over the entire property. Facilities to be constructed and operated at this site include a 110-MG underground storage reservoir and a four-MW hydroelectric power generating facility. Figure 3 shows the construction site plan for these facilities. An access road along the southern slope of the reservoir with ingress and egress from Forest Lawn Drive would be constructed to provide access during the bypass pipeline's construction. The central site area would be used for a construction parking area and major material and equipment staging area. Construction activities for the underground storage reservoir would include grading and reservoir site preparation, inlet/outlet and vault construction, construction of the reservoir storage structure and burial of the storage structure. Construction working hours for all activities would be between 7 a.m. to 8 p.m. (schedule is based on 10 hour working day), Monday through Friday. The construction is proposed to begin in January 2007 and end in April 2013.

STUDY SCOPE

The scope of work for this study was developed in conjunction with the City of Los Angeles Department of Transportation (LADOT). The base assumptions and technical methodologies were discussed as part of the study approach. The study, which analyzes the potential project-generated traffic impacts for two separate sites (SLRC and HWSG) on their adjacent street systems, anticipates that the project will be completed by 2013. The analysis of future year traffic forecasts is based on projected conditions in 2013 both with and without the addition of the project traffic. The following traffic scenarios have been developed and analyzed as part of this study:



KAKU ASSOCIATES

FIGURE 3
SITE PLAN FOR HWSG SITE

- Existing (2004) Conditions - The analysis of existing traffic conditions provides a basis for the remainder of the study. The existing conditions analysis includes an assessment of the street system serving the site, traffic volumes, and current operating conditions.

- Cumulative Base (2013) Conditions - Future traffic conditions without the proposed project will be developed for the year 2013. The objective of this analysis is to project the future traffic growth and operating conditions that could be expected from regional growth and related projects in the vicinity of the project site by the year 2013. Although the project would have multiple phases during construction, to be conservative, 2013 was chosen as the future baseline at any phase of the project.

- Cumulative (2013) plus Project Conditions - This traffic scenario provides projected traffic volumes and an assessment of operating conditions under future conditions with the addition of project-generated traffic. The impacts of the proposed project on future traffic operating conditions were then identified.

LADOT has identified a total of ten intersections to be analyzed as part of the scope of work for this project. The first five intersections are located adjacent to the SLRC site while the other five are located adjacent to the HWSG site.

SLRC Study Area

1. Silver Lake Boulevard & Van Pelt Place
2. Glendale Boulevard & State Route 2 southbound off-ramp/Waterloo Street/Fargo Street
3. Glendale Boulevard & Silver Lake Boulevard
4. Glendale Boulevard & Fletcher Drive/Silver Ridge Avenue
5. Fletcher Drive & Riverside Drive

HWSG Study Area

6. Barham Boulevard & Forest Lawn Drive/Lakeside Plaza Drive
7. Forest Lawn Drive & Zoo Drive
8. Riverside Drive & Zoo Drive
9. Riverside Drive & State Route 134 eastbound off-ramp
10. Victory Boulevard & Western Avenue

The locations of these ten study intersections are illustrated in Figure 1.

ORGANIZATION OF REPORT

This report is divided into seven chapters. Chapter I provides an introduction to the study and presents details of the various elements of the study. Chapter II describes the existing conditions in the two separate study areas including an inventory of the streets and highways in the study areas, a summary of traffic volumes, and an assessment of the operating conditions of these streets. The methodologies used to develop traffic forecasts for the cumulative base and cumulative plus project scenarios and the forecasts themselves are included in Chapter III. Chapter IV presents an assessment of the proposed project's potential traffic impacts and Chapter V discusses the proposed mitigation measures. The results of the analysis of the proposed project's impacts on the CMP regional transportation system are provided in Chapter VI. Chapter VII provides the summary of the results. Appendices to this report include details of the technical analysis.

II. EXISTING CONDITIONS

A comprehensive data collection effort was undertaken to develop a detailed description of existing conditions within the study areas for both the SLRC site and the HWSG site. The assessment of conditions relevant to this study includes a description of the two separate study areas, an inventory of the local street systems in the vicinity of both sites, a review of traffic volumes on these facilities, an assessment of the existing operating conditions, and the current transit services in both study areas. A detailed description of these elements is presented in this chapter.

EXISTING STREET SYSTEM

As indicated, the project has two sites (SLRC and HWSG), which are separated by about five miles. The two sites' surrounding street system is described below.

SLRC Site

The proposed construction at the SLRC site would be located west of the Silver Lake Reservoir, which runs along West Silver Lake Drive. As shown in Figure 2, construction would generally take place south of the Silver Lake Reservoir at the southern end of West Silver Lake Drive. In addition, a proposed trunk line would be constructed along West Silver Lake Drive through tunneling with jacking and receiving pits at the end, as shown in the figure. Regional access to the SLRC site is provided by the Golden State Freeway (I-5) and Glendale Freeway (SR-2). The I-5 Freeway runs in a northwest-southeast direction to the northeast of the SLRC site, while the SR-2 runs in a north-south direction to the east of the site.

The major streets that serve the potential SLRC site are Glendale Boulevard, Fletcher Drive, Silver Lake Boulevard, and Hyperion Avenue in the north-south direction, and Riverside Drive, Van Pelt

Place, and Rowena Avenue in the east-west direction. The following is a brief description of the streets that serve the site:

- Glendale Boulevard - Glendale Boulevard is a major north-south arterial. It provides four travel lanes, two lanes in the northbound direction and two lanes in the southbound direction. Glendale Boulevard provides local access to the SLRC site through a connection to Silver Lake Boulevard, while it also provides regional access through a connection to both I-5 and SR-2. The posted speed limit is 35 miles per hour (mph).

- Fletcher Drive - Fletcher Drive is a major north-south arterial. It provides two lanes in the northbound direction and two lanes in the southbound direction. It provides local access and regional access through connections to SR-2. Parking is not allowed on either side of the street within the study area. The posted speed limit is 35 miles per hour.

- West Silver Lake Drive - West Silver Lake Drive is a north-south roadway. It provides two travel lanes (one lane in each direction) and local access to the surrounding residential neighborhood. Parking is allowed on the western portion of the roadway, however, parking is prohibited on the eastern portion along the reservoirs.

- Silver Lake Boulevard - Silver Lake Boulevard is a major north-south arterial. It provides one travel lane in each direction. Silver Lake bends and travels in an east-west direction while connecting to Glendale Boulevard. Silver Lake Boulevard provides direct access to the project site. Parking is limited on both sides of the street within the study area. The posted speed limit is 35 miles per hour.

- Riverside Drive - Riverside Drive is a major north-south arterial. It provides two travel lanes in the northbound direction and two lanes in the southbound direction. Riverside Drive provides local access and regional access through connections to I-5 and SR-2. Parking is limited on both sides of the street within the study area. The posted speed limit is 35 miles per hour.

- Van Pelt Place - Van Pelt Place is an east-west roadway. It provides one travel lane in each direction. Van Pelt Place provides direct access to the SLRC site. Parking is allowed on both sides of the street within the study area. The posted speed limit is 25 miles per hour.

- Rowena Avenue - Rowena Avenue is a secondary east-west arterial. It provides two travel lanes in the eastbound direction and two lanes in the westbound direction. Rowena Avenue provides local access to the SLRC site. Parking is allowed on both sides of the street within the study area. The posted speed limit is 35 miles per hour.

- Hyperion Avenue - Hyperion Avenue is a secondary north-south arterial. It provides two travel lanes in the northbound direction and two lanes in the southbound direction. Hyperion Avenue provides local access to the SLRC site. Parking is allowed on both sides of the street within the study area. The posted speed limit is 35 miles per hour.

Table 1 provides a description of these facilities, summarizing the physical characteristics of all key streets serving both sites within the two study areas. Diagrams of the existing lane configurations at the five study intersections in the SLRC study area are illustrated in Appendix A.

HWSG Site

The study area for the HWSG site is bounded by Alameda Avenue on the north, Golden State Freeway (I-5) on the east, Griffith Park on the south, and Barham Boulevard and Hollywood Way on the west. As shown in Figure 3, access to the HWSG site would be provided at the southern slope of the property with ingress and egress from Forest Lawn Drive. Regional access to the site is provided by the I-5 Freeway and Ventura Freeway (SR-134). The I-5 Freeway runs in a north-south direction east of the HWSG site, while the SR-134 runs in an east-west direction along the north side of the site. Access to the HWSG site from the north I-5 would be via the I-5 ramp interchange at Western Avenue; otherwise HWSG can be accessed via the SR-134 Freeway at Forest Lawn Drive.

The major streets serving the HWSG site are Forest Lawn Drive, Riverside Drive, Zoo Drive, Western Avenue, and Alameda Avenue in the east-west direction, and Barham Boulevard and Victory Boulevard in the north-south direction. The following is a brief description of the streets that serve the site:

- Forest Lawn Drive - Forest Lawn Drive is a secondary east-west arterial. It mainly provides two travel lanes in the eastbound direction and two lanes in the westbound direction. It bends and travels in north-south direction while connecting to Zoo Drive on the west, then narrows to one lane in each direction while connecting to SR-134. Forest Lawn Drive provides direct access to the HWSG site through the southern slope of the property. It also provides regional access via ramps at SR-134. Parking is restricted within the study area. The posted speed limit is 25 miles per hour between Zoo Drive and SR-134 while it is 45 miles between Zoo Drive and Barham Boulevard.

- Riverside Drive - Riverside Drive is a major east-west arterial within the study area. It provides two travel lanes in the eastbound direction and two lanes in the westbound direction. Riverside Drive turns to the north and south when it connects to the SR-134 ramps at Zoo Drive. Parking is allowed on both sides of the street within the study area. The posted speed limit is 35 mph.

TABLE 1
EXISTING SURFACE STREET CHARACTERISTICS

SEGMENT	FROM	TO	LANE NB/EB	LANE SB/WB	MEDIAN TYPE	PARKING RESTRICTIONS NB/EB	PARKING RESTRICTIONS SB/WB	SPEED LIMIT
SLRC Site :								
Glendale Bl	Alvarado Bl	Berkeley Av	3	3	RM	NS 3-7P	NSAT	35
	Berkeley Av	Effie St	3	3	RM	NS 3-7P	PA	35
	Effie St	Clifford St	3	3	2LT	NS 3-7P, 1hr 8A-3P	NSAT	35
	Clifford St	Allesandro St	3	3	DY	NS 3-7P, 1hr 8A-3P	NSAT	35
	Allesandro St	Glendale Frwy	3	2	2LT	NSAT	NSAT	35
	Glendale Frwy	Waterloo / Fargo	2	2	RM	NSAT	NSAT	35
	Waterloo / Fargo	Baxter St	2	2	2LT	NSAT	PA	35
	Baxter St	Brier Av	2	2	DY	PA	PA	35
	Brier Av	Silver Lake Bl	2	2	DY	PA	RZ	35
	Silver Lake Bl	Fletcher Dr	2	2	2LT	NS 4-6P	NS 7-9A	35
(Rowena Av)	Fletcher Dr	Glendale Bl	2	2	DY	PA	PA	35
	Glendale Bl	Auburn St	2	2	DY	PA	PA	35
	Auburn St	W Silver Lake Dr	2	2	DY	RZ	PA	35
	W Silver Lake Dr	Herkimer St	2	2	DY	PA	2hr 8A-6P	35
	Herkimer St	Avenel St	2	2	DY	2hr 8A-6P	2hr 8A-6P	35
	Avenel St	Hyperion Av	2	2	DY	PA	2hr 8A-6P	35
	Hyperion Av	St George St	1	1	DY	PA	PA	25
Allesandro St	Glendale Bl	Ewing St	1	1	DY	NSAT	NSAT	35
	Ewing St	Baxter St	1	1	DY	PA	NSAT	35
	Baxter St	Riverside Dr	1	1	2LT	PA	PA	35
Silver Lake Bl	Glendale Bl	Armstrong Av	1	1	DY	PA	PA	35
	Armstrong Av	Duane St	1	1	DY	PA	NSAT	35
	Duane St	Van Pelt Pl	1	1	2LT	PA	NSAT	35
	Van Pelt Pl	Swan Pl	1	1	DY	PA	NP 11P-6A ex by permit	35
	Swan Pl	Effie St	1	1	DY	PA	PA	35
	Effie St	Berkley Av	1	1	DY	2hr 8A-6P	PA	35
	Berkeley Av	Resivior St	1	1	2LT	PA	PA	35
	Resivior St	Parkman Av	1	1	DY	PA	PA	35
	Parkman Av	Bellevue Av	2	2	DY	PA	PA	35
	Bellevue Av	London St	2	2	DY	PA	NSAT	35
	London St	Smilax St	2	2	RM	NSAT	NSAT	35
	Smilax St	Virgil Av	2	2	DY	NSAT	NSAT	35
Fletcher Dr	Glendale Bl	Silver Lake Bl	2	2	DY	NSAT	NSAT	35
	Silver Lake Bl	Riverside Dr	2	2	2LT	NSAT	NSAT	35
	Riverside Dr	I-5 NB On-ramp	2	2	DY	1hr 8A-6P	NSAT	35
	I-5 NB On-ramp	Ripple St	2	2	DY	PA	PA	35
	Ripple St	Larga Av	2	2	RM	NSAT	NSAT	35
	Larga Av	Atwater Av	2	2	DY	2hr 8A-6P	2hr 8A-6P	35
	Atwater Av	La Clede Av	2	2	DY	PA	PA	35
	La Clede Av	San Fernando	2	2	DY	NSAT	NSAT	35
Hyperion Av	Scotland St	Tracy St	2	2	DY	4hr 8A-6P	PA	35
	Tracy St	Evans St	2	2	DY	2hr 8A-6P	PA	35
	Evans St	Griffith Park Bl	2	2	DY	2hr 8A-6P	2hr 8A-6P	35
	Griffith Park Bl	Roewena Av	2	2	2LT	2hr 8A-6P	NSAT	35
	Roewena Av	La Paz Dr	2	2	DY	RZ	PA	35
	La Paz Dr	Ettrick St	2	2	2LT	PA	PA	35
	Ettrick St	Glendale Bl	2	2	2LT / RM	NSAT	NSAT	35
Riverside Dr	Glendale Bl	Fletcher Dr	2	2	2LT	NSAT	PA	35
	Fletcher Dr	Fruitdale St	2	2	2LT	1hr 8A-4P, NS 4-6P	PA	35
	Fruitdale St	Gleneden St	2	2	2LT	PA	PA	35
	Gleneden St	Riverside Terr	2	2	2LT	PA	15 min 7A-5P	35
	Riverside Terr	Newell St	2	2	2LT	PA	PA	35
	Newell St	Stadium Wy	2	2	2LT	NSAT / PA	PA	35
	Stadium Wy	Gail St	2	2	RM	NSAT	NSAT	35
	Gail St	Dorris Pl	2	2	2LT	PA	NSAT	35
Stadium Wy	Riverside Dr	Landa St	2	2	DY	NSAT	NSAT	35
	Landa St	Elysian Park Dr	3	3	DY	NSAT	NSAT	35

Notes:

MEDIAN TYPE: DY = Double Yellow Centerline
SDY = Single Dashed Yellow Centerline
2LT = Dual Left Turn Centerline
RM = Raised Median
UD = Undivided Lane

PARKING: PA = Parking Allowed
NSAT = No Stopping Anytime
GZ = Green zone - Passenger loading and unloading
RZ = Red zone - No parking allowed
LANES: # = Number of lanes

TABLE 1 (CONTINUED)
EXISTING SURFACE STREET CHARACTERISTICS

SEGMENT	FROM	TO	LANE NB/EB	LANE SB/WB	MEDIAN TYPE	PARKING RESTRICTIONS NB/EB	PARKING RESTRICTIONS SB/WB	SPEED LIMIT
HWSG Site:								
Crystal Springs Dr	Griffith Park Dr	Western Heritage Wy	1	1	SDY	NPAT	NPAT	25
	Western Heritage Wy	N Zoo Dr	2	2	2LT	NSAT	NSAT	25
	N Zoo Dr	Riverside Dr	1	1	DY	NSAT	NSAT	25
	Riverside Dr	"Travel Town"	1	1	DY	NSAT / NP sunset to sunrise	NSAT / NP sunset to sunrise	25
	"Travel Town"	Zoo Dr	1	1	DY	NP 8P-6A	NP 8P-6A	25
Zoo Dr	Crystal Springs Dr	Forest Lawn	1	1	2LT	NSAT	NSAT	25
Griffith Park Dr	Zoo Dr	Mineral Wells Tr	1	1	SDY / DY	NPAT	NPAT	25
	Mineral Wells Tr	Zoo Bypass	1	1	DY	NSAT	NSAT	25
Forest Lawn Dr	134 Fwy	Zoo Dr	1	1	DY	NSAT	NSAT	25
	Zoo Dr	Memorial Dr	2	2	2LT	NSAT	NSAT	45
	Memorial Dr	WBS Gate 8,7	2	2	2LT	NP 2A-4A nightly / PA	NSAT / PA	45
	WBS Gate 8,7	Barham Bl	2	2	2LT	NP 2A-4A nightly / 2hr 8A-6p	NP 2A-4A nightly / 2hr 8A-6p	45
Barham Bl	Pass Av	Lakeside Dr	3	3	RM	NSAT	NPAT	35
	Lakeside Dr	Forest Lawn Dr	3	3	2LT	NSAT	NSAT	35
	Forest Lawn Dr	S Coyote Cyn	2	2	2LT	NSAT	NSAT	35
W Olive Av	Pass Av	Hollywood Wy	3	3	RM	NSAT	NP 7A-9A	35
	Hollywood Wy	Riverside Dr	3	3	RM	NSAT	NP 7A-9A, 30min PA	35
	Riverside Dr	Lima St	2	2	2LT	NP 3A-5A	2hr 8A-6P	35
	Lima St	Alameda Av	2	2	2LT	NP 3A-5A	NP 3A-5A	35
Victory Bl	Crystal Springs Dr	Sonora Av	2	2	DY	NSAT	NSAT	35
	Sonora Av	Justin Av	2	2	2LT	PA	PA	35
	Justin Av	Winchester Av	2	2	2LT	2hr 8A-6P	PA	35
	Winchester Av	Allen Av	2	2	2LT	PA	PA	35
	Allen Av	Linden Av	2	2	2LT	2hr 8A-6P	2hr 8A-6P, NP 3A-5A	35
	Linden Av	Elm Av	2	2	2LT	2hr 8A-6P	NP 3A-5A	35
	Elm Av	Alameda Av	2	2	2LT	PA	PA	35
	Alameda Av	Valencia Av	2	2	2LT	1hr 8A-6P	2hr 8A-6P	35
	Valencia Av	Ash Av	2	2	2LT	PA	PA	35
	Ash Av	Elmwood Av	2	2	2LT	NP 7A-3P	2hr 8A-6P	35
	Elmwood Av	Cedar Av	2	2	2LT	PA	1hr 8A-6P	35
	Cedar Av	Providencia Av	2	2	2LT	2hr 8A-6P	PA	35
Riverside Dr	Pass Av	Maple St	2	2	DY	1hr 8A-6P / 10 min 8A-6P	10 min 8A-6P / 1hr 8A-6P	30
	Maple St	Screenland Dr	2	2	DY	2hr 8A-6P	10 min 8A-6P / 1hr 8A-6P	30
	Screenland Dr	Hollywood Wy	2	2	2LT	NPAT	NSAT	30
	Hollywood Wy	Olive Av	2	2	DY	30 min 8A-6P	PA	30
	Olive Av	Avon St	2	2	2LT	10 min 8A-6P	NP 3A-5A	30
	Avon St	California St	2	2	2LT	NSAT	NP 3A-5A	30
	California St	Niagara St	2	2	2LT	2hr 8A-6P	2hr 8A-6P	30
	Niagara St	Bob Hope Dr	2	2	2LT	PA	PA	30
	Bob Hope Dr	134 Fwy	2	2	DY	NP 11P-6A	NP 11P-6A	30
	134 Fwy	Buena Vista St	2	2	DY	NPAT	NP 11P-6A	30
	Buena Vista St	Keystone St	2 / 1	2	2LT	NPAT	NPAT	30
	Keystone St	Parish Pl	1	1	2LT	2hr 8A-6P	2hr 8A-6P	30
	Parish Pl	Beachwood Dr	1	1	2LT	PA	PA	30
	Beachwood Dr	Griffith Park Dr	1	1	2LT	2hr ANYTIME	PA	30
	Griffith Park Dr	Mariposa St	1	1	2LT	PA	PA	30
	Mariposa St	Main St	1	1	2LT	PA / NPAT (ex. By Permit)	PA	30
	Main St	Allen Av	1	1	2LT	NPAT (ex. By Permit)	NPAT (ex. By Permit)	35
	Allen Av	Western Av	1	1	2LT	PA	PA	35
	Western Av	Victory Bl	1	1	2LT / DY	PA	PA	35
Sonora Av	Victory Bl	Garden St	1	2	DY	RZ	PA	35
	Garden St	Flower St	2	2	DY	PA	PA	35
	Flower St	Air Way	2	2	DY	PA	PA	35
	Air Way	San Fernando Rd	2	2	RM / 2LT	RZ	NPAT	35
Alameda Av	Victory Bl	Lake St	2	2	2LT	PA	PA	35
	Lake St	Flower St	2	2	RM	NSAT	NSAT	35
	Flower St	San Fernando Rd	2	2	RM / DY	NSAT	NSAT	35
Western Av	Riverside Dr	Victory Bl	1	1	2LT	2hr 24/7	2hr 24/8	35
	Victory Bl	Lake St	1	1	2LT	2hr 9A-6P	PA	35
	Lake St	Flower St	2	2	RM	NSAT	NSAT	35
	Flower St	San Fernando Rd	2	2	DY	NSAT	NSAT	35

Notes:

MEDIAN TYPE: DY = Double Yellow Centerline
SDY = Single Dashed Yellow Centerline
2LT = Dual Left Turn Centerline
RM = Raised Median
UD = Undivided Lane

PARKING: PA = Parking Allowed
NSAT = No Stopping Anytime
GZ = Green zone - Passenger loading and unloading
RZ = Red zone - No parking allowed
LANES: # = Number of lanes

- Zoo Drive - Zoo Drive is a secondary east-west arterial. It provides one travel lane in each direction. Zoo Drive provides local access to the HWSG site. Parking is restricted is restricted on both sides of the street within the study area. The posted speed limit is 25 mph.

- Western Avenue - Western Avenue is a secondary east-west arterial. It provides one travel lane in each direction between Victory Boulevard and Riverside Drive within the study area. Western Avenue provides regional access through a connection to I-5. Parking is allowed on both sides of the street in the study area. The posted speed limit is 35 mph.

- Alameda Avenue - Alameda Avenue is a major east-west arterial. It provides two travel lanes in each direction. Alameda Avenue provides regional access through connection to I-5. Parking is allowed on both sides of the street within the study area. The posted speed limit is 35 mph.

- Barham Boulevard - Barham Boulevard is a major north-south arterial. It mainly provides two travel lanes in the northbound direction and two lanes in the southbound direction. Barham Boulevard provides local access to the HWSG site. Parking is restricted on both sides of the street within the study area. The posted speed limit is 35 mph.

- Victory Boulevard - Victory Boulevard is a major north-south arterial. It provides two travel lanes in the northbound direction and two lanes in the southbound direction. Victory Boulevard provides regional access through a connection to the I-5 ramps via Western Avenue. Parking is limited on both sides of the street within the study area. The posted speed limit is 35 mph.

Table 1 provides a description of these facilities, summarizing the physical characteristics of all key streets serving both sites within the two study areas. Diagrams of the existing lane configurations at the five study intersections in the HWSG study area are illustrated in Appendix A.

EXISTING TRAFFIC VOLUMES AND LEVELS OF SERVICE

This section presents the existing peak hour turning movement traffic volumes for the intersections analyzed in the study, describes the methodology used to assess the traffic conditions at each intersection, and analyzes the resulting operating conditions at each in terms of volume to capacity (V/C) ratios and average control delay in seconds and the corresponding levels of service.

Existing Traffic Volumes

Weekday morning and afternoon peak hour traffic counts were conducted at the ten study intersections in May 2004. These weekday traffic volumes, which are illustrated in Figure 4A for the SLRC site and Figure 4B for the HWSG site, represent existing 2004 conditions for the purposes of this analysis. Appendix C contains the detailed traffic count data.

Level of Service Methodology

Level of service (LOS) is a qualitative measure used to describe the condition of traffic flow on the street system, ranging from excellent conditions at LOS A to overloaded conditions at LOS F. LOS D is typically recognized as the minimum acceptable level of service in urban areas. Level of service definitions are provided in Table 2 (for signalized intersections) and Table 3 (for stop-controlled intersections). Of the ten analyzed intersections, seven intersections are currently controlled by traffic signals. In the vicinity of the SLRC site, the intersection of Silver Lake Boulevard and Van Pelt Place is stop-controlled on the eastbound approach. The remaining stop-controlled intersections located within the HWSG study area are the intersections of Riverside Drive and Zoo Drive and Riverside Drive and the SR-134 eastbound off-ramp.

The "Critical Movement Analysis-Planning" (Transportation Research Board, 1980) method of intersection capacity analysis was used to determine the intersection volume to capacity (V/C) ratio and corresponding level of service for the turning movements and intersection characteristics at the seven signalized study intersections. The CALCADB software package developed by LADOT was used to implement the CMA methodology. Table 2 defines the ranges of V/C ratios and corresponding levels of service for signalized intersections.

In addition, the “Two-Way Stop Controlled” methodology and the “All-Way Stop Controlled” methodology from the *2000 Highway Capacity Manual* was used to determine the average vehicle delay (in seconds) and the corresponding level of service for the three stop-controlled study intersections. The level of service definitions for the stop-controlled intersections are summarized in Table 3.

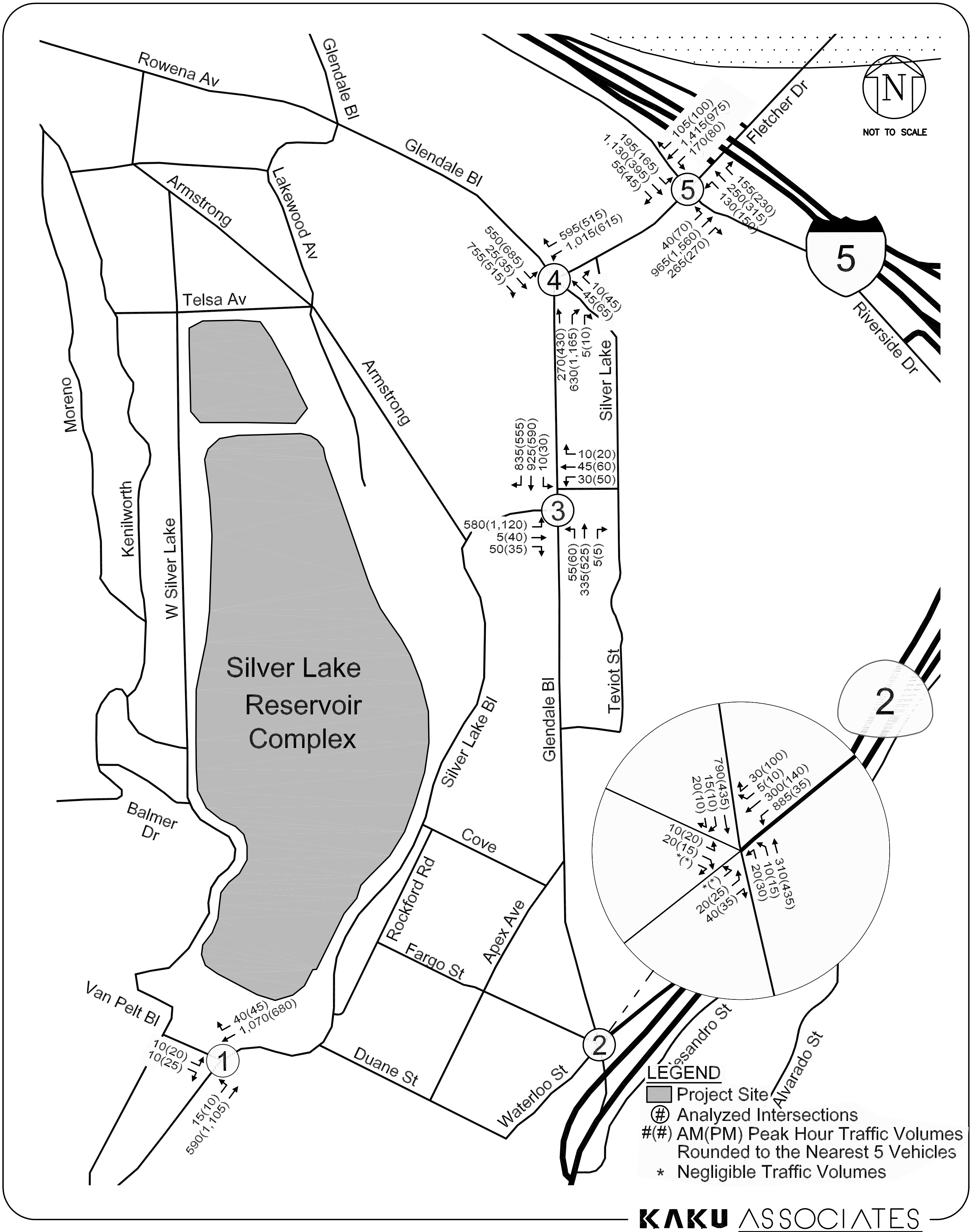


FIGURE 4A
EXISTING PEAK HOUR TRAFFIC VOLUMES (SLRC SITE)

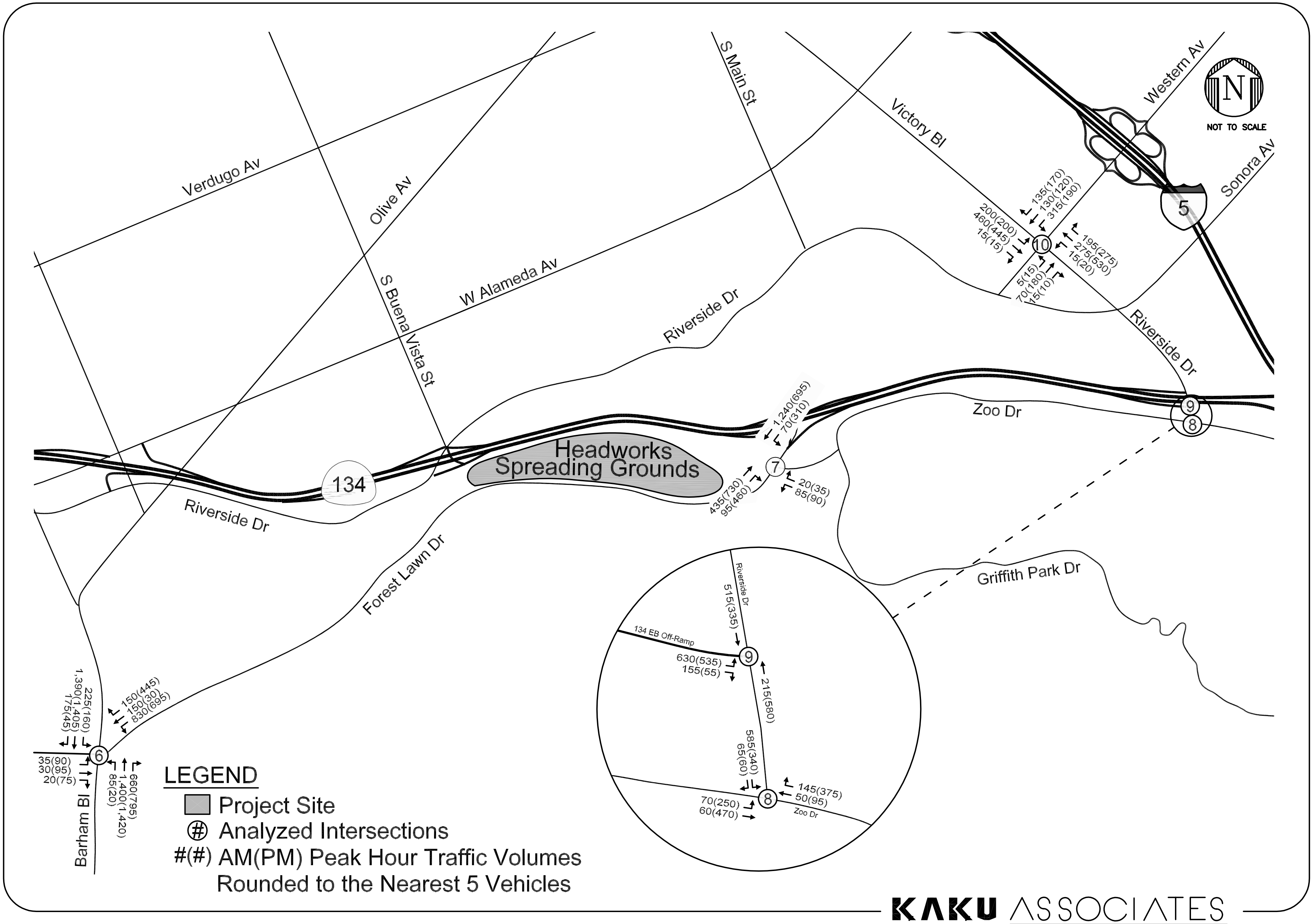


FIGURE 4B
EXISTING PEAK HOUR TRAFFIC VOLUMES (HWSG SITE)

TABLE 2
LEVEL OF SERVICE DEFINITIONS FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	VOLUME/CAPACITY RATIO (V/C)	DEFINITION
A	$\leq$ 0.600	EXCELLENT. No vehicle waits longer than one red light, and no approach phase is fully used.
B	> 0.600 $\leq$ 0.700	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	> 0.700 $\leq$ 0.800	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	> 0.800 $\leq$ 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	> 0.900 $\leq$ 1.000	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	> 1.000	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersectin approaches. Tremendous delays with continuously increasing queue lengths.

SOURCE: Transportation Research Board, *Transportation Research Circular No. 212, Interim Materials on Highway Capacity* , 1980.

TABLE 3

LEVEL OF SERVICE DEFINITIONS FOR STOP-CONTROLLED INTERSECTIONS

Level of Service	Average Vehicle Delay (seconds)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	≤ 50.0

Source: Transportation Research Board, *Highway Capacity Manual, 2000.*

Four intersections within the two study areas are currently controlled by the City of Los Angeles' Automated Traffic Surveillance and Control (ATSAC) system. These are:

- Glendale Boulevard & Silver Lake Boulevard
- Glendale Boulevard & Fletcher Drive/Silver Ridge Avenue
- Fletcher Drive & Riverside Drive
- Barham Boulevard & Forest Lawn Drive/Lakeside Plaza Drive

In accordance with LADOT procedures, a capacity increase of 7% (0.07 V/C adjustment) was applied to reflect the benefits of ATSAC control at this intersection.

Existing Levels of Service

The traffic volumes presented in Figure 4A (SLRC site) and in Figure 4B (HWSG site) were analyzed using the intersection capacity analysis methodology described above to determine the current operating conditions at the ten intersections. Table 4 summarizes the results of this analysis indicating the existing morning and afternoon peak hour V/C ratio and corresponding level of service at the analyzed intersections. As indicated in the table, three out of five intersections in the vicinity of the SLRC site are currently operating at an acceptable level of service, i.e., LOS D or better, during both the morning and afternoon peak hours. The intersections of Silver Lake Boulevard/Van Pelt Place and Fletcher Drive/Riverside Drive are currently operating at an unacceptable level of service during the morning and/or afternoon peak hours.

For the HWSG site, two of the five study intersections are currently operating at an acceptable level of service during both the morning and afternoon peak hour. The remaining intersections of Barham Boulevard and Forrest Lawn Drive/Lakeside Plaza Drive, Riverside Drive/Zoo Drive, and Riverside Drive/SR-134 eastbound off-ramp are currently operating LOS E or worse during the morning and/or afternoon peak hours.

TABLE 4
YEAR 2004 EXISTING CONDITIONS
INTERSECTION LEVELS OF SERVICE

Intersection	Existing Conditions			
	AM Peak Hour		PM Peak Hour	
	V/C or Delay	LOS	V/C or Delay	LOS
SLRC Site :				
1. Silver Lake Bl & Van Pelt Pl [1]	38	E	45	E
2. Glendale Bl & SR-2 SB-off ramp/Waterloo St/Fargo St	0.830	D	0.441	A
3. Glendale Bl & Silver Lake Bl	0.615	B	0.679	B
4. Fletcher Dr/Glendale Bl & Silver Ridge Av/Rowena Av (Glendale Bl)	0.738	C	0.796	C
5. Fletcher Dr & Riverside Dr	0.945	E	0.884	D
HWSG Site:				
6. Barham Bl & Forest Lawn Dr/Lakeside Plaza Drive	0.963	E	0.905	E
7. Forest Lawn Dr & Zoo Dr	0.885	D	0.754	C
8. Riverside Dr & Zoo Dr [1]	39	E	25	D
9. Riverside Dr & SR-134 EB off-ramp [1]	37	E	49	F
10. Victory Bl & Western Ave	0.553	A	0.656	B

Notes:

[1] Intersection is controlled by stop signs on the minor approaches. Average vehicle delay in seconds is reported rather than V/C ratio.

EXISTING TRANSIT SERVICE

Five bus lines operated by the Los Angeles County Metropolitan Transportation Authority (LACMTA) currently serve the two project sites. These transit lines are described below:

- LACMTA 92 - Line 92 is a regional northwest/southeast line that travels from Metrolink Sylmar/San Fernando Station to downtown Los Angeles. This line provides service to Sylmar, Pacoima, Sun Valley, Burbank Regional Transportation Center, Glendale, and Civil Center in Downtown Los Angeles. This line mainly travels along Glenoaks Boulevard and Glendale Boulevard.

- LACMTA 96 - Line 96 is a regional northwest/southeast line that travels from Sherman Oaks to downtown Los Angeles. This line provides service to Valley Village, Studio City, North Hollywood, Universal City, Toluca Lake, Burbank, Griffith Park, Silver Lake, Glassell Park, Cypress Park, the Burbank Regional Transportation Center, the Los Angeles Zoo, and Universal Studios. This line mainly travels along Riverside Drive, Olive Avenue, Victory Boulevard, Griffith Park Drive, and Stadium Way.

- LACMTA 163 - Line 163 is a regional line that travels from West Hills to Hollywood. This live provides service to Canoga Park, Reseda, Valley Glen, North Hollywood, Metrolink Burbank Airport station, Toluca Lake, Universal City, and the Hollywood/Vine Station of the Metro Red Line. It mainly runs on Sherman Way on the east-west direction between West Hills and North Hollywood, and becomes north-south direction on Hollywood Way and Barham Boulevard.

- LACMTA 603 - Line 603 is a local north/south line that travels from Glendale to downtown Los Angeles. This line provides service to the Glendale Galleria, the Grand Station of the Metro Blue Line, and the Westlake Station of the Metro Red Line. It mainly travels on San Fernando Road, Fletcher Drive, and Glendale Boulevard. It has stops on Riverside Drive and Glendale Boulevard to connect to the SLRC site.

- LACMTA 201 - Line 201 is a local northeast-southwest line that travels from Glendale to Koreatown. It provides service to Glendale Galleria, Atwater Village, Silver Lake, and the Wilshire/Vermont Station of the Metro Red Line. It mainly travels on Glenoaks Boulevard, Atwater Avenue, Fletcher Drive, West Silver Lake Drive, and Silver Lake Boulevard. It has stops on West Silver Lake Drive adjacent to the SLRC site.

III. FUTURE (YEAR 2013) TRAFFIC PROJECTIONS

In order to evaluate properly the proposed project's potential impacts on the local street system, estimates of future traffic conditions both with and without the project were developed. Future traffic volumes without the project were first estimated, representing the cumulative base conditions. The traffic generated by the proposed project was then estimated and separately assigned to the surrounding street system. The sum of the cumulative base and project-generated traffic represents the cumulative plus project conditions.

CUMULATIVE BASE TRAFFIC PROJECTIONS

The cumulative base traffic projections reflect growth in traffic from two primary sources. The first source is background or ambient growth in the existing traffic volumes, which reflects the effects of overall regional growth both in and outside the study area. The second source is traffic generated by specific projects located within, or in the vicinity of, the study area. These factors are described below.

Areawide Traffic Growth

The traffic in the vicinity of the study area has been estimated to increase historically at a rate of about 1% per year. Future increases in the background traffic volumes due to regional growth and development are expected to continue at this rate. With the assumed completion date of 2013, the existing 2004 traffic volumes were adjusted upward by a factor of 9% to reflect this areawide regional growth. The resulting existing plus ambient growth traffic volumes are illustrated in Figures 5A and 5B for the two project sites.

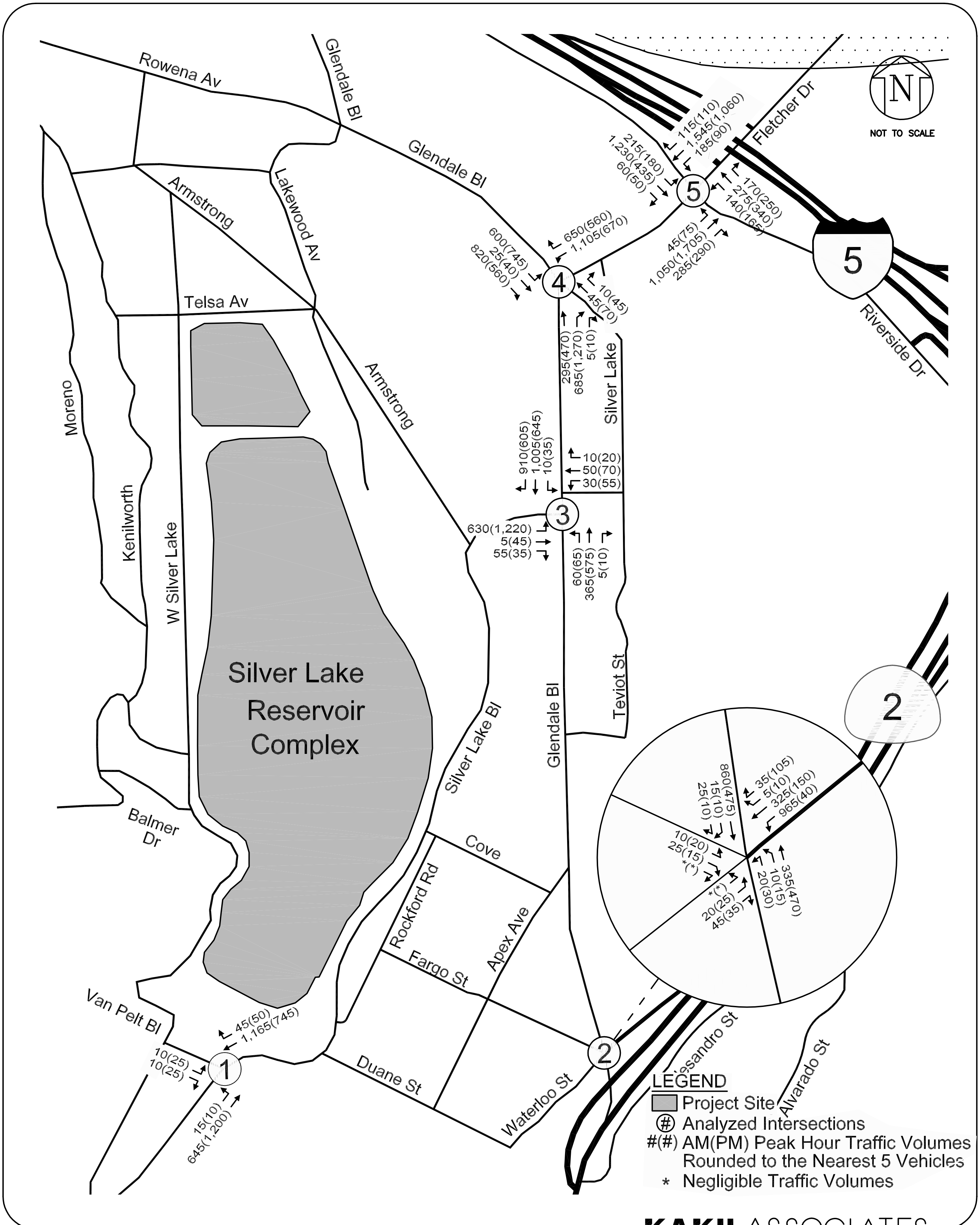


FIGURE 5A
EXISTING PLUS AMBIENT GROWTH
PEAK HOUR TRAFFIC VOLUMES (SLRC SITE)

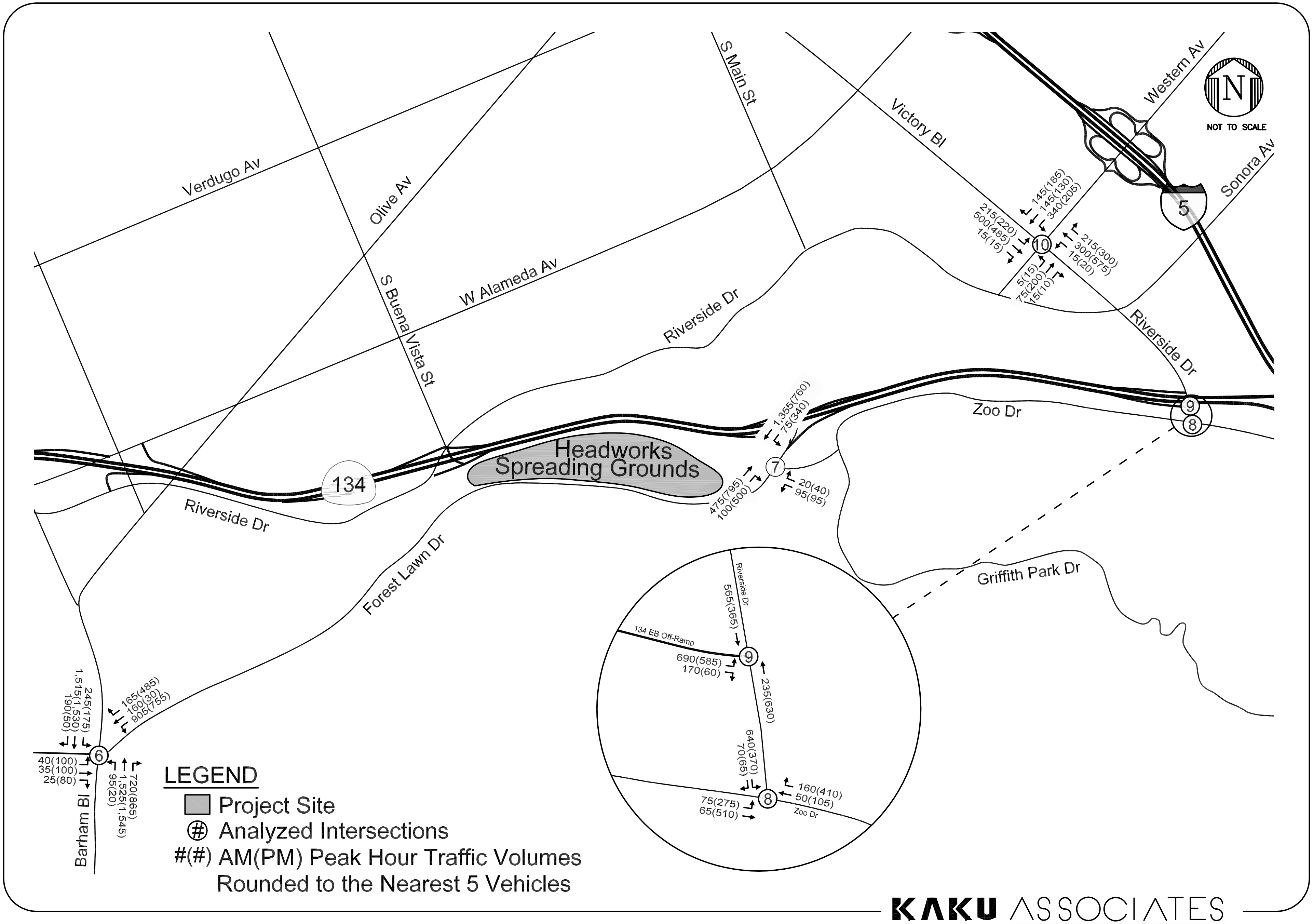


FIGURE 5B
EXISTING PLUS AMBIENT GROWTH PEAK HOUR TRAFFIC VOLUMES (HWSG SITE)

Cumulative Project Traffic Generation and Assignment

As indicated, the second major source of traffic growth in the study area is expected from other future development projects in the area. These related projects or "cumulative projects" are those planned developments expected to be completed within the same timeframe as the proposed project construction plan. Data describing cumulative projects in the area was obtained from the City of Los Angeles Department of Transportation (LADOT). In addition, cumulative projects within the City of Glendale and Burbank were obtained from recent traffic studies completed within the HWSG study area. 17 cumulative projects were identified within the study areas and their locations are shown in Figure 6.

Trip Generation. Trip generation estimates for each of the cumulative projects were obtained from the LADOT in May 2004. These estimates were developed using trip generation rates contained in *Trip Generation, 6th Edition* (Institute of Transportation Engineers, 1997). As summarized in Table 5, the 17 cumulative projects are expected to generate a total of 164,482 daily trips, of which 13,403 vehicles per hour (vph) would occur during the morning peak hour and 14,765 vph would occur during the afternoon peak hour.

Trip Distribution. The geographic distribution of the traffic generated by the cumulative projects depends on several factors. These factors include the type and density of the proposed land uses, the geographic distribution of population from which the employees and potential patrons of the proposed developments are drawn, and the location of the projects in relation to the surrounding street system. Using the factors mentioned, the distribution patterns were developed and used for the cumulative projects.

Traffic Assignment. Using the trip generation estimates and trip distribution patterns described above, traffic generated by the cumulative projects was assigned to the street network. The resulting related project only traffic volumes are illustrated in Figures 7A and 7B for the two project sites. These volumes were then added to the existing traffic volumes after the adjustment for areawide growth shown in Figures 5A and 5B to represent cumulative base conditions (i.e., future conditions without the proposed project), which are illustrated in Figures 8A and 8B.

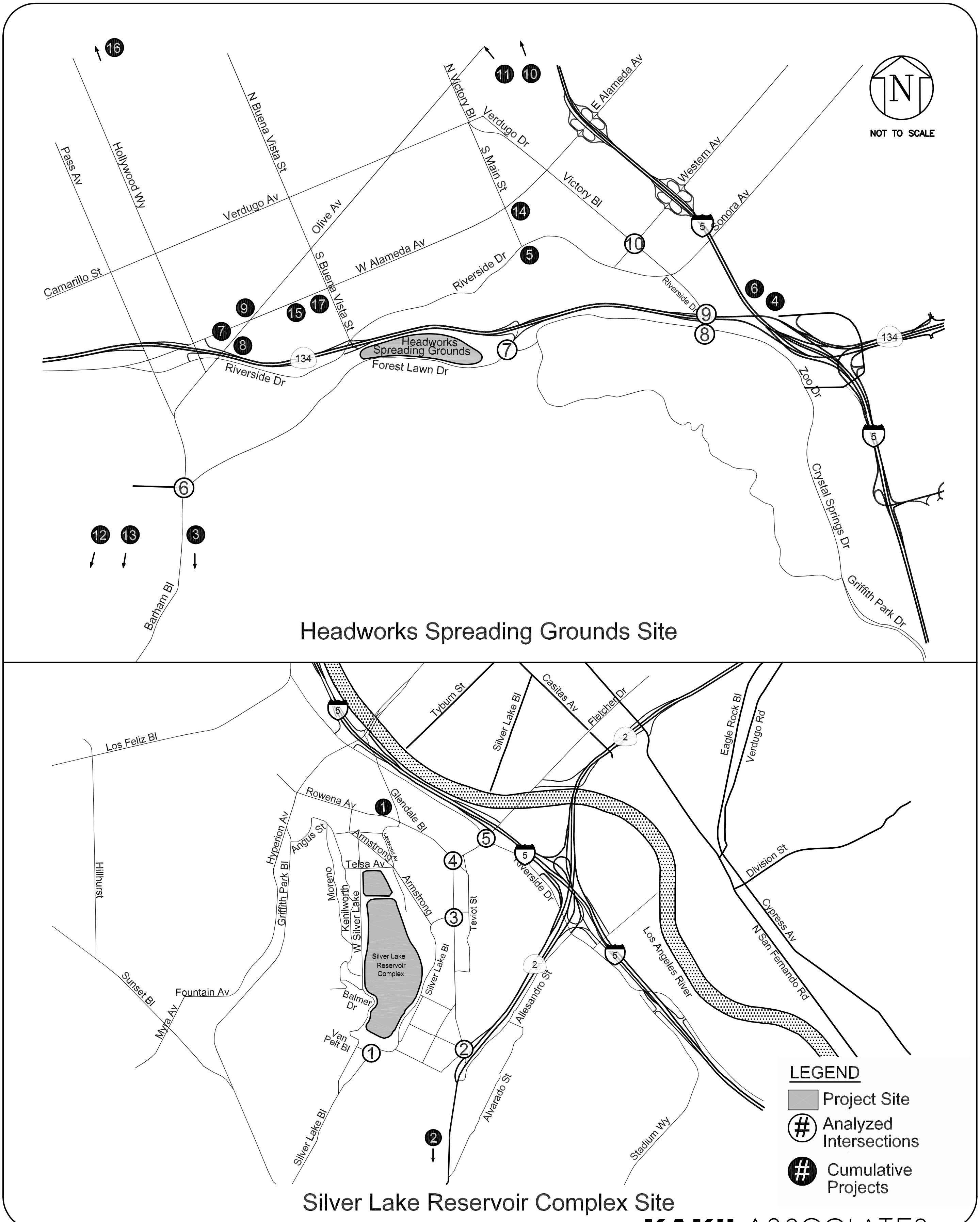


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FIGURE 6
RELATED PROJECTS LOCATION

TABLE 5
RELATED PROJECTS TRIP GENERATION ESTIMATES

No	Project	Project Description	City	Location	Size	TRIP GENERATION ESTIMATES		
						Net Daily	**Net AM Peak Hour**	**Net PM Peak Hour**
1	Restaurant & Bar [a]	Restaurant & bar w/ live entertainment	Los Angeles	Rowena Av & Rokeby St	5.055 KSF	455	4	38
2	Belmont New Primary Center No. 12 [a]	New Primary school to accommodate max daily enrollment of 380 students w/36 parking spaces	Los Angeles	Lake St & Beverly Bl	380 students	340	70	0
3	Self Storage/ Warehouse/ General Office/ Tenant Office [a]	Self-storage General Office Building Tenant Office	Los Angeles	Cahuenga Bl & Universal Center Dr	110.146 KSF 36.649 KSF 16.385 KSF	679	74	84
4	Grand Central Creative Campus (GC3) [b]	Disney campus	Glendale	San Fernando Rd/Western Ave/Flower St	3,565,022 GSF	27800	3111	1540
5	LA Equestrian Center [c]	Alternative 3	Glendale	Riverside Dr & Main St	n/a	5076	564	1128
6	Dreamworks (office) [c]	Offie, Phase II	Glendale	San Fernando Rd/Flower St	136 KSF	1681	238	232
7	Burbank Media Center [d]	Scenario 1 (General Office Building/Health Club/Reatil/Restaurant)	Burbank	Lima St & Olive Ave	Scenario 1	5880	622	649
8	Bob Hope Office/Live Theater [e]	Office/Theatre	Burbank	SEC Olive & Lima	n/a	1755	157	194
9	Pinnacle Project Phase 1 [e] Pinnacle Project Phase 2 [e]	Phase I, 85% complete Phase II	Burbank	Olive & Alameda	385 KSF 200 KSF Subtotal	581 2260 **2841**	82 324 **406**	77 303 **380**
10	Family Housing [e]	Multi Family Housing	Burbank	Southside of Olive Ave at 3rd St	140 DU	970	73	94
11	Empire Center [e]	Mixed-used Office/Retail	Burbank	n/a	300 KSF	53452	3308	5009
12	Warner Brothers Main Campus [e]	Main Campus	Burbank	4000 Warner Boulevard	520.885 KSF	6,678	553	497
13	Warner Brothers Ranch [e]	Ranch	Burbank	4000 Warner Boulevard	287,738 KSF	3505	320	283
14	Disney Studios [e]	Disney Studios	Burbank	500 S. Buena Vista Street	291.396 KSF	2441	285	184
15	NBC [e]	NBC	Burbank	3000 W. Alameda Av	479.280 KSF	5137	562	504
16	Burbank Airport [e]	n/a	Burbank	2627 Hollywood Way	6 MAP	34992	2329	2854
17	Saint Joseph Medical Center [e]	Medical Office Building	Burbank	Buena Vista & Alameda Av	299 KSF	10800	727	1095
					Total	**164,482**	**13,403**	**14,765**

Notes:
KS
[a] Trip Generation Estimates were provided by LADOT staff (including daily trips and total peak hour trips).
[b] Source of Trip Generation Estimates: Kaku Associates, June 2000 Transportation/Circulation and Parking Technical Report for the Grand Central Creative Campus (GC3)
[c] Source of Trip Generation Estimates: Crain & Associates, March 2003 Home Depot Traffic Study
[d] Source of Trip Generation Estimates: Kaku Associates, February 2004 Traffic Impact Study for the Burbank Media Center Platt Project
[e] Source of Trip Generation Estimates: Crain & Associates, March 2003 Home Depot Traffic Study & City of Burabnk Planning Department

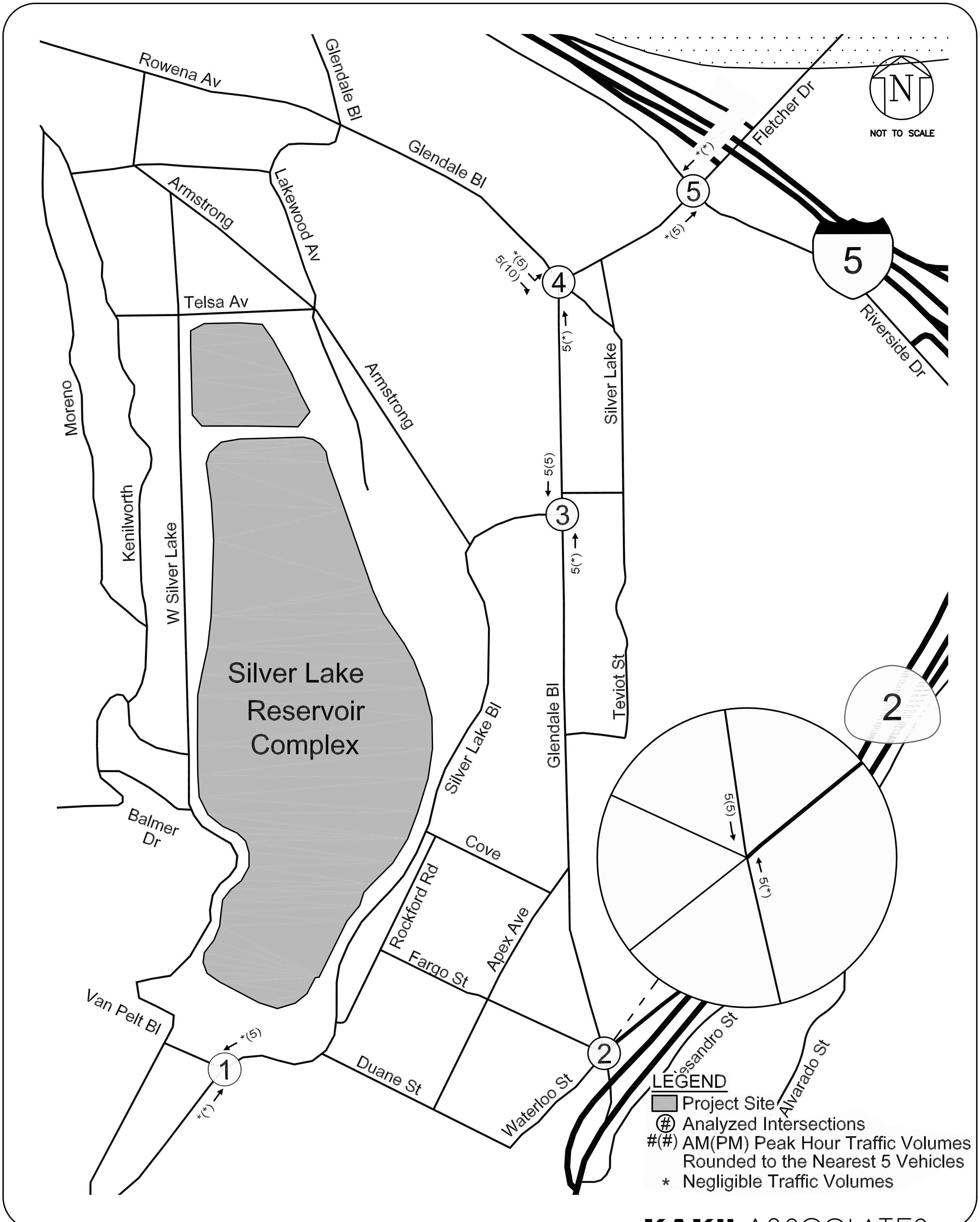

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FIGURE 7A
RELATED PROJECT ONLY
PEAK HOUR TRAFFIC VOLUMES (SLRC SITE)

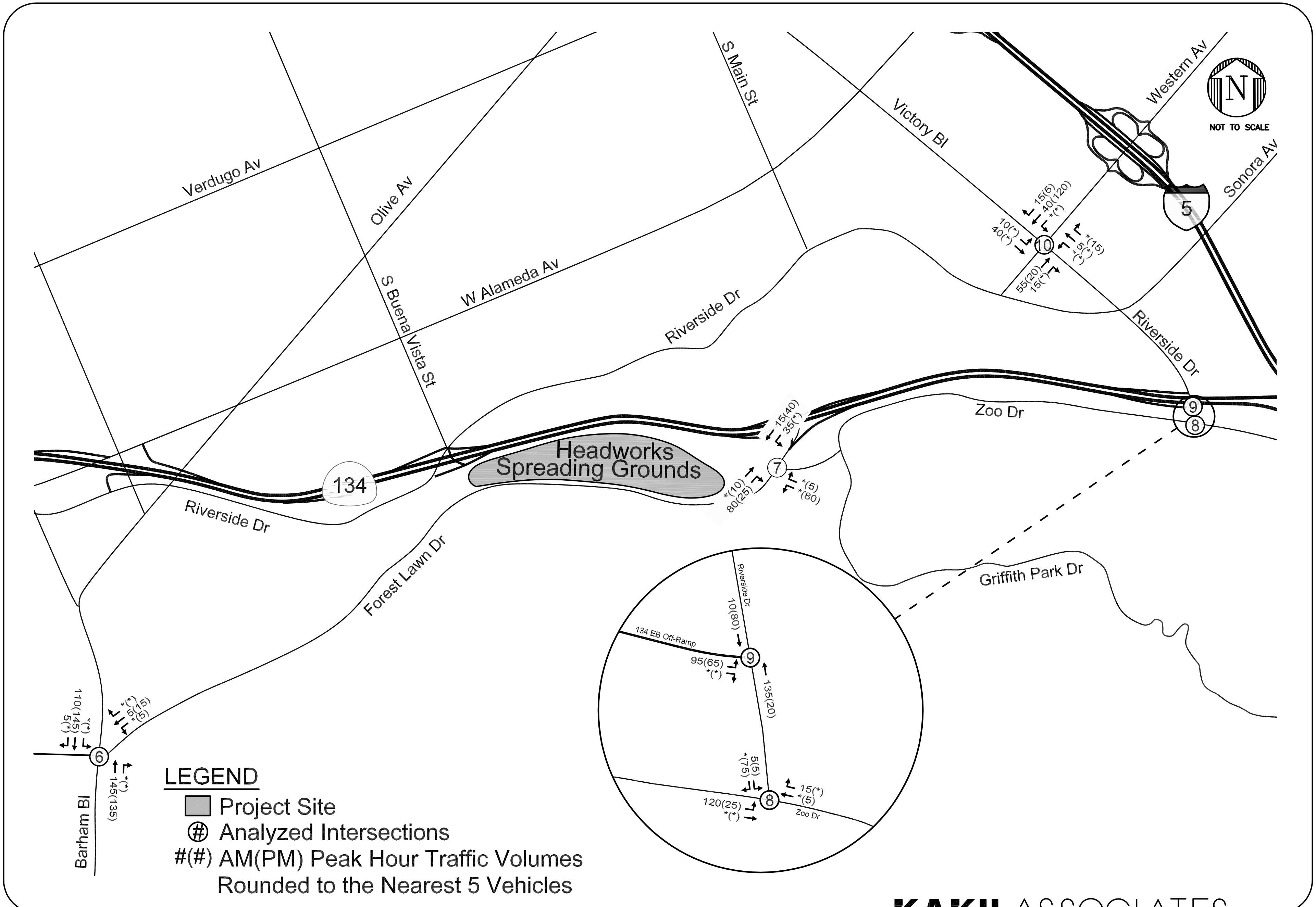

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FIGURE 7B
RELATED PROJECT ONLY PEAK HOUR TRAFFIC VOLUMES (HWSG SITE)

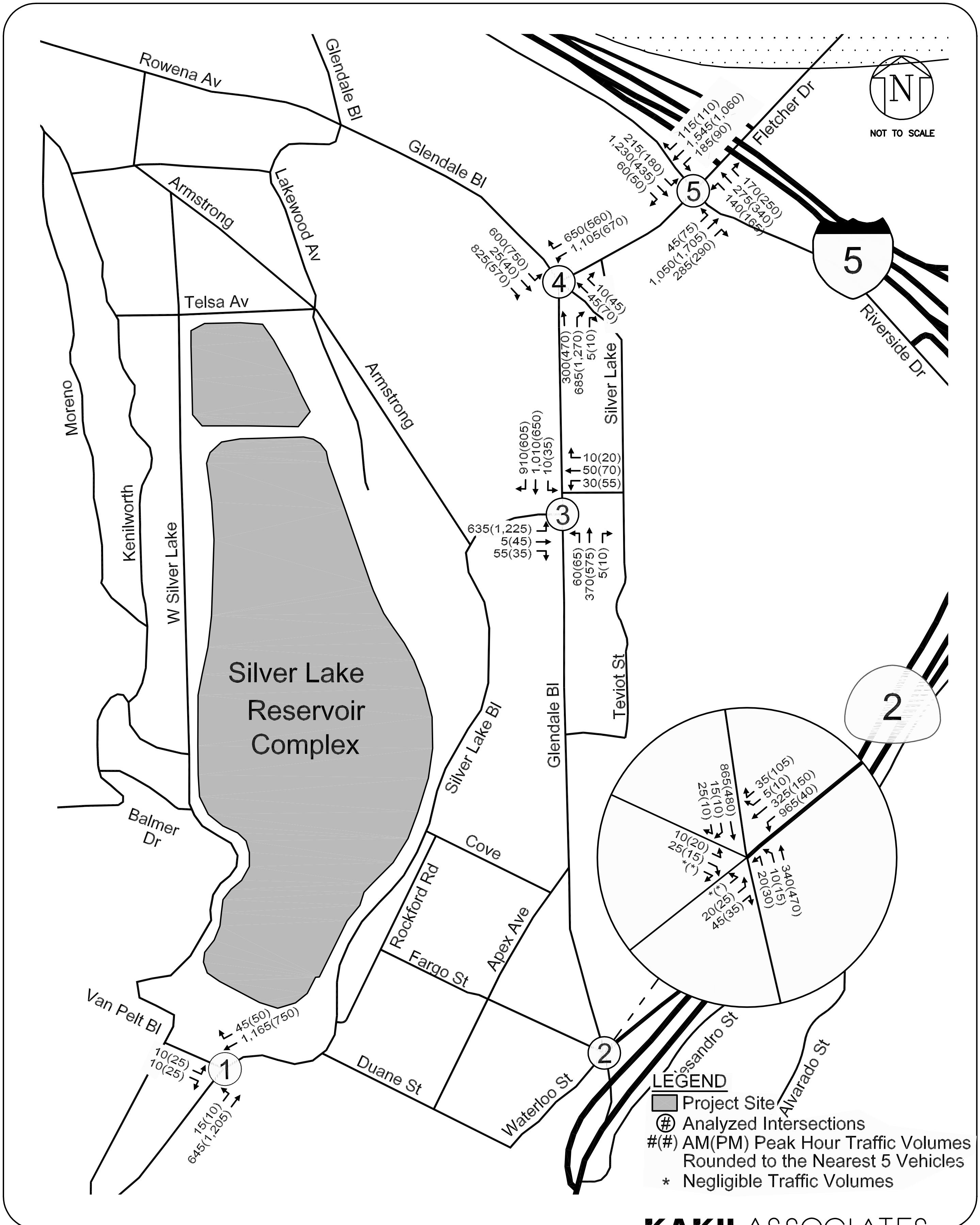

FIGURE 8A
YEAR 2013 CUMULATIVE BASE
PEAK HOUR TRAFFIC VOLUMES (SLRC SITE)

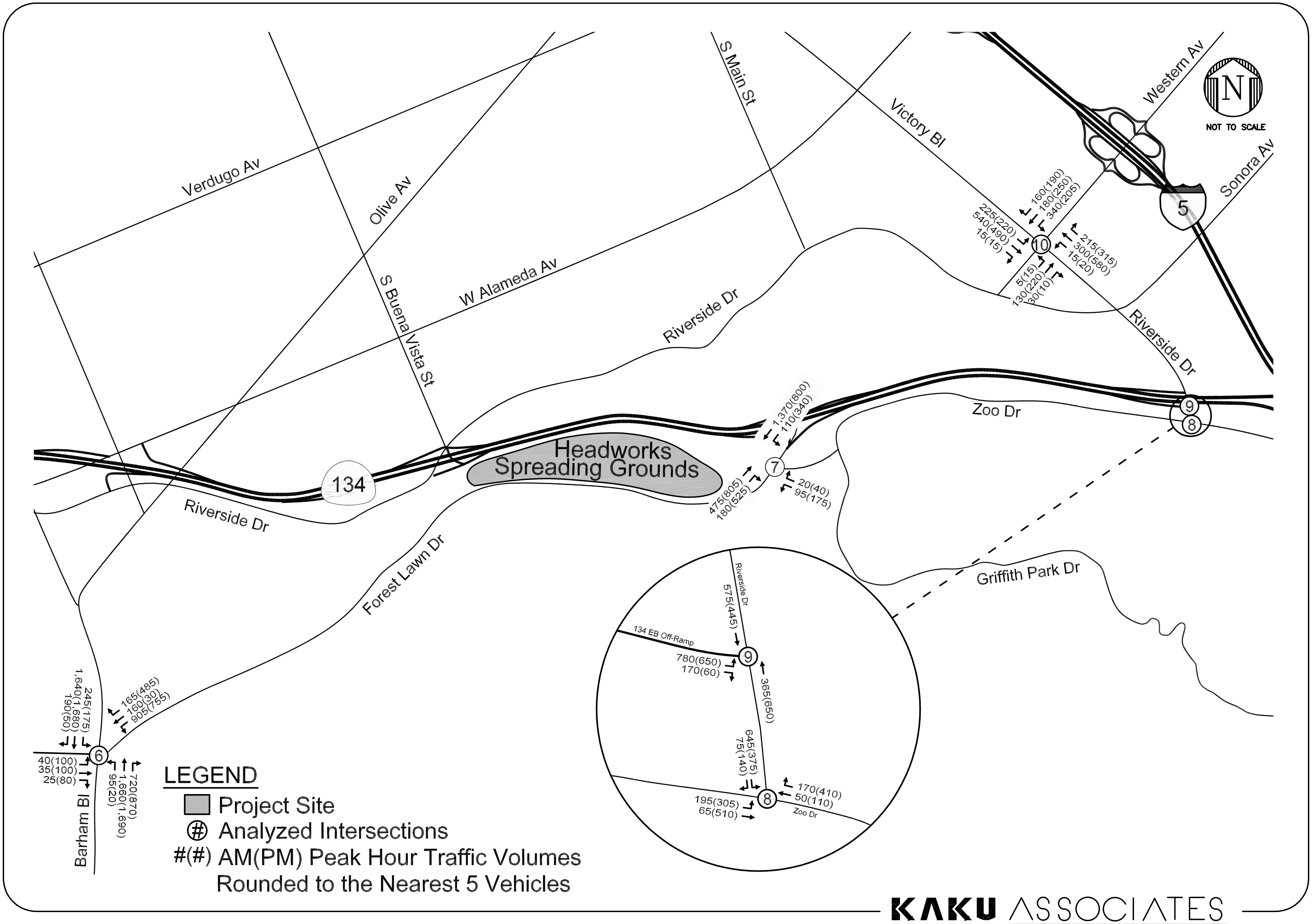

FIGURE 8B

YEAR 2013 CUMULATIVE BASE PEAK HOUR TRAFFIC VOLUMES (HWSG SITE)

PROJECT TRAFFIC VOLUMES

The development of traffic generation estimates for the proposed project involves the use of a three-step process similar to that discussed above for the cumulative projects, including traffic generation, trip distribution, and traffic assignment.

Project Traffic Generation

As indicated, the proposed project would involve temporary and short-term construction activities at both the SLRC site and the HWSG site. The project construction project would be temporary in nature and would occur in several phases where the number of trips to be generated depends on the number of construction workers and trucks needed at each phase. Thus, the project trips were estimated using the maximum number of workers and trucks expected to be present at any stage of the construction. LADWP has developed and provided the truck and employee information for both sites for each phase of the project.

Table 6 illustrates the number of trips estimated during each stage of the construction at the SLRC site. As shown, two major construction activities are scheduled for the SLRC site and are not anticipated to overlap. The Bypass Pipeline Construction is scheduled to occur from May 2007 until April 2009, and the Regulating Station Construction would continue from April 2009 to November 2010. During the bypass pipeline construction period, materials (concrete, soil, pipe, etc.) as well as equipment (crane, augers, pavers, etc.) would be delivered to the SLRC site either by regular trucks or by flatbed trucks. Given the required amount of materials and equipment and the capacities of delivery trucks, the necessary number of truckloads was identified for each activity (e.g., concrete delivery). Approximately 18 trucks daily and 21 construction workers would be needed at this stage of construction. As for the regulating station construction period, approximately 15 concrete delivery trucks and 14 construction workers would be needed on a daily basis.

In estimating the peak hour project trip generation, 10% of the daily truck trips were estimated to arrive and leave the site during the morning and afternoon peak hours. Using the bypass pipeline construction as the basis, approximately 36 daily truck trips would be generated by the

TABLE 6

PROJECT SCHEDULE & DERIVATION OF TRIP GENERATION ESTIMATES - SLRC SITE

2007	2008	2009	2010	2011	2012	2013
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

BY PASS PIPELINE CONSTRUCTION

# of soil dump trucks per day (export to HWSG for 187 day:	3
# of flat-bed trucks per day (pipe delivery for 21 days)	6
# of concrete delivery trucks per day (for 31 days)	9
# of workers per day (for open trench construction)	14
# of workers per day (for tunneling construction)	7

	Daily	AM Pk Hr		PM Pk Hr	
		In	Out	In	Out
# of truck trips [a]	90	9	9	9	9
# of worker trips	42	21	0	0	21
Total	132	30	9	9	30

REGULATING STATION CONSTRUCTION

# of concrete delivery trucks per day	15
# of workers per day	14

	Daily	AM Pk Hr		PM Pk Hr	
		In	Out	In	Out
# of truck trips [a]	75	8	8	8	8
# of worker trips	28	14	0	0	14
Total	103	22	8	8	22

Note:
[a] Truck trip assumes 2.5 passenger car equivalent (PCE)

site if 18 trucks would be needed on a daily basis. The daily truck trips were then converted to passenger car equivalent (PCE) of 2.5 since trucks would create a greater impact at the capacity of the intersections compared to a typical automobile. Approximately 90 daily trips in PCE are estimated, of which nine inbound and nine outbound truck trips (in PCEs) would occur during the morning and afternoon peak hours. Assuming all 21 construction workers would arrive during the morning peak hour and leave during the afternoon peak hour, the SLRC site is projected to generate a maximum of 30 trips during the morning and afternoon peak hours. Table 8 summarizes the trip generation estimates for the SLRC site.

As for the HWSG site, five major construction activities are scheduled between January 2007 and April 2013, which include the following:

- Excavation and subgrade preparation for the reservoir (January 2007 to August 2008)
- Inlet/outlet vault construction (January to August 2007)
- Reservoir storage structure construction (September 2008 to August 2011)
- Burying the reservoir storage structure (September 2011 to April 2013)
- Hydroelectric power generating facility construction (January 2010 to June 2011)

Using the same trip generation methodologies described above, the number of daily truck trips were estimated using PCE factors for each of the five major construction activities at the HWSG site. Table 7 shows that the peak estimates of trip generation would occur during the eighteen-month overlapped period of reservoir storage structure construction and hydroelectric power generating facility construction, from January 2010 to June 2011. Approximately 150 total daily truck trips (in PCE) would occur during this overlapping period, of which approximately 10% of these trips (16 trips) were estimated to arrive and leave during the morning peak hour and the afternoon peak hour. In addition, 120 construction workers were estimated to be on site during the reservoir construction, which would generate a total of 240 daily trips (120 inbound trips during the morning peak hour and 120 outbound trips during the afternoon peak hour). The overlapped period would generate approximately 390 daily trips, of which 152 trips would occur during the morning peak hour (136 inbound and 16 outbound) and 152 trips during the afternoon peak hour (16 inbound and 136 outbound).

TABLE 7

PROJECT SCHEDULE & DERIVATION OF TRIP GENERATION ESTIMATES - HWSG SITE

2007	2008	2009	2010	2011	2012	2013
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

EXCAVATION AND SUBGRADE PREPARATION FOR THE RESERVOIR

of soil dump trucks per day (from 05/08 to 07/08) 30
peak # of workers per day 63

	Daily	AM Pk Hr In	AM Pk Hr Out	PM Pk Hr In	PM Pk Hr Out
# of truck trips(for soil dump) [a]	150	15	15	15	15
# of construction worker trips	126	63	0	0	63
Total	276	78	15	15	78

INLET/OUTLET VAULT CONSTRUCTION

of concrete trucks per day (for 2 days) 41
# of flat-bed trucks per day (delivery vault for 8 days) 1
# of workers per day 14

	Daily	AM Pk Hr In	AM Pk Hr Out	PM Pk Hr In	PM Pk Hr Out
# of truck trips (for concrete & vault) [a]	210	21	21	21	21
# of construction worker trips	28	14	0	0	14
Total	238	35	21	21	35

RESERVOIR STORAGE STRUCTURE CONSTRUCTION

of concrete delivery trucks per day 15
# of gravel delivery trucks per day 2
# of average worker per day 80
peak labor per day (Sep-Dec 2009) 185

	Daily	AM Pk Hr In	AM Pk Hr Out	PM Pk Hr In	PM Pk Hr Out
# of truck trips (concrete & gravel) [a]	85	9	9	9	9
# of average construction worker trips	160	80	0	0	80
Total	245	89	9	9	89

BURYING THE RESERVOIR STORAGE STRUCTURE

of soil delivery trucks per day (Aug 2011-Mar 2012) 80
# of concrete delivery trucks per day 8
# of construction workers per day 42

	Daily	AM Pk Hr In	AM Pk Hr Out	PM Pk Hr In	PM Pk Hr Out
# of truck trips (soil & concrete) [a]	440	44	44	44	44
# of construction worker trips	84	23	0	0	23
Total	524	67	44	44	67

HYDROELETRIC POWER GENERATING FACILITY

of soil dump trucks per day 8
# of concrete mixer trucks per day 1
# of tractor trailer trucks per day 1
# of flat-bed trucks per day 3
# of workers per day 40

	Daily	AM Pk Hr In	AM Pk Hr Out	PM Pk Hr In	PM Pk Hr Out
# of truck trips [a]	65	7	7	7	7
# of worker trips	80	40	0	0	40
Total	145	47	7	7	47

OVERLAP PERIOD 1

	Daily	AM Pk Hr In	AM Pk Hr Out	PM Pk Hr In	PM Pk Hr Out
# of truck trips [a]	360	36	36	36	36
# of worker trips	154	77	0	0	77
Total	514	113	36	36	113

OVERLAP PERIOD 2

	Daily	AM Pk Hr In	AM Pk Hr Out	PM Pk Hr In	PM Pk Hr Out
# of truck trips [a]	150	16	16	16	16
# of worker trips	240	120	0	0	120
Total	390	136	16	16	136

Note:
[a] Truck trip assumes 2.5 passenger car equivalent (PCE)

TABLE 8
PROJECT TRIP GENERATION ESTIMATES

Site	Location	Trip Types	TRIP GENERATION ESTIMATES [b]						
			Daily	AM Peak Hour			PM Peak Hour		
			Trips	In	Out	Total	In	Out	Total
SLRC Site	Silver Lake Boulevard	Truck Deliveries [a]	90	9	9	18	9	9	18
		Construction Workers	42	21	0	21	0	21	21
		Total	**132**	**30**	**9**	**39**	**9**	**30**	**39**
HWSG Site	Forest Lawn Drive	Truck Deliveries [a]	150	16	16	32	16	16	32
		Construction Workers	240	120	0	120	0	120	120
		Total	**390**	**136**	**16**	**152**	**16**	**136**	**152**

Note:

[a] Truck trip assumes 2.5 passenger car equivalent (PCE)

As shown in Table 8, the peak trip estimates for the overlapping period between January 2010 and June 2011 were thus used as the project trip generation at the HWSG site for the purpose of this analysis. Appendix D provides the summary of required peak truckloads estimates for these activities.

Project Traffic Distribution

The geographic distribution of the traffic generated by the proposed project depends on several factors. These factors include the type and density of the proposed land uses, the geographic distribution of population from which the construction workers are drawn, the locations of the construction material suppliers and soil dump sites, and finally the locations of the two project sites in relation to their surrounding street systems and available access to the regional freeway system. Based on those factors, the overall trip distribution was developed in consultation with LADOT.

As the construction material suppliers of concrete and gravel and soil dump sites are located in the Southern California area, specifically Los Angeles and Orange counties, all truck deliveries would travel on the regional freeway networks and connect to the project sites from the adjacent freeway ramps. As for the construction workers, most of them would travel on the regional freeway network, while some portion of them would arrive from local street network. Given the difference between the distribution of construction workers and that of truck trips, the specific distribution patterns for this project were developed for both the construction worker commute trips and the truck delivery trips. These distribution patterns are illustrated in Figures 9A and 9B for the SLRC site and in Figures 10A and 10B for the HWSG site.

Project Traffic Assignment

The traffic expected to be generated by the proposed project was assigned to the street network using the distribution patterns described in Figures 9A and 9B for the SLRC site and in Figures 10A and 10B for the HWSG site. Figures 11A and 11B illustrate the assignment of this traffic for the 10 intersections analyzed in this study.

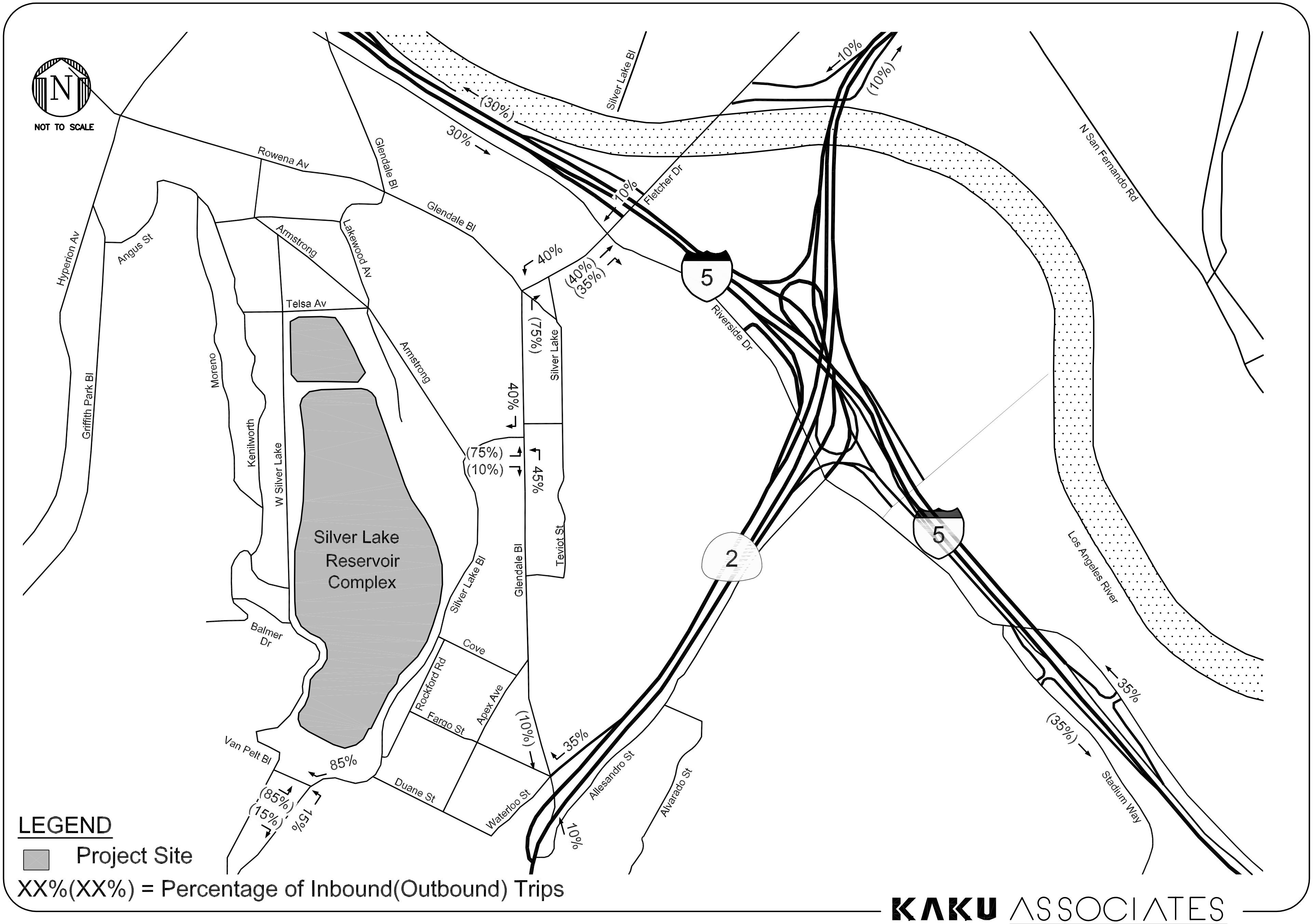

FIGURE 9A

TRIP DISTRIBUTION - CONSTRUCTION WORKERS (SLRC SITE)

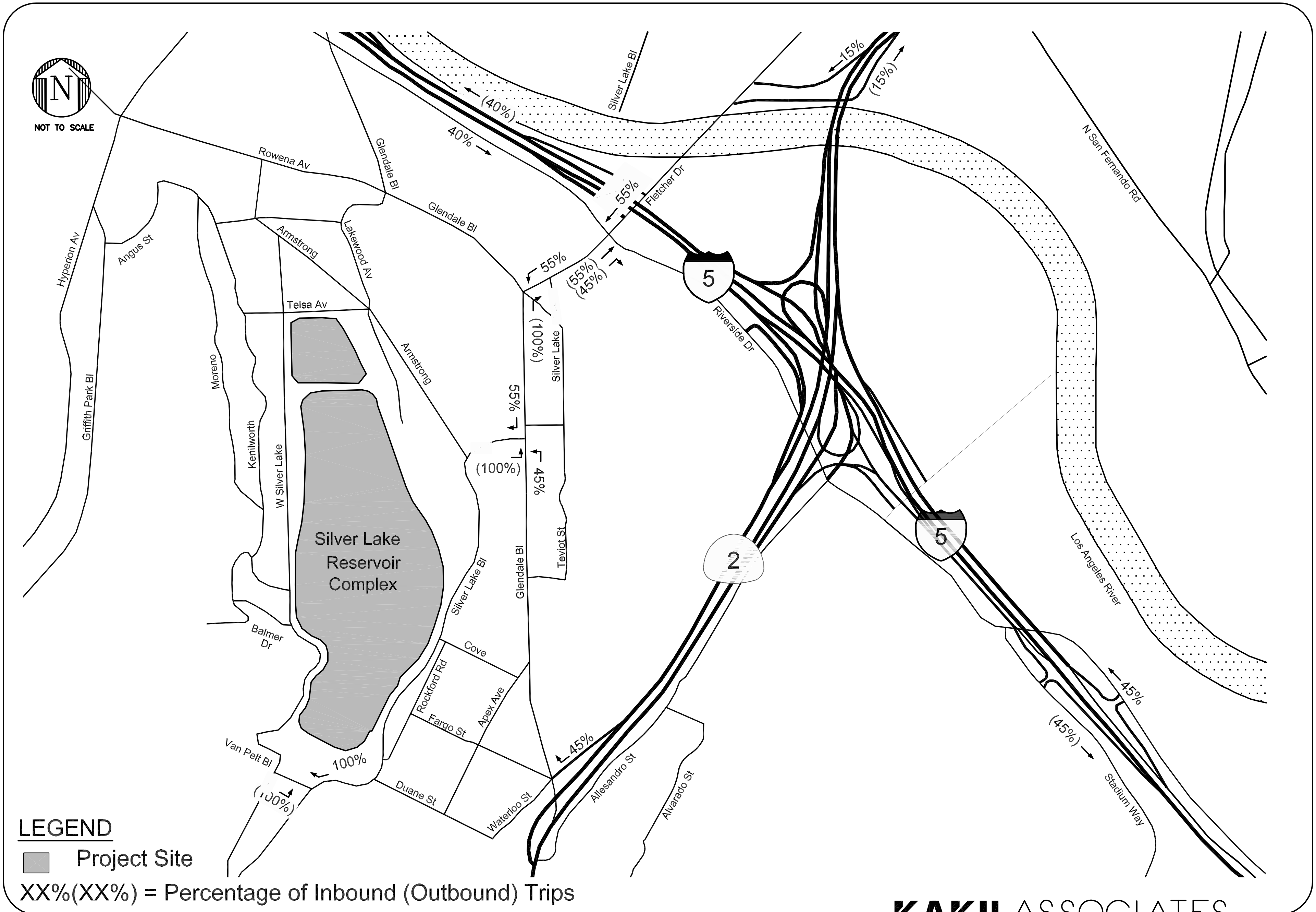

FIGURE 9B
TRIP DISTRIBUTION - TRUCKS (SLRC SITE)

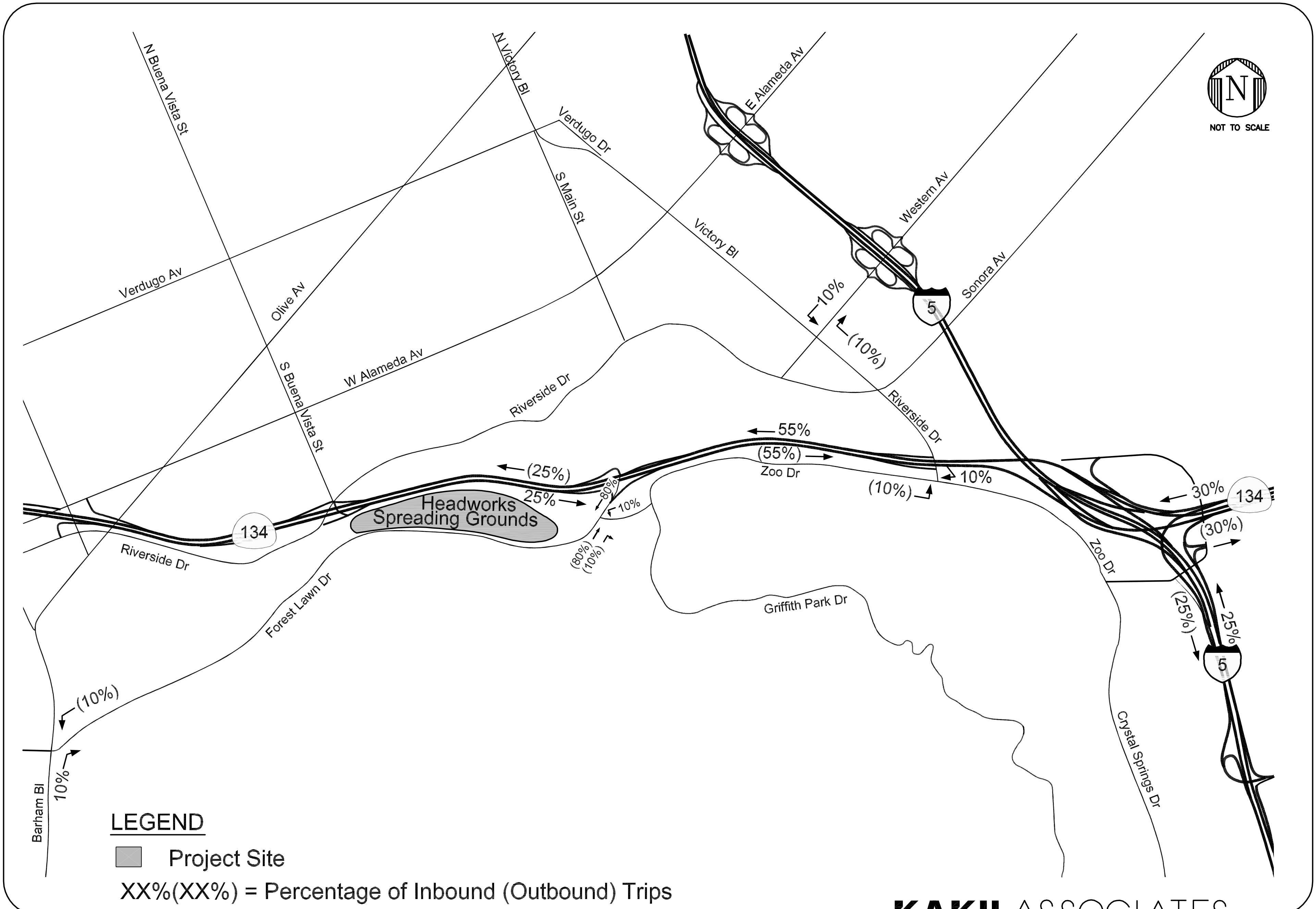

FIGURE 10A
TRIP DISTRIBUTION - CONSTRUCTION WORKERS (HWSG SITE)

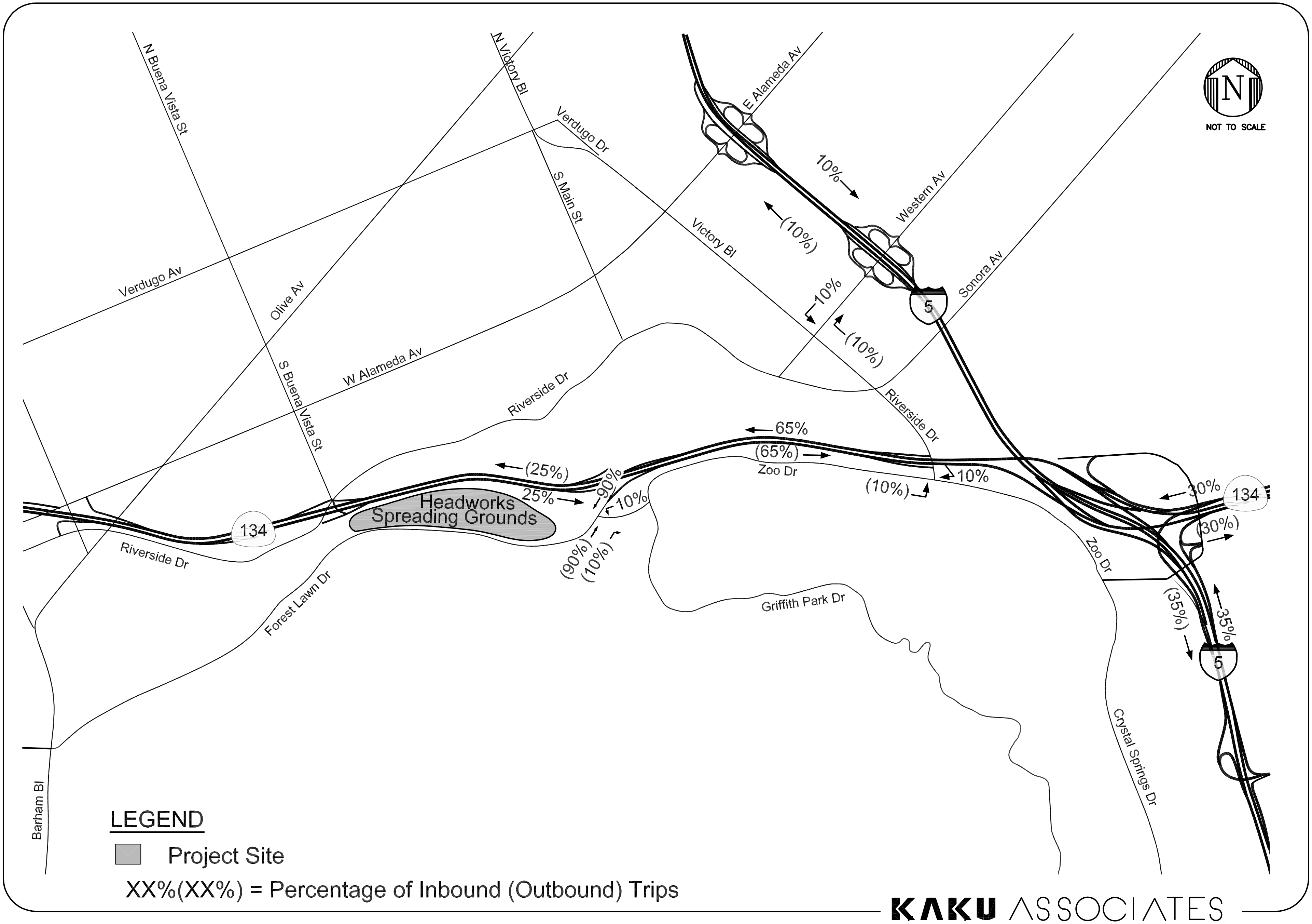

FIGURE 10B
TRIP DISTRIBUTION - TRUCKS (HWSG SITE)

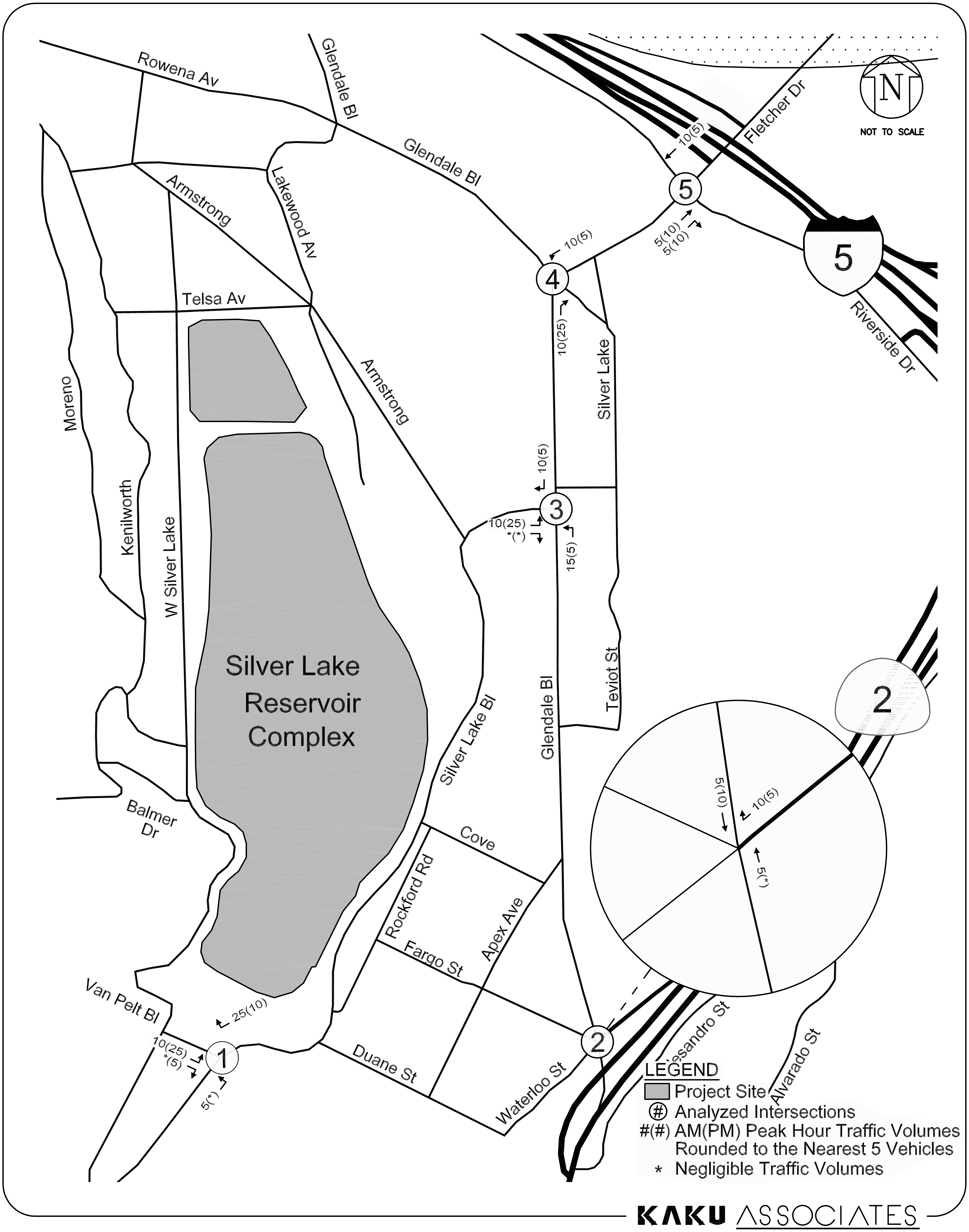

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FIGURE 11A
PROJECT ONLY PEAK HOUR TRAFFIC VOLUMES (SLRC SITE)

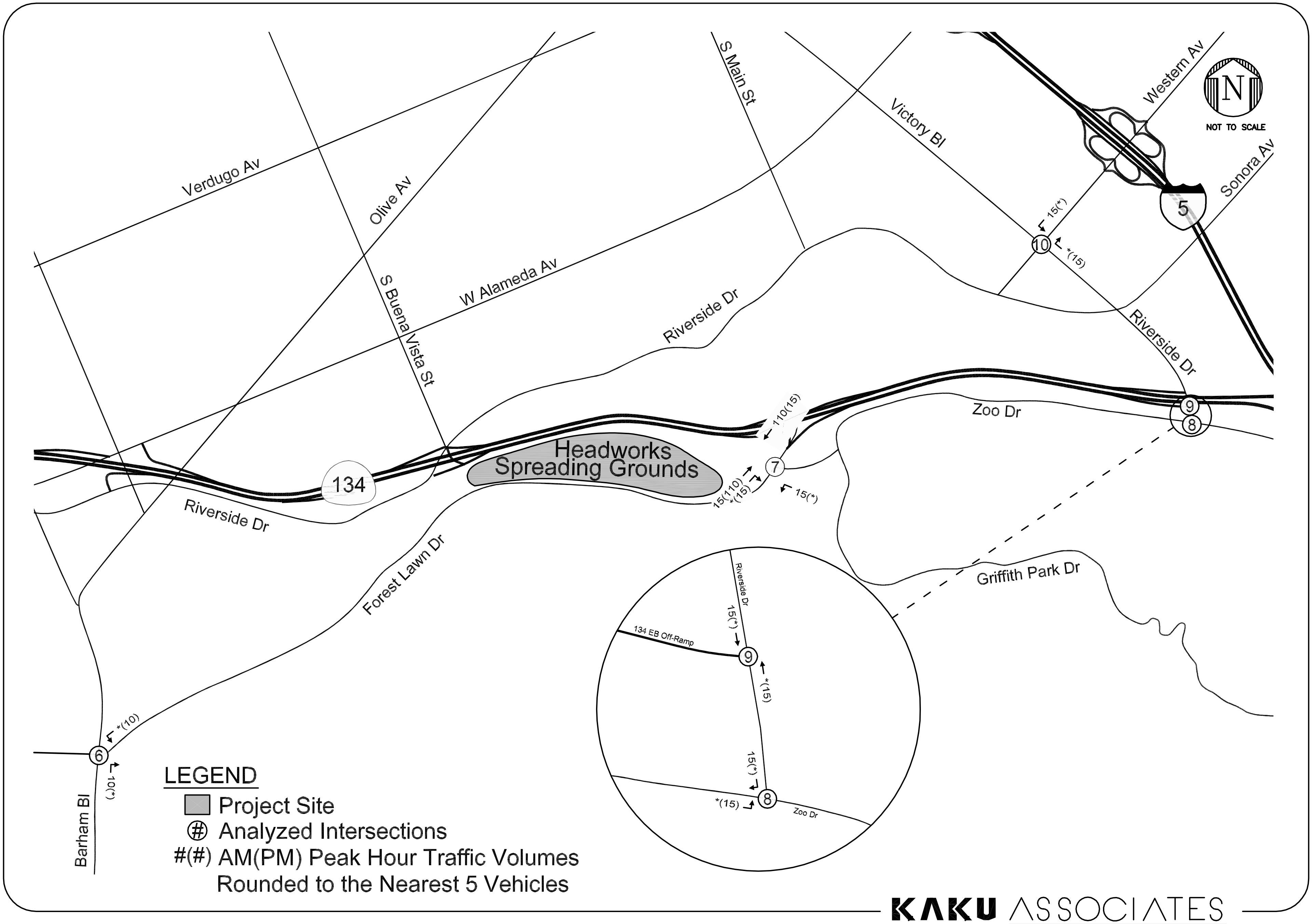


FIGURE 11B
PROJECT ONLY PEAK HOUR TRAFFIC VOLUMES (HWSG SITE)

CUMULATIVE PLUS PROJECT TRAFFIC PROJECTIONS

The project-generated traffic volumes from Figures 11A and 11B were added to the cumulative base traffic volumes illustrated in Figures 8A and 8B to develop cumulative plus project peak hour traffic volumes as illustrated in Figures 12A and12B.

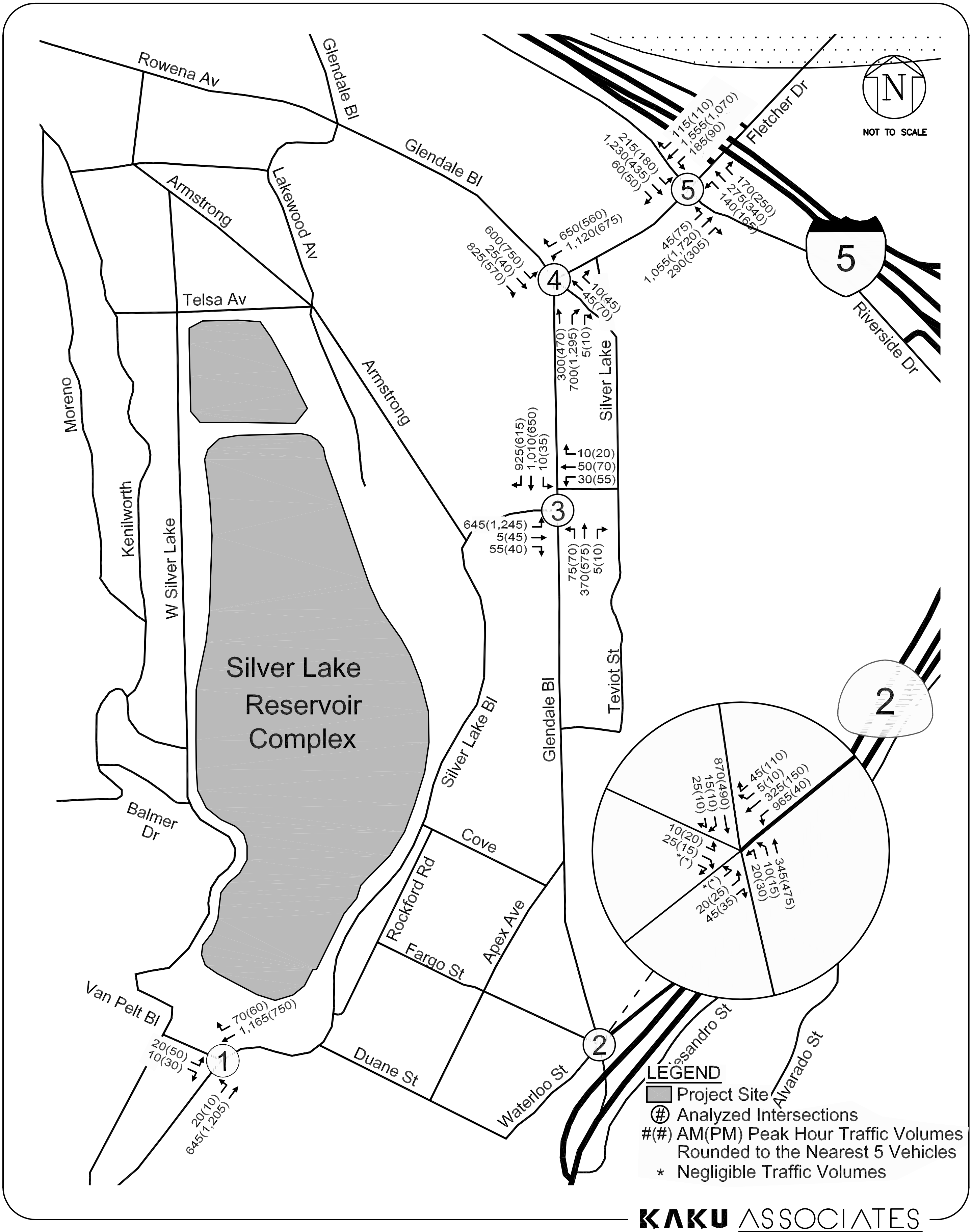


FIGURE 12A
YEAR 2013 CUMULATIVE PLUS PROJECT
PEAK HOUR TRAFFIC VOLUMES (SLRC SITE)

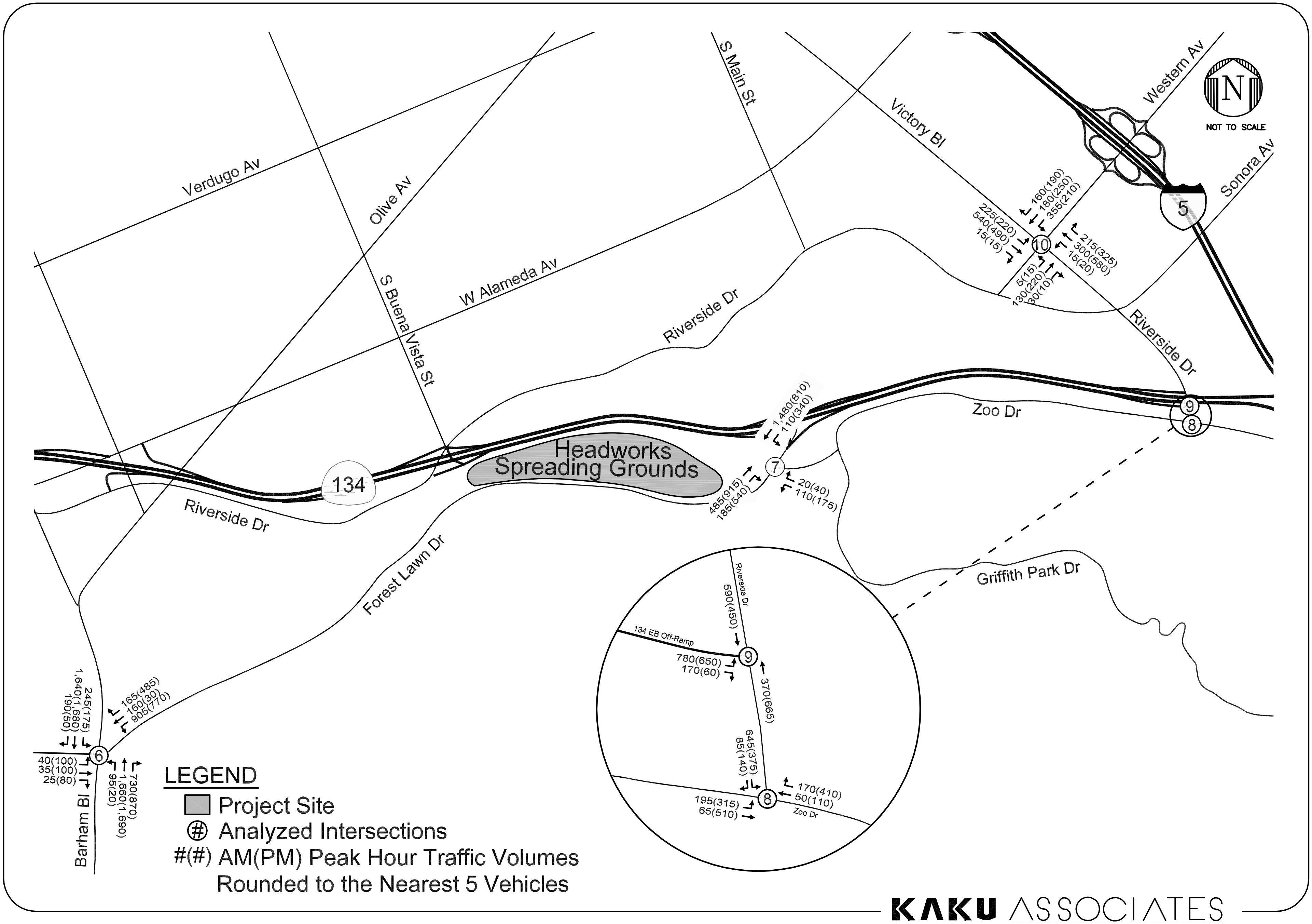


FIGURE 12B
YEAR 2013 CUMULATIVE PLUS PROJECT PEAK HOUR TRAFFIC VOLUMES (HWSG SITE)

IV. TRAFFIC IMPACT ANALYSIS

The traffic impact analysis compares the projected levels of service at each study intersection under the cumulative base and cumulative plus project conditions to estimate the incremental increase in the V/C ratio caused by the proposed project. This provides the information needed to assess the potential impact of the project using significance criteria established by LADOT. In addition, potential impacts of the trips on the roadway were also evaluated in this chapter.

SIGNIFICANT TRAFFIC IMPACT CRITERIA

The City of Los Angeles Department of Transportation has established threshold criteria used to determine if a project has a significant traffic impact at an intersection. In accordance with the *LADOT Traffic Study Policies and Procedures* set by City of Los Angeles, the significant impact criteria identified is a standard guideline within the City of Los Angeles in evaluating the potential traffic impact of a project. Under the LADOT standard, a project impact would be considered significant if the following conditions are met:

Intersection Condition with Project Traffic		Project-related Increase
LOS	V/C Ratio	in V/C Ratio
C	0.701 – 0.800	equal to or greater than 0.040
D	0.801 – 0.900	equal to or greater than 0.020
E, F	> 0.900	equal to or greater than 0.010

Using these criteria, for example, a project would not have a significant impact at an intersection if it is operating at LOS C after the addition of project traffic and the incremental change in the V/C ratio is less than 0.040. If, however, the intersection is operating at a LOS F after the addition of project traffic and the incremental change in the V/C ratio is 0.010 or greater, the project would be considered to have a significant impact.

CUMULATIVE BASE TRAFFIC CONDITIONS

The year 2013 cumulative base peak hour traffic volumes were analyzed to determine the projected V/C ratios and levels of service for the ten analyzed intersections. Without the addition of project traffic, Table 9 summarizes the future levels of service. As indicated in Table 9, only four of the ten study intersections are projected to operate at an acceptable level of service (LOS D or better) during both peak hours. The following are the study locations projected to operate at an unacceptable level of service:

- Silver Lake Boulevard & Van Pelt Place
- Riverside Drive & Fletcher Drive
- Barham Boulevard & Forest Lawn Drive/Lakeside Plaza Drive
- Forest Lawn Drive & Zoo Drive
- Riverside Drive & Zoo Drive
- Riverside Dr & SR-134 EB off-ramp

CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

The resulting cumulative plus project peak hour traffic volumes, illustrated in Figures 12A and 12B, were analyzed to determine the projected future operating conditions with the addition of the proposed project traffic. The results of the cumulative plus project analysis, which are presented in Table 9, indicate that three of the ten analyzed intersections are expected to operate at LOS D or better during both peak hours. The following are the study locations are projected to operate at an unacceptable level of service:

- Silver Lake Boulevard & Van Pelt Place
- Glendale Boulevard & SR-2 SB off-ramp/Waterloo Street/Fargo Street
- Riverside Drive & Fletcher Drive
- Barham Boulevard & Forest Lawn Drive/Lakeside Plaza Drive
- Forest Lawn Drive & Zoo Drive
- Riverside Drive & Zoo Drive
- Riverside Drive & SR-134 EB off-ramp

TABLE 9
YEAR 2013 FUTURE CONDITIONS
INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour	Year 2013 Cumulative Base V/C or Delay	Year 2013 Cumulative Base LOS	Year 2013 Cumulative Plus Project V/C or Delay	Year 2013 Cumulative Plus Project LOS	Increase in V/C or Delay	Significant Impact?
SLRC Site :							
1. Silver Lake Bl & Van Pelt Pl [1]	AM	0.801		0.810		0.009	
	PM	0.841		0.860		0.019	
	AM	49	E	72	F	23	NO
	PM	66	E	[2]	F	n/a	YES
2. Glendale Bl & SR-2 SB-off ramp/Waterloo St/Fargo St	AM	0.908	D	0.912	E	0.004	NO
	PM	0.483	A	0.487	A	0.004	NO
3. Glendale Bl & Silver Lake Bl	AM	0.677	B	0.695	B	0.018	NO
	PM	0.750	C	0.761	C	0.011	NO
4. Fletcher Dr/Glendale Bl & Silver Ridge Av/Rowena Av (Glendale Bl)	AM	0.814	D	0.818	D	0.004	NO
	PM	0.877	D	0.877	D	0.000	NO
5. Riverside Dr & Fletcher Dr	AM	1.037	F	1.041	F	0.004	NO
	PM	0.972	E	0.979	E	0.007	NO
HWSG Site:							
6. Barham Bl & Forest Lawn Dr/Lakeside Plaza Drive	AM	1.105	F	1.105	F	0.000	NO
	PM	1.046	F	1.051	F	0.005	NO
7. Forest Lawn Dr & Zoo Dr	AM	0.978	E	1.060	F	0.082	YES
	PM	0.878	D	0.953	E	0.075	YES
8. Riverside Dr & Zoo Dr [1]	AM	0.674		0.675		0.001	
	PM	0.723		0.733		0.010	
	AM	64	F	69	F	5	NO
	PM	39	E	41	E	1	NO
9. Riverside Dr & SR-134 EB off-ramp [1]	AM	0.478		0.483		0.005	
	PM	0.455		0.460		0.005	
	AM	66	F	71	F	5	NO
	PM	96	F	[2]	F	n/a	NO
10. Victory Bl & Western Ave	AM	0.657	B	0.667	B	0.010	NO
	PM	0.747	C	0.751	C	0.004	NO

Notes:

[1] Intersection is controlled by stop signs. The top row show analysis using Highway Capacity Manual stop-controlled methodology, for the purpose of evaluating the operating condition of the intersection. Average vehicular delay in seconds is reported rather than V/C ratio. The bottom rows show analysis using the CMA methodology, for the purpose of application of City of Los Angeles significant criteria. V/C ratio is reported

[2] Overflow condition indicating oversaturated conditions for long periods. Average vehicle delay cannot be calculated.

PROJECT IMPACTS

Intersection Impacts

Using LADOT's criteria for determining the significance of the project traffic impacts, the proposed project was determined to have significant impacts at two of the ten analyzed intersections. The two intersections are:

- Silver Lake Boulevard & Van Pelt Place
- Forest Lawn Drive & Zoo Drive

On-street Impacts

The potential impact of the proposed bypass pipeline tunneling construction was also evaluated along West Silver Lake Drive. For tunneling operations, jacking (entrance) and receiving (exit) pits would be needed at the ends of the pipe for equipment and to export materials. A jacking pit of 14 feet by 40 feet would be constructed on West Silver Lake Drive south of Armstrong Avenue and a receiving pit of 14 feet by 20 feet would be constructed on West Silver Lake Drive east of Redesdale Avenue (note that Redesdale Avenue does not intersect with West Silver Lake Drive). Approximately ten parking spaces would need to be temporarily removed at the proposed jacking pit location while West Silver Lake Drive east of Redesdale Avenue would need to be temporarily narrowed to accommodate the proposed receiving pit. West Silver Lake Drive is approximately 44 feet wide with parking on both sides within the vicinity of the proposed jacking pit, while no parking is allowed on the eastern portion of the roadway east of Redesdale Avenue. The proposed pits are expected to have minimal impact on the traffic flow along West Silver Lake Drive during the construction period since the existing number of travel lanes would be maintained. As for the proposed temporary removal of the parking at the jacking pit, on-street parking availability in the area was observed to be adequate. Thus, the temporary parking loss would have negligible impact on parking in the area.

Neighborhood Traffic Impacts

As part of the traffic analysis, the potential impact of the project traffic on the adjacent residential neighborhood was also evaluated. Adjacent residential street segments on both HWSG and SLRC sites were evaluated to determine the potential neighborhood intrusion impacts of the proposed project. Using the methodology described in *LADOT Traffic Study Policies and Procedures*, it is based on percentage increase in daily traffic on the residential street. LADOT uses a sliding scale that becomes more stringent as the daily volume increases. The thresholds set by LADOT are as follows:

Projected Daily Traffic with Project (Final ADT)	Project-related Increase in Daily Traffic
Less than 1,000	16% or more of final ADT
1,000 or more	12% or more of final ADT
2,000 or more	10% or more of final ADT
3,000 or more	8% or more of final ADT

The HWSG site is located in an area where residential neighborhoods are distant enough that the project traffic is highly unlikely to cut through any residential streets. The access routes to and from the site would have no alternative other than traveling along major roadways since no residential streets within the study area would lead into and out of the HWSG site. Thus, project related in daily traffic in any residential streets nearby would be negligible and insignificant.

The SLRC site, however, is adjacent to residential neighborhoods, where project traffic may travel along some of the residential streets surrounding the site. As shown in the trip generation estimates derivation in Table 6, a maximum of 18 trucks and 21 construction workers per day are expected on-site. A total of 36 truck trips and 42 automobile trips could potentially use some of the residential streets. Trucks entering and leaving the site, however, would be directed to avoid unnecessary use of the residential streets. Truck routes would be designated as part of the traffic control plan that should be submitted to LADOT for their approval. The additional 42 daily trips made by the 21 construction workers are likely to access the site through major roadways such as Silver Lake Boulevard and Glendale Boulevard, as shown in the trip distribution in Figure 9A. Assuming a portion of the 42 daily trips would use one of the residential streets, the additional traffic is insignificant considering the number of trips is small. Based on the maximum trip generation estimates at the SLRC site, the project related increase in daily traffic in any of the residential streets are not expected to exceed any of the neighborhood intrusion impact criteria identified above. Therefore, the potential impact at the surrounding neighborhood streets would also be insignificant at the SLRC site.

V. MITIGATION MEASURES

The traffic impact analysis in the previous chapter determined that the proposed Silver Lake Reservoir Replacement Complex Project would generate significant traffic impacts at two of the ten intersections analyzed in this study under cumulative plus project conditions. Potential measures to mitigate these impacts are identified and evaluated in this chapter.

DESCRIPTION OF MITIGATION MEASURES

Typically, physical improvements such as roadway, traffic signal operation, and right-of-way acquisition improvements are proposed as mitigation measures to reduce impacts to levels of insignificance at any of the impacted locations. This proposed project, however, is temporary in nature and the level of traffic being added to the street system will only be present until completion of the project construction. Thus, permanent improvements at the impacted locations are unnecessary.

Although all potential measures were considered while developing project mitigation measures, the analysis concentrated on operational strategies of controlling the project-generated trips during the impacted peak hours, such as rescheduling the arrival or the departure time for construction workers and truck deliveries. The following detailed the mitigation measures for the two impacted study intersections:

- <u>Silver Lake Boulevard and Van Pelt Place (the SLRC site)</u> - Two operational measures were developed to eliminate the project traffic impact at this location during the afternoon peak hour. Truck deliveries for materials or equipment should be scheduled so that none of the truck trips would arrive or depart the SLRC site during the afternoon peak period between 4 p.m. and 6 p.m. Any truck deliveries should occur before the afternoon peak period. In addition, the maximum 21 construction workers projected at the site should have a staggered schedule so that no more than 15 construction workers (the threshold) would leave the SLRC site during the afternoon peak hour.

- Forest Lawn Drive & Zoo Drive (HWSG site) - Due to the amount of traffic projected and the lane capacities at this location, there was no operational or temporary mitigation measure feasible that would reduce the project impact to levels of insignificance. Physical improvements were considered at this location, however, the proposed project is temporary and the additional traffic added to this location would not be present once the construction is completed. The schedule of the construction workers can be staggered to minimize the impact at this location.

In addition, the preparation of a site specific traffic control plan should be prepared when necessary for any stage of the construction that may affect the traffic flow in the surrounding street system especially adjacent to the SLRC site. This plan could include details of the following:

- A detour plan if one is required. The detour plans would require diversion routes and the location of temporary signs, temporary traffic control devices, traffic control workers to direct traffic, and barriers.
- Change of lane designation plans
- Truck haul routes and site access points
- Vehicular and pedestrian circulation safety details including signage for site access, speed limits, and crosswalks
- Signage of temporary turn restrictions and alternative turn locations

The development of this plan must be coordinated with LADOT and would require their approval prior to the implementation of any measures and activities that would affect traffic flow in the area.

EFFECT OF MITIGATION MEASURES

With the implementation of the suggested operational strategies, the significant project impacts would be mitigated to levels of insignificance at one of the impacted intersection: Silver Lake Boulevard and Van Pelt Place. This trip reduction measure of eliminating the truck trips and limiting the worker outbound trips to no more than 15 departures during the afternoon peak hour would also reduce the V/C ratios at other study intersections near the SLRC site. Table 10 summarizes the effects of the proposed mitigation measures.

TABLE 10

YEAR 2013 FUTURE CONDITIONS WITH MITIGATION
INTERSECTION LEVELS OF SERVICE

Intersection	Peak Hour	Year 2013 Cumulative Base V/C or Delay	Year 2013 Cumulative Base LOS	Year 2013 Cumulative Plus Project V/C or Delay	Year 2013 Cumulative Plus Project LOS	Year 2013 Cumulative Plus Project Increase in V/C	Year 2013 Cumulative Plus Project Significant Impact?	Year 2013 Cumulative Plus Project w/ Mitigation V/C or Delay	Year 2013 Cumulative Plus Project w/ Mitigation LOS	Year 2013 Cumulative Plus Project w/ Mitigation Increase in V/C	Year 2013 Cumulative Plus Project w/ Mitigation Residual Impact?
SLRC Site :											
1. Silver Lake Bl & Van Pelt Pl [1]	AM	0.801		0.810		0.009		0.809		0.008	
	PM	0.841		0.860		0.019		0.850		0.009	
	AM	49	E	72	F	23	NO	70	F	21	NO
	PM	66	E	[2]	F	n/a	YES	[2]	F	n/a	NO
2. Glendale Bl & SR-2 SB-off ramp/Waterloo St/Fargo St	AM	0.908	D	0.912	E	0.004	NO	0.911	E	0.003	NO
	PM	0.483	A	0.487	A	0.004	NO	0.484	A	0.001	NO
3. Glendale Bl & Silver Lake Bl	AM	0.677	B	0.695	B	0.018	NO	0.691	B	0.014	NO
	PM	0.750	C	0.761	C	0.011	NO	0.753	C	0.003	NO
4. Fletcher Dr/Glendale Bl & Silver Ridge Av/Rowena Av (Glendale Bl)	AM	0.814	D	0.818	D	0.004	NO	0.817	D	0.003	NO
	PM	0.877	D	0.877	D	0.000	NO	0.877	D	0.000	NO
5. Riverside Dr & Fletcher Dr	AM	1.037	F	1.041	F	0.004	NO	1.040	F	0.003	NO
	PM	0.972	E	0.979	E	0.007	NO	0.975	E	0.003	NO
HWSG Site:											
6. Barham Bl & Forest Lawn Dr/Lakeside Plaza Drive	AM	1.105	F	1.105	F	0.000	NO	1.105	F	0.000	NO
	PM	1.046	F	1.051	F	0.005	NO	1.051	F	0.005	NO
7. Forest Lawn Dr & Zoo Dr	AM	0.978	E	1.060	F	0.082	YES	1.060	F	0.082	YES
	PM	0.878	D	0.953	E	0.075	YES	0.953	E	0.075	YES
8. Riverside Dr & Zoo Dr [1]	AM	0.674		0.675		0.001		0.675		0.001	
	PM	0.723		0.733		0.010		0.733		0.010	
	AM	64	F	69	F	5	NO	69	F	5	NO
	PM	39	E	41	E	1	NO	41	E	1	NO
9. Riverside Dr & SR-134 EB off-ramp [1]	AM	0.478		0.483		0.005		0.483		0.005	
	PM	0.455		0.460		0.005		0.460		0.005	
	AM	66	F	71	F	5	NO	71	F	5	NO
	PM	96	F	[2]	F	n/a	NO	[2]	F	n/a	NO
10. Victory Bl & Western Ave	AM	0.657	B	0.667	B	0.010	NO	0.667	B	0.010	NO
	PM	0.747	C	0.751	C	0.004	NO	0.751	C	0.004	NO

Notes:

[1] Intersection is controlled by stop signs. The top row show analysis using Highway Capacity Manual stop-controlled methodology, for the purpose of evaluating the operating condition of the intersection. Average vehicular delay in seconds is reported rather than V/C ratio. The bottom rows show analysis using the CMA methodology, for the purpose of application of City of Los Angeles significant criteria. V/C ratio is reported

[2] Overflow condition indicating oversaturated conditions for long periods. Average vehicle delay cannot be calculated.

As for the HWSG site, implementing a staggered schedule for construction workers can minimize the project impact at the intersection of Forest Lawn Drive and Zoo Drive. Although this location would remain impacted during the construction period, the effect would be mostly due to the cut through traffic in this area. The proposed site is located in a remote location where there would be no residential neighborhoods affected by the impacts at this location.

VI. REGIONAL/CMP ANALYSIS

This section presents the Congestion Management Program (CMP) transportation impact analysis. This analysis was conducted in accordance with the procedures outlined in the *Congestion Management Program for Los Angeles County* (Los Angeles County Metropolitan Transportation Authority, June 2002). The CMP requires that when an EIR is prepared for a project, traffic impact analyses be conducted for select regional facilities based on the quantity of project traffic expected to use these facilities.

CMP TRAFFIC IMPACT ANALYSIS

The CMP guidelines for determining the study area of the analysis for CMP arterial monitoring intersections and for freeway monitoring locations are as follows:

- All CMP arterial monitoring intersections where the proposed project will add 50 or more trips during either the a.m. or p.m. weekday peak hours of adjacent street traffic.
- All CMP mainline freeway monitoring locations where the proposed project will add 150 or more trips, in either direction, during either the a.m. or p.m. weekday peak hours.

The nearest CMP arterial monitoring intersection to the SLRC site is the intersection of Alvarado Boulevard and Sunset Boulevard. The HWSG site, however, does not have any monitoring location within the vicinity of the study area. Based on the incremental project trip generation estimates presented in Chapter III (39 morning peak hour trips and 39 project afternoon peak hour trips), the proposed project is not expected to add 50 or more new trips per hour to this location. Therefore, no further analysis of this CMP monitoring intersection is required. The nearest mainline freeway monitoring locations to the two project sites are the Golden State Freeway (I-5) at Stadium Way (close to the SLRC site) and the Ventura Freeway (SR-134) at east of Central Avenue (close to the HWSG site).

Based on the incremental project trip generation estimates presented in Chapter III, the project is expected to generate 152 morning peak hour trips and 152 afternoon peak hour trips for the HWSG site. Given the trip distribution illustrated in Figure 10A and 10B, only 30% of the project trips (46 morning peak hour trips and 46 afternoon peak hour trips) would travel on Ventura Freeway (SR-134) to access the HWSG Site from/to the east. Therefore, the proposed project will not add more than the threshold of 150 new trips per hour to the CMP monitoring station along the Ventura Freeway at. Therefore, no further analysis is required at this CMP freeway monitoring station. Similarly, based on the incremental project trip generation estimates presented in Chapter III, the proposed project will not add more than the threshold of 150 new trips per hour to the CMP monitoring station along the Golden State Freeway at Stadium Way or any nearby freeway segment. Therefore, no further analysis is required at this CMP freeway monitoring station.

VII. SUMMARY AND CONCLUSIONS

This study was undertaken to analyze the potential traffic impacts of the proposed Silver Lake Reservoir Complex Storage Replacement Project on the local street systems near the SLRC and HWSG project sites. The following summarizes the results of this analysis:

- The proposed project is a six-year construction plan, which would remove Silver Lake and Ivanhoe Reservoirs (SLRC site) from direct service to the LADWP water distribution system and construct a new water storage facility and a new power generating facility at the existing Headwork Spreading Ground site (HWSG site). The addition of a regulating station and a new bypass pipeline would convey water delivery flow to existing service areas and operation of Silver Lake and Ivanhoe Reservoirs as drinking water storage facilities would change. As a result of the proposed construction plan, the proposed project is expected to generate additional trips at the two project sites: 39 vph during both the morning and afternoon peak hours at the SLRC site, and 152 vph during both the morning and afternoon peak hours at the HWSG site. The trip generation estimates were based on the period of maximum construction activity.

- Ten intersections were analyzed within the two separate study areas for this project, including five locations near the SLRC site and five locations near the HWSG site. Four of the ten study intersections currently operate at LOS D or better during both peak hours.

- Analysis of projected year 2013 cumulative base conditions, representing future conditions without the proposed project, indicates that four of the ten analyzed intersections would continue to operate at LOS D or better during both peak hours.

- Analysis of projected cumulative plus project conditions indicates that, using the City of Los Angeles criteria for determining significance of impact, the proposed project would have significant impacts at two intersections during the period of maximum construction activity: Silver Lake Boulevard & Van Pelt Place and Forest Lawn Drive & Zoo Drive.

- Implementation of proposed operational measures of rescheduling truck deliveries and working hours of construction workers would mitigate the project impacts to a level of insignificance at the intersection of Silver Lake Boulevard and Van Pelt Place. The intersection of Forest Lawn Drive and Zoo Drive, however, would remain impacted during the construction period due to the large amount of traffic projected at this location. Staggered scheduling of the construction workers can be implemented to reduce, but not eliminate, the impact level at this location.

- Traffic control plan should be prepared when necessary for any stage of the construction that may affect the traffic flow in the surrounding street system especially adjacent to the SLRC site. The development of this plan must be coordinated with LADOT and would require their approval prior to the implementation of any measures and activities that would affect traffic flow in the area.

- Analyses conducted to satisfy the Los Angeles County Congestion Management Program (CMP) determined that the project would have negligible effects at CMP arterial monitoring intersections and the regional freeway system.

REFERENCES

Congestion Management Program for Los Angeles County, Los Angeles County Metropolitan Transportation Authority, June 2002.

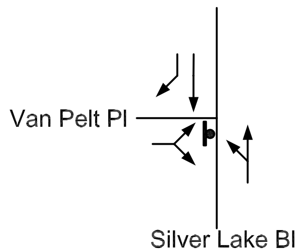
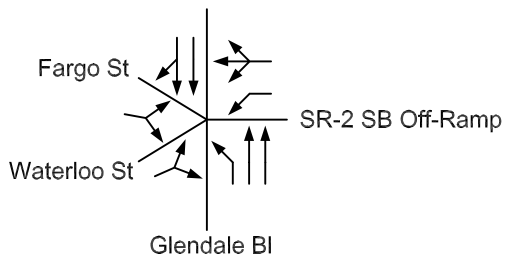
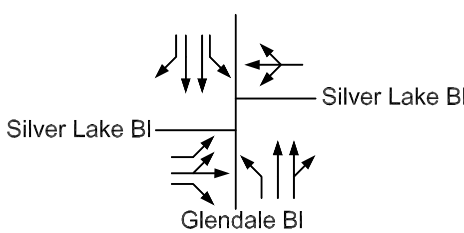
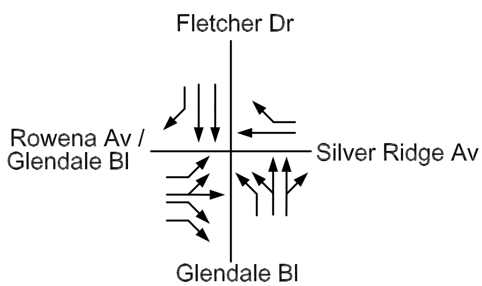
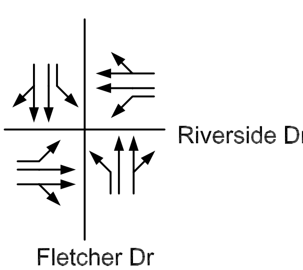
Trip Generation Manual, 6th Edition, Institute of Transportation Engineers (ITE), 1997

2000 Highway Capacity Manual, Transportation Research Board, Special Report 209

APPENDIX A

INTERSECTION LANE CONFIGURATIONS

INTERSECTION LANE CONFIGURATIONS

	EXISTING CONDITIONS	FUTURE W/ MITIGATION
1. Silver Lake Bl & Van Pelt Pl		Operational Mitigation Measure
2. Glendale Bl & SR-2 SB-off Ramp / Fargo St / Waterloo St		Same As Existing
3. Glendale Bl & Silver Lake Bl		Same As Existing
4. Glendale Bl & Fletcher Dr / Silver Ridge Av		Same As Existing
5. Fletcher Dr & Riverside Dr		Same As Existing

= Stop Sign

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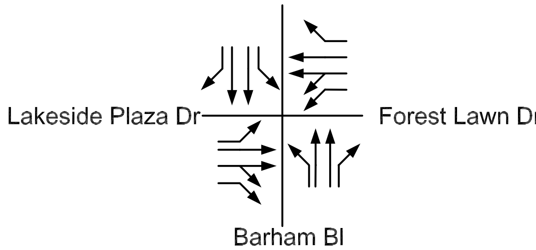
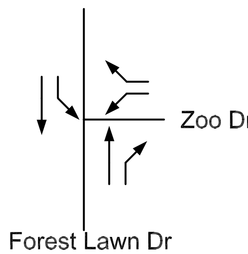
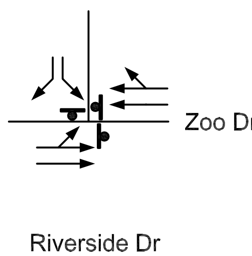
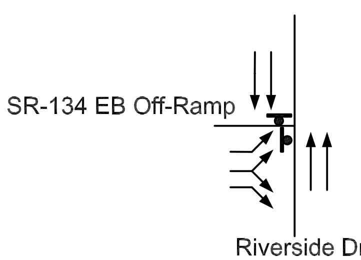
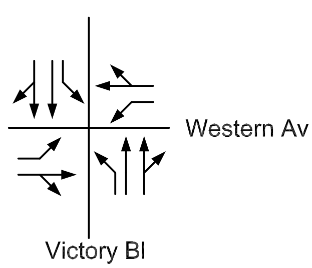
INTERSECTION LANE CONFIGURATIONS

	EXISTING CONDITIONS	FUTURE W/ MITIGATION
6. Barham Bl & Forest Lawn Dr / Lakeside Plaza Dr		Same As Existing
7. Forest Lawn Dr & Zoo Dr		Same As Existing
8. Riverside Dr & Zoo Dr		Same As Existing
9. Riverside Dr & SR-134 EB Off-Ramp		Same As Existing
10. Victory Bl & Western Av		Same As Existing

= Stop Sign

KAKU ASSOCIATES

APPENDIX B

TRAFFIC COUNTS

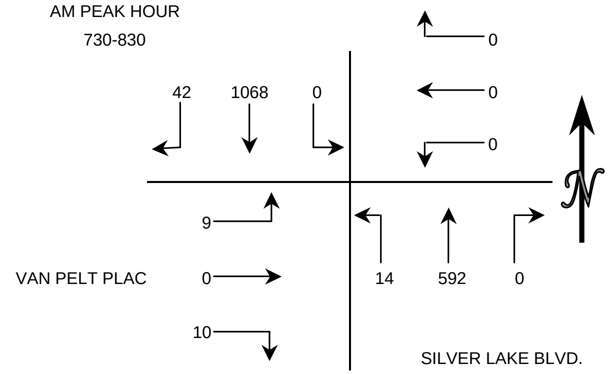
WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

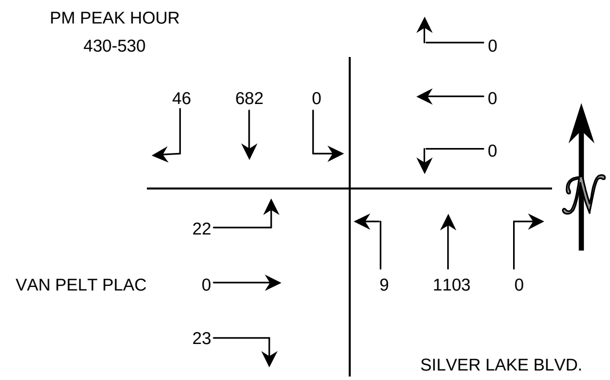
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KAKU ASSOCIATES, INC.
PROJECT: SILVER LAKE
DATE: MAY 4, 2004
PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
INTERSECTION: N/S SILVER LAKE BLVD.
E/W VAN PELT PLACE

15 MIN COUNTS						7:00 AM TO 9:00 AM							
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	6	201	0	0	0	0	0	100	3	2	0	1	313
715-730	3	235	0	0	0	0	0	121	5	4	0	3	371
730-745	8	295	0	0	0	0	0	156	3	5	0	1	468
745-800	9	277	0	0	0	0	0	164	5	1	0	0	456
800-815	17	253	0	0	0	0	0	148	3	1	0	2	424
815-830	8	243	0	0	0	0	0	124	3	3	0	6	387
830-845	10	251	0	0	0	0	0	154	8	3	0	2	428
845-900	11	231	0	0	0	0	0	122	2	3	0	4	373
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	26	1008	0	0	0	0	0	541	16	12	0	5	1608
715-815	37	1060	0	0	0	0	0	589	16	11	0	6	1719
730-830	42	1068	0	0	0	0	0	592	14	10	0	9	1735
745-845	44	1024	0	0	0	0	0	590	19	8	0	10	1695
800-900	46	978	0	0	0	0	0	548	16	10	0	14	1612



15 MIN COUNTS						4:00 PM TO 6:00 PM							
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	7	145	0	0	0	0	0	248	1	4	0	5	410
415-430	6	150	0	0	0	0	0	250	1	4	0	1	412
430-445	10	156	0	0	0	0	0	282	1	4	0	2	455
445-500	10	184	0	0	0	0	0	265	4	5	0	5	473
500-515	17	153	0	0	0	0	0	282	2	6	0	7	467
515-530	9	189	0	0	0	0	0	274	2	8	0	8	490
530-545	7	175	0	0	0	0	0	257	3	6	0	5	453
545-600	10	164	0	0	0	0	0	268	2	8	0	13	465
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	33	635	0	0	0	0	0	1045	7	17	0	13	1750
415-515	43	643	0	0	0	0	0	1079	8	19	0	15	1807
430-530	46	682	0	0	0	0	0	1103	9	23	0	22	1885
445-545	43	701	0	0	0	0	0	1078	11	25	0	25	1883
500-600	43	681	0	0	0	0	0	1081	9	28	0	33	1875



WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

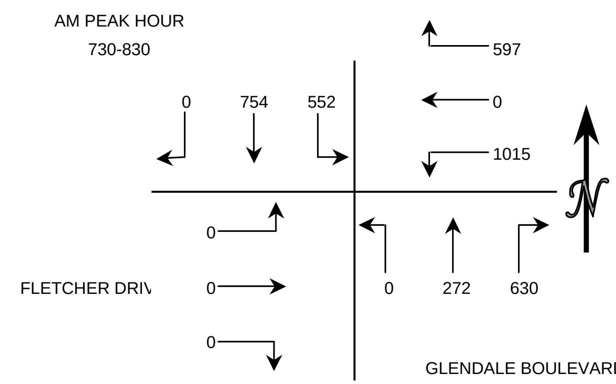
CLIENT: KAKU ASSOCIATES, INC.
PROJECT: SILVER LAKE
DATE: MAY 4, 2004
PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
INTERSECTION: N/S GLENDALE BOULEVARD
E/W FLETCHER DRIVE

15 MIN COUNTS — 7:00 AM TO 9:00 AM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	0	172	113	154	0	232	93	74	0	0	0	0	838
715-730	0	175	141	145	0	252	151	71	0	0	0	0	935
730-745	0	198	151	157	0	255	159	70	0	0	0	0	990
745-800	0	206	130	166	0	254	166	75	0	0	0	0	997
800-815	0	184	119	120	0	241	152	60	0	0	0	0	876
815-830	0	166	152	154	0	265	153	67	0	0	0	0	957
830-845	0	145	118	126	0	206	151	62	0	0	0	0	808
845-900	0	185	106	167	0	200	157	77	0	0	0	0	892

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	0	751	535	622	0	993	569	290	0	0	0	0	3760
715-815	0	763	541	588	0	1002	628	276	0	0	0	0	3798
730-830	0	754	552	597	0	1015	630	272	0	0	0	0	3820
745-845	0	701	519	566	0	966	622	264	0	0	0	0	3638
800-900	0	680	495	567	0	912	613	266	0	0	0	0	3533

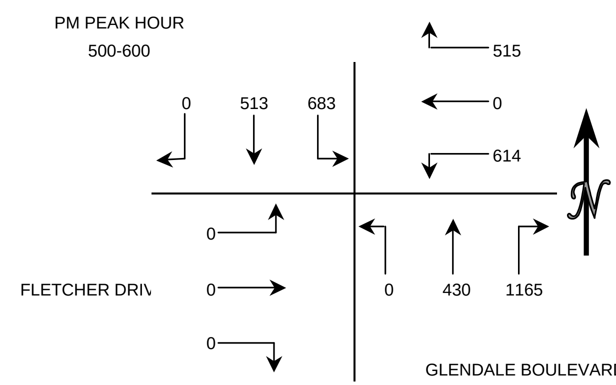


15 MIN COUNTS — 4:00 PM TO 6:00 PM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	0	123	141	127	0	111	258	105	0	0	0	0	865
415-430	0	109	147	120	0	121	275	93	0	0	0	0	865
430-445	0	126	175	116	0	151	274	111	0	0	0	0	953
445-500	0	138	187	106	0	129	295	98	0	0	0	0	953
500-515	0	130	148	122	0	156	291	112	0	0	0	0	959
515-530	0	141	194	126	0	157	297	107	0	0	0	0	1022
530-545	0	140	171	118	0	152	299	105	0	0	0	0	985
545-600	0	102	170	149	0	149	278	106	0	0	0	0	954

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	0	496	650	469	0	512	1102	407	0	0	0	0	3636
415-515	0	503	657	464	0	557	1135	414	0	0	0	0	3730
430-530	0	535	704	470	0	593	1157	428	0	0	0	0	3887
445-545	0	549	700	472	0	594	1182	422	0	0	0	0	3919
500-600	0	513	683	515	0	614	1165	430	0	0	0	0	3920



WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

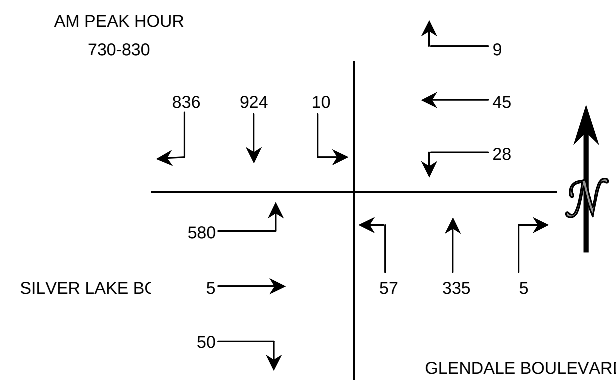
CLIENT: KAKU ASSOCIATES, INC.
PROJECT: SILVER LAKE
DATE: MAY 4, 2004
PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
INTERSECTION: N/S GLENDALE BOULEVARD
E/W SILVER LAKE BOULEVARD

15 MIN COUNTS — 7:00 AM TO 9:00 AM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	184	192	1	2	9	4	0	84	11	4	3	98	592
715-730	187	205	2	1	16	8	3	59	10	7	3	104	605
730-745	214	250	1	2	10	8	0	84	15	12	2	136	734
745-800	226	222	2	0	12	7	3	88	14	14	1	177	766
800-815	195	259	3	3	11	6	0	92	15	13	2	149	748
815-830	201	193	4	4	12	7	2	71	13	11	0	118	636
830-845	164	186	6	5	15	8	1	73	14	13	0	138	623
845-900	151	189	6	6	14	6	2	88	14	8	4	155	643

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	811	869	6	5	47	27	6	315	50	37	9	515	2697
715-815	822	936	8	6	49	29	6	323	54	46	8	566	2853
730-830	836	924	10	9	45	28	5	335	57	50	5	580	2884
745-845	786	860	15	12	50	28	6	324	56	51	3	582	2773
800-900	711	827	19	18	52	27	5	324	56	45	6	560	2650

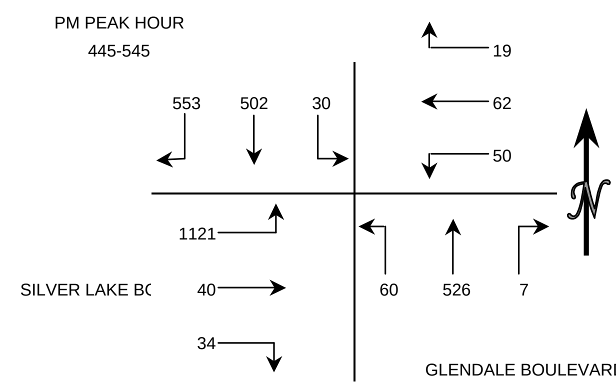


15 MIN COUNTS — 4:00 PM TO 6:00 PM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	102	114	5	6	17	11	3	124	16	9	14	241	662
415-430	110	107	12	9	14	7	2	104	17	6	14	247	649
430-445	126	123	7	7	16	9	4	129	17	7	7	280	732
445-500	120	123	12	7	19	15	0	133	20	9	4	274	736
500-515	133	121	5	2	13	11	0	125	15	6	7	297	735
515-530	146	130	7	6	11	11	4	123	12	13	18	259	740
530-545	154	128	6	4	19	13	3	145	13	6	11	291	793
545-600	119	109	9	11	7	10	0	117	17	8	7	270	684

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	458	467	36	29	66	42	9	490	70	31	39	1042	2779
415-515	489	474	36	25	62	42	6	491	69	28	32	1098	2852
430-530	525	497	31	22	59	46	8	510	64	35	36	1110	2943
445-545	553	502	30	19	62	50	7	526	60	34	40	1121	3004
500-600	552	488	27	23	50	45	7	510	57	33	43	1117	2952



WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0964

5-LEG INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KAKU ASSOCIATES, INC.
PROJECT: SILVER LAKE
DATE: MAY 4, 2004
PERIOD: 4:00 PM TO 6:00 PM
INTERSECTION: N/S GLENDALE BOULEVARD
E/W SR-2 SB-OFF RAMP/WATERLOO/FARGO

15 MIN COUNTS																					
	SB GLENDALE BLVD.				SEB SR-2 SB OFF RAMP				NB GLENDALE BLVD.				NEB WATERLOO STREET				SEB FARGO STREET				
PERIOD	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	TOTALS
400-415	4	1	98	0	27	4	26	5	0	80	2	12	7	0	3	0	0	2	0	2	273
415-430	2	1	91	0	23	7	33	13	0	116	4	6	10	0	7	0	0	1	0	1	315
430-445	0	3	100	0	19	5	28	9	0	104	2	5	8	0	4	0	1	5	0	2	295
445-500	1	1	106	0	19	3	26	8	0	111	5	4	3	0	4	0	1	5	0	1	298
500-515	3	3	108	0	23	1	36	15	0	91	4	6	11	0	8	0	0	1	0	6	316
515-530	6	4	113	0	27	3	43	9	0	117	5	10	10	0	7	0	0	4	0	6	364
530-545	0	3	109	0	29	1	33	5	0	114	1	8	9	0	5	0	0	4	0	5	326
545-600	0	4	97	0	21	3	37	9	0	85	2	7	5	0	3	0	0	0	0	3	276
HOUR TOTALS																					
	SB GLENDALE BLVD.				SEB SR-2 SB OFF RAMP				NB GLENDALE BLVD.				NEB WATERLOO STREET				SEB FARGO STREET				
PERIOD	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	TOTALS
400-500	7	6	395	0	88	19	113	35	0	411	13	27	28	0	18	0	2	13	0	6	1181
415-500	6	8	405	0	84	16	123	45	0	422	15	21	32	0	23	0	2	12	0	10	1224
430-530	10	11	427	0	88	12	133	41	0	423	16	25	32	0	23	0	2	15	0	15	1273
445-545	10	11	436	0	98	8	138	37	0	433	15	28	33	0	24	0	1	14	0	18	1304
500-600	9	14	427	0	100	8	149	38	0	407	12	31	35	0	23	0	0	9	0	20	1282

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0964

5-LEG INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KAKU ASSOCIATES, INC.
PROJECT: SILVER LAKE
DATE: MAY 4, 2004
PERIOD: 7:00 A.M. TO 9:00 A.M.
INTERSECTION: N/S GLENDALE BOULEVARD
E/W SR-2 SB-OFF RAMP/WATERLOO/FARGO

15 MIN COUNTS																				
	SB GLENDALE BLVD.				SEB SR-2 SB OFF RAMP				NB GLENDALE BLVD.				NEB WATERLOO STREET				SEB FARGO STREET				
PERIOD	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	TOTALS
700-715	4	18	152	0	11	1	58	253	0	58	2	4	12	0	3	0	0	1	0	3	580
715-730	2	4	191	0	14	1	66	232	0	60	2	4	12	0	1	0	0	2	0	1	592
730-745	8	2	215	0	13	0	54	209	0	50	2	8	9	0	4	0	0	0	0	2	576
745-800	10	3	190	0	9	5	71	231	0	87	1	5	9	0	6	0	0	2	0	4	633
800-815	3	3	197	0	5	0	75	202	0	86	3	6	15	0	4	0	0	5	0	1	605
815-830	5	6	216	0	9	0	70	231	0	64	2	7	9	0	7	0	0	8	0	1	635
830-845	3	4	185	0	7	0	82	223	0	71	3	1	8	0	3	0	0	7	0	2	599
845-900	3	2	150	0	10	0	69	235	0	66	0	3	13	0	3	0	0	3	0	1	558
HOUR TOTALS																					
	SB GLENDALE BLVD.				SEB SR-2 SB OFF RAMP				NB GLENDALE BLVD.				NEB WATERLOO STREET				SEB FARGO STREET				
PERIOD	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	TOTALS
700-800	24	27	748	0	47	7	249	925	0	255	7	21	42	0	14	0	0	5	0	10	2381
715-815	23	12	793	0	41	6	266	874	0	283	8	23	45	0	15	0	0	9	0	8	2406
730-830	26	14	818	0	36	5	270	873	0	287	8	26	42	0	21	0	0	15	0	8	2449
745-845	21	16	788	0	30	5	298	887	0	308	9	19	41	0	20	0	0	22	0	8	2472
800-900	14	15	748	0	31	0	296	891	0	287	8	17	45	0	17	0	0	23	0	5	2397

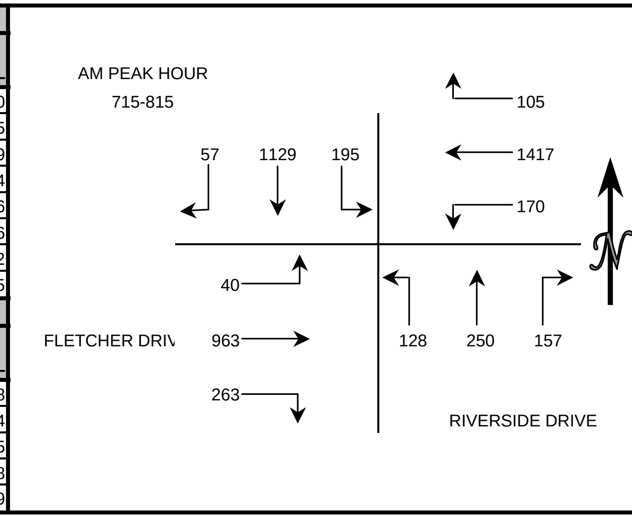
WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

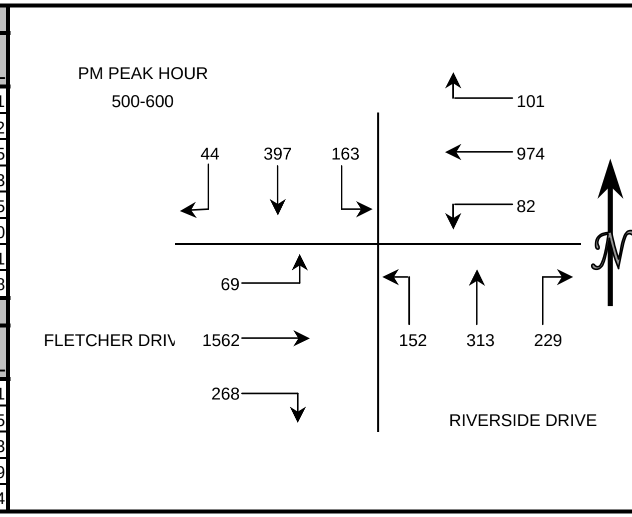
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KAKU ASSOCIATES, INC.
PROJECT: SILVER LAKE
DATE: MAY 4, 2004
PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
INTERSECTION: N/S RIVERSIDE DRIVE
E/W FLETCHER DRIVE

15 MIN COUNTS					7:00 AM TO 9:00 AM								
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	14	259	36	36	342	57	23	48	39	47	174	5	1080
715-730	16	318	49	38	377	48	28	74	28	56	215	8	1255
730-745	11	267	60	21	346	40	50	65	34	77	239	9	1219
745-800	13	278	40	22	353	35	31	62	33	61	257	9	1194
800-815	17	266	46	24	341	47	48	49	33	69	252	14	1206
815-830	19	236	43	28	378	42	22	46	35	63	238	6	1156
830-845	18	192	21	22	267	39	17	66	51	64	227	8	992
845-900	13	144	34	12	279	40	26	38	49	47	213	10	905
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	54	1122	185	117	1418	180	132	249	134	241	885	31	4748
715-815	57	1129	195	105	1417	170	157	250	128	263	963	40	4874
730-830	60	1047	189	95	1418	164	151	222	135	270	986	38	4775
745-845	67	972	150	96	1339	163	118	223	152	257	974	37	4548
800-900	67	838	144	86	1265	168	113	199	168	243	930	38	4259



15 MIN COUNTS					4:00 PM TO 6:00 PM								
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	16	72	29	12	202	25	57	62	36	67	361	12	951
415-430	16	76	41	8	209	27	47	59	36	59	365	9	952
430-445	17	74	42	18	231	27	53	55	46	57	393	22	1035
445-500	16	93	47	22	207	23	58	71	35	79	406	16	1073
500-515	7	96	27	30	239	25	50	81	48	70	382	10	1065
515-530	15	89	42	22	244	15	59	74	34	67	400	19	1080
530-545	9	100	41	23	222	21	58	84	30	76	403	14	1081
545-600	13	112	53	26	269	21	62	74	40	55	377	26	1128
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	65	315	159	60	849	102	215	247	153	262	1525	59	4011
415-515	56	339	157	78	886	102	208	266	165	265	1546	57	4125
430-530	55	352	158	92	921	90	220	281	163	273	1581	67	4253
445-545	47	378	157	97	912	84	225	310	147	292	1591	59	4299
500-600	44	397	163	101	974	82	229	313	152	268	1562	69	4354



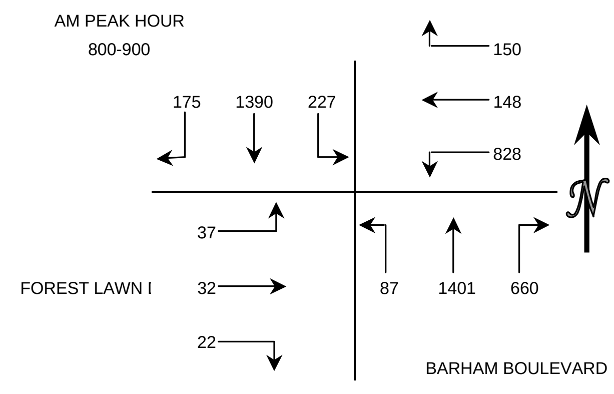
WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

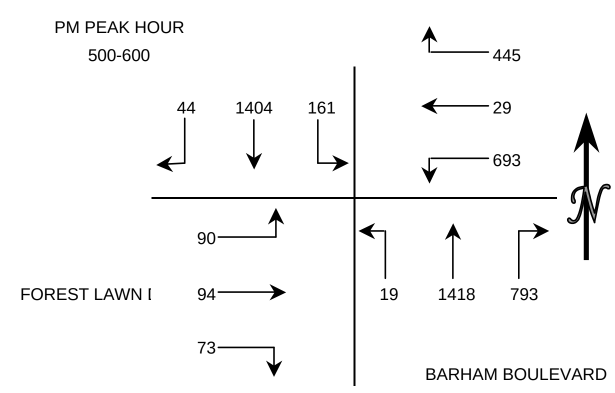
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KAKU ASSOCIATES, INC.
PROJECT: BURBANK TRAFFIC COUNTS
DATE: WEDNESDAY, MAY 5, 2004
PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
INTERSECTION: N/S BARHAM BOULEVARD
E/W FOREST LAWN DRIVE

15 MIN COUNTS	7:00 AM TO 9:00 AM												
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	18	289	28	9	8	223	80	147	13	2	3	3	823
715-730	19	309	40	19	15	253	104	180	4	4	2	4	953
730-745	26	407	36	25	13	241	117	226	7	3	7	7	1115
745-800	20	393	37	21	16	240	136	280	13	1	0	3	1160
800-815	32	403	57	25	30	221	157	257	22	5	4	5	1218
815-830	40	324	49	24	49	219	170	381	20	6	5	10	1297
830-845	48	325	62	34	33	184	166	379	21	8	14	10	1284
845-900	55	338	59	67	36	204	167	384	24	3	9	12	1358
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	83	1398	141	74	52	957	437	833	37	10	12	17	4051
715-815	97	1512	170	90	74	955	514	943	46	13	13	19	4446
730-830	118	1527	179	95	108	921	580	1144	62	15	16	25	4790
745-845	140	1445	205	104	128	864	629	1297	76	20	23	28	4959
800-900	175	1390	227	150	148	828	660	1401	87	22	32	37	5157



15 MIN COUNTS	4:00 PM TO 6:00 PM												
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	13	292	41	55	4	126	153	326	8	16	8	24	1066
415-430	14	282	36	59	11	109	163	302	10	18	13	25	1042
430-445	10	311	46	113	7	167	187	331	7	16	15	21	1231
445-500	12	352	35	113	4	161	175	324	3	11	16	12	1218
500-515	8	330	34	114	4	157	200	360	3	23	20	24	1277
515-530	12	331	36	102	5	179	200	332	6	14	20	18	1255
530-545	14	354	37	127	8	198	186	342	4	17	31	24	1342
545-600	10	389	54	102	12	159	207	384	6	19	23	24	1389
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	49	1237	158	340	26	563	678	1283	28	61	52	82	4557
415-515	44	1275	151	399	26	594	725	1317	23	68	64	82	4768
430-530	42	1324	151	442	20	664	762	1347	19	64	71	75	4981
445-545	46	1367	142	456	21	695	761	1358	16	65	87	78	5092
500-600	44	1404	161	445	29	693	793	1418	19	73	94	90	5263



WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KAKU ASSOCIATES, INC.
PROJECT: BURBANK TRAFFIC COUNTS
DATE: WEDNESDAY, MAY 5, 2004
PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
INTERSECTION: N/S RIVERSIDE DRIVE
E/W SR-134 EB OFF RAMP

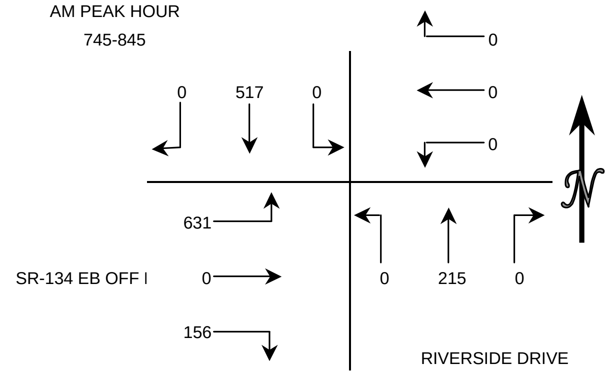
15 MIN COUNTS — 7:00 AM TO 9:00 AM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	0	66	0	0	0	0	0	17	0	20	0	97	200
715-730	0	104	0	0	0	0	0	24	0	32	0	112	272
730-745	0	111	0	0	0	0	0	21	0	49	0	118	299
745-800	0	125	0	0	0	0	0	46	0	45	0	161	377
800-815	0	129	0	0	0	0	0	57	0	32	0	151	369
815-830	0	136	0	0	0	0	0	55	0	41	0	152	384
830-845	0	127	0	0	0	0	0	57	0	38	0	167	389
845-900	0	88	0	0	0	0	0	56	0	32	0	201	377

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	0	406	0	0	0	0	0	108	0	146	0	488	1148
715-815	0	469	0	0	0	0	0	148	0	158	0	542	1317
730-830	0	501	0	0	0	0	0	179	0	167	0	582	1429
745-845	0	517	0	0	0	0	0	215	0	156	0	631	1519
800-900	0	480	0	0	0	0	0	225	0	143	0	671	1519

AM PEAK HOUR
745-845



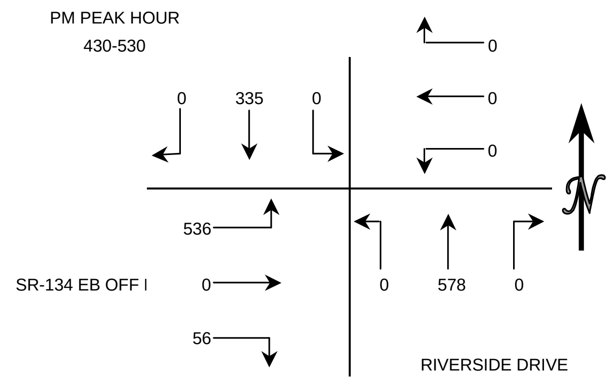
15 MIN COUNTS — 4:00 PM TO 6:00 PM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	0	59	0	0	0	0	0	91	0	10	0	133	293
415-430	0	68	0	0	0	0	0	88	0	7	0	154	317
430-445	0	72	0	0	0	0	0	146	0	9	0	138	365
445-500	0	76	0	0	0	0	0	127	0	11	0	144	358
500-515	0	91	0	0	0	0	0	141	0	24	0	130	386
515-530	0	96	0	0	0	0	0	164	0	12	0	124	396
530-545	0	84	0	0	0	0	0	160	0	6	0	90	340
545-600	0	70	0	0	0	0	0	157	0	7	0	113	347

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	0	275	0	0	0	0	0	452	0	37	0	569	1333
415-515	0	307	0	0	0	0	0	502	0	51	0	566	1426
430-530	0	335	0	0	0	0	0	578	0	56	0	536	1505
445-545	0	347	0	0	0	0	0	592	0	53	0	488	1480
500-600	0	341	0	0	0	0	0	622	0	49	0	457	1469

PM PEAK HOUR
430-530



WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

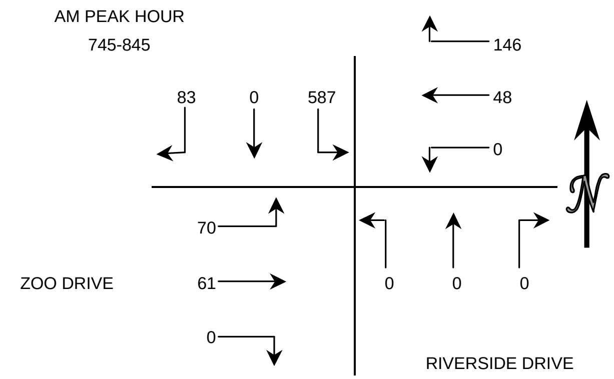
CLIENT:		KAKU ASSOCIATES, INC.		
PROJECT:		BURBANK TRAFFIC COUNTS		
DATE:		WEDNESDAY, MAY 5, 2004		
PERIODS:		7:00 AM TO 9:00 AM	AND	4:00 PM TO 6:00 PM
INTERSECTION:	N/S	RIVERSIDE DRIVE		
	E/W	ZOO DRIVE		

15 MIN COUNTS — 7:00 AM TO 9:00 AM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	14	0	73	12	8	0	0	0	0	0	7	3	117
715-730	18	0	113	10	11	0	0	0	0	0	6	8	166
730-745	17	0	147	18	8	0	0	0	0	0	18	9	217
745-800	11	0	162	38	12	0	0	0	0	0	12	11	246
800-815	24	0	136	34	12	0	0	0	0	0	13	23	242
815-830	24	0	146	34	15	0	0	0	0	0	22	13	254
830-845	24	0	143	40	9	0	0	0	0	0	14	23	253
845-900	23	0	100	43	13	0	0	0	0	0	23	18	220

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	60	0	495	78	39	0	0	0	0	0	43	31	746
715-815	70	0	558	100	43	0	0	0	0	0	49	51	871
730-830	76	0	591	124	47	0	0	0	0	0	65	56	959
745-845	83	0	587	146	48	0	0	0	0	0	61	70	995
800-900	95	0	525	151	49	0	0	0	0	0	72	77	969

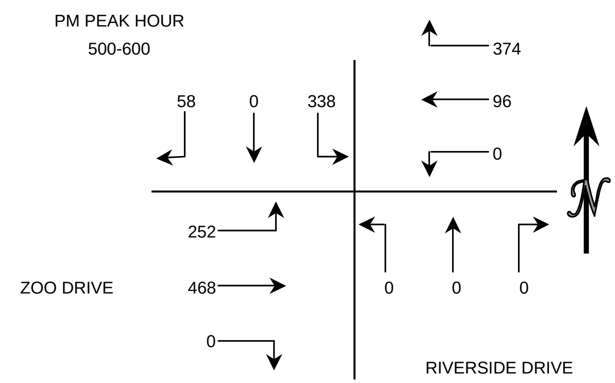


15 MIN COUNTS — 4:00 PM TO 6:00 PM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	12	0	56	66	15	0	0	0	0	0	33	22	204
415-430	12	0	63	76	15	0	0	0	0	0	28	20	214
430-445	16	0	73	99	25	0	0	0	0	0	31	43	287
445-500	5	0	78	93	24	0	0	0	0	0	49	34	283
500-515	19	0	93	96	17	0	0	0	0	0	72	47	344
515-530	15	0	92	96	25	0	0	0	0	0	119	70	417
530-545	14	0	84	94	26	0	0	0	0	0	134	64	416
545-600	10	0	69	88	28	0	0	0	0	0	143	71	409

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	45	0	270	334	79	0	0	0	0	0	141	119	988
415-515	52	0	307	364	81	0	0	0	0	0	180	144	1128
430-530	55	0	336	384	91	0	0	0	0	0	271	194	1331
445-545	53	0	347	379	92	0	0	0	0	0	374	215	1460
500-600	58	0	338	374	96	0	0	0	0	0	468	252	1586



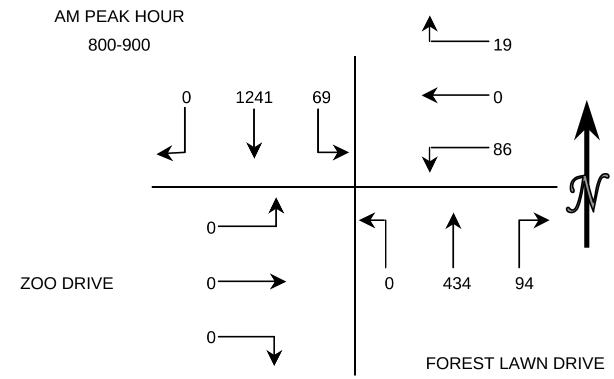
WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

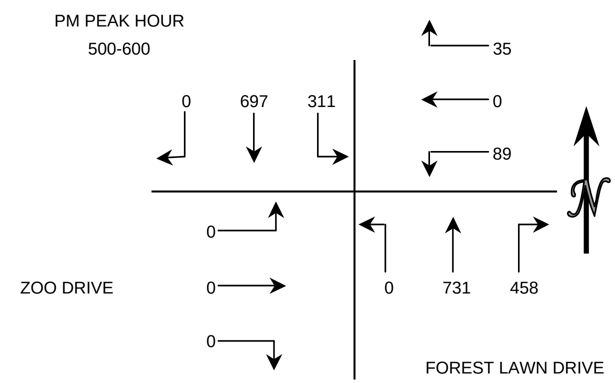
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KAKU ASSOCIATES, INC.
PROJECT: BURBANK TRAFFIC COUNTS
DATE: WEDNESDAY, MAY 5, 2004
PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
INTERSECTION: N/S FOREST LAWN DRIVE
E/W ZOO DRIVE

15 MIN COUNTS						7:00 AM TO 9:00 AM							
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	263	9	7	0	12	7	55	0	0	0	0	353
715-730	0	312	15	2	0	19	16	89	0	0	0	0	453
730-745	0	295	13	3	0	12	12	86	0	0	0	0	421
745-800	0	335	11	1	0	15	23	108	0	0	0	0	493
800-815	0	278	26	3	0	21	26	102	0	0	0	0	456
815-830	0	316	10	4	0	20	20	128	0	0	0	0	498
830-845	0	312	17	6	0	20	26	97	0	0	0	0	478
845-900	0	335	16	6	0	25	22	107	0	0	0	0	511
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	1205	48	13	0	58	58	338	0	0	0	0	1720
715-815	0	1220	65	9	0	67	77	385	0	0	0	0	1823
730-830	0	1224	60	11	0	68	81	424	0	0	0	0	1868
745-845	0	1241	64	14	0	76	95	435	0	0	0	0	1925
800-900	0	1241	69	19	0	86	94	434	0	0	0	0	1943



15 MIN COUNTS						4:00 PM TO 6:00 PM							
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	0	132	10	9	0	16	42	176	0	0	0	0	385
415-430	0	132	11	13	0	15	48	164	0	0	0	0	383
430-445	0	166	14	8	0	23	55	213	0	0	0	0	479
445-500	0	169	17	10	0	18	61	175	0	0	0	0	450
500-515	0	159	42	6	0	20	102	216	0	0	0	0	545
515-530	0	177	79	4	0	21	107	168	0	0	0	0	556
530-545	0	170	95	9	0	28	131	168	0	0	0	0	601
545-600	0	191	95	16	0	20	118	179	0	0	0	0	619
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	0	599	52	40	0	72	206	728	0	0	0	0	1697
415-515	0	626	84	37	0	76	266	768	0	0	0	0	1857
430-530	0	671	152	28	0	82	325	772	0	0	0	0	2030
445-545	0	675	233	29	0	87	401	727	0	0	0	0	2152
500-600	0	697	311	35	0	89	458	731	0	0	0	0	2321



WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KAKU ASSOCIATES, INC.
PROJECT: BURBANK TRAFFIC COUNTS
DATE: WEDNESDAY, MAY 5, 2004
PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
INTERSECTION: N/S VICTORY BOULVEARD
E/W WESTERN AVENUE

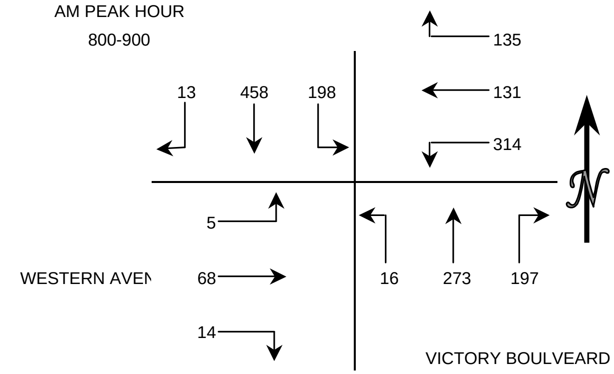
15 MIN COUNTS — 7:00 AM TO 9:00 AM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	0	66	24	18	20	62	26	49	2	2	21	1	291
715-730	0	88	31	12	18	77	38	57	3	5	18	1	348
730-745	1	107	39	27	20	86	54	82	5	1	35	2	459
745-800	1	101	43	26	31	76	36	56	2	5	16	3	396
800-815	3	131	54	23	26	75	54	75	7	2	18	0	468
815-830	5	124	56	42	30	79	45	64	4	3	12	0	464
830-845	2	109	39	39	40	88	43	76	4	6	15	3	464
845-900	3	94	49	31	35	72	55	58	1	3	23	2	426

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	2	362	137	83	89	301	154	244	12	13	90	7	1494
715-815	5	427	167	88	95	314	182	270	17	13	87	6	1671
730-830	10	463	192	118	107	316	189	277	18	11	81	5	1787
745-845	11	465	192	130	127	318	178	271	17	16	61	6	1792
800-900	13	458	198	135	131	314	197	273	16	14	68	5	1822

AM PEAK HOUR
800-900



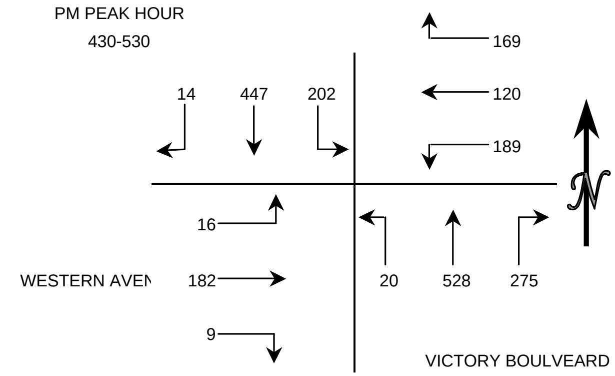
15 MIN COUNTS — 4:00 PM TO 6:00 PM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	4	80	53	40	32	52	57	111	2	2	25	5	463
415-430	3	86	40	27	27	41	81	105	6	4	16	0	436
430-445	5	111	52	42	37	51	62	144	4	1	42	7	558
445-500	3	110	53	55	28	36	76	120	1	2	31	2	517
500-515	3	118	51	30	28	64	72	150	8	2	60	1	587
515-530	3	108	46	42	27	38	65	114	7	4	49	6	509
530-545	2	107	66	40	39	44	69	116	5	1	38	6	533
545-600	9	60	32	28	33	31	50	115	8	4	52	1	423

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	15	387	198	164	124	180	276	480	13	9	114	14	1974
415-515	14	425	196	154	120	192	291	519	19	9	149	10	2098
430-530	14	447	202	169	120	189	275	528	20	9	182	16	2171
445-545	11	443	216	167	122	182	282	500	21	9	178	15	2146
500-600	17	393	195	140	127	177	256	495	28	11	199	14	2052

PM PEAK HOUR
430-530



APPENDIX C

INTERSECTION LEVEL OF SERVICE WORKSHEETS

EXISTING CONDITIONS

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Silver Lake Bl & Van Pelt Pl

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: E[37.9]

Street Name:	Silver Lake Bl		Van Pelt Pl	
Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Uncontrolled	Uncontrolled	Stop Sign	Stop Sign
Rights:	Include	Include	Include	Include
Lanes:	0 1 0 0 0	0 0 1 0 1	0 0 1! 0 0	0 0 0 0 0

Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:												
Base Vol:	14	592	0	0	1068	42	9	0	10	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	14	592	0	0	1068	42	9	0	10	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	15	637	0	0	1148	45	10	0	11	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	15	637	0	0	1148	45	10	0	11	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1194	xxxx	xxxxx	xxxx	xxxx	xxxxx	1815	xxxx	1148	xxxx	xxxx	xxxxx
Potent Cap.:	592	xxxx	xxxxx	xxxx	xxxx	xxxxx	87	xxxx	244	xxxx	xxxx	xxxxx
Move Cap.:	592	xxxx	xxxxx	xxxx	xxxx	xxxxx	85	xxxx	244	xxxx	xxxx	xxxxx
Volume/Cap:	0.03	xxxx	xxxx	xxxx	xxxx	xxxx	0.11	xxxx	0.04	xxxx	xxxx	xxxx
Level Of Service Module:												
Queue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Stopped Del:	11.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	B	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	130	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.5	xxxxx	xxxxx	xxxx	xxxxx
Shrd StpDel:	11.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	37.9	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	B	*	*	*	*	*	*	E	*	*	*	*
ApproachDel:		xxxxxx			xxxxxx			37.9			xxxxxx	
ApproachLOS:		*			*			E			*	

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Silver Lake Bl & Van Pelt Pl

Average Delay (sec/veh): 1.1 Worst Case Level Of Service: E[45.0]

Street Name:	Silver Lake Bl						Van Pelt Pl					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0 0	0 0	1	0 1	0 0	1!	0 0	0 0	0	0 0
Volume Module:												
Base Vol:	9	1103	0	0	682	46	22	0	23	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	9	1103	0	0	682	46	22	0	23	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
PHF Volume:	9	1149	0	0	710	48	23	0	24	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	9	1149	0	0	710	48	23	0	24	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	758	xxxx	xxxxx	xxxx	xxxx	xxxxx	1878	xxxx	710	xxxx	xxxx	xxxxx
Potent Cap.:	862	xxxx	xxxxx	xxxx	xxxx	xxxxx	79	xxxx	437	xxxx	xxxx	xxxxx
Move Cap.:	862	xxxx	xxxxx	xxxx	xxxx	xxxxx	79	xxxx	437	xxxx	xxxx	xxxxx
Volume/Cap:	0.01	xxxx	xxxx	xxxx	xxxx	xxxx	0.29	xxxx	0.05	xxxx	xxxx	xxxx
Level Of Service Module:												
Queue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Stopped Del:	9.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	136	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	1.4	xxxxx	xxxxx	xxxx	xxxxx
Shrd StpDel:	9.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	45.0	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	E	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			45.0			xxxxxx		
ApproachLOS:	*			*			E			*		

EX_AM

May 10, 2004 ,Monday 05:16:41 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: SR-2 SB off-ramp/Waterloo St I/S No: 2

AM/PM: AM Comments: EXISTING 2004

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND (Waterloo)		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	28	308	0	0	788	37	887	303	30	20	0	41
AMBIENT												
RELATED												
PROJECT												
TOTAL	28	308	0	0	788	37	887	303	30	20	0	41

LANE

	LT	LT/TH	TH	LT/TH/RT	TH/RT	RT	LT/RT
NORTHBOUND	1		2				
SOUTHBOUND			1		1		
WESTBOUND	1			1			
EASTBOUND							1

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	<none>
SOUTHBOUND	Perm	Auto
WESTBOUND	Split	Auto
EASTBOUND	Split	Auto

Critical Movements Diagram

SouthBound A: 413 B: 0

EastBound A: 61 B: 20

WestBound A: 610 B: 610

NorthBound A: 154 B: 28

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

fargo

$$V/C = \frac{28 + 413 + 610 + 61 + 30}{\cancel{1425}\ 1375} = \cancel{0.780}$$

$\frac{1142}{1375} = 0.830$

~~LOS = C~~

LOS = D.

Developed by Chun Wong, 12/94

EX_PM

May 10, 2004 ,Monday 05:26:58 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: SR-2 SB off-ramp/Waterloo St I/S No: 2

AM/PM: PM Comments: EXISTING 2004

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

Waterloo

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	43	433	0	0	436	21	37	146	98	24	0	33
AMBIENT												
RELATED												
PROJECT												
TOTAL	43	433	0	0	436	21	37	146	98	24	0	33

LANE	↰	↰↑	↑	↰↑↱	↑↱	↱	↰↱
NORTHBOUND	1	0	2	0	0	0	0
SOUTHBOUND	0	0	1	0	1	0	0
WESTBOUND	1	0	0	1	0	0	0
EASTBOUND	0	0	0	0	0	0	1

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	<none>
SOUTHBOUND	Perm	Auto
WESTBOUND	Split	Auto
EASTBOUND	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	229	0
EastBound	57	24
WestBound	244	37
NorthBound	217	43

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

Fargo

$$V/C = \frac{43 + 229 + 244 + 57 + 33}{\cancel{1425}\ 1375} = \cancel{0.402}$$

~~LOS = A~~

$\frac{606}{1375} = 0.441$

LOS = A

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CalcaDB

May 10, 2004 ,Monday 05:16:41 PM

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: SILVER LAKE BL I/S No: 3

AM/PM: AM Comments: EXISTING 2004

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	57	335	5	10	924	836	28	45	9	580	5	50
AMBIENT												
RELATED												
PROJECT												
TOTAL	57	335	5	10	924	836	28	45	9	580	5	50

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	1	0	1	0	1	0	0	1	0	2	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	OLA	Split	Auto	Split	Auto

Critical Movements Diagram

SouthBound
A: 544
B: 10

EastBound
A: 293
B: 293

WestBound
A: 82
B: 28

NorthBound
A: 170
B: 57

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{57 + 544 + 82 + 293}{*1425} = 0.615$$

LOS = B

EX_PM

May 11, 2004 ,Tuesday 09:52:45 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: SILVER LAKE BL I/S No: 3

AM/PM: PM Comments: EXISTING 2004

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	60	526	7	30	592	553	50	62	19	1121	40	34
AMBIENT												
RELATED												
PROJECT												
TOTAL	60	526	7	30	592	553	50	62	19	1121	40	34

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	1	0	1	0	1	0	0	1	0	2	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0

	NORTHBOUND		SOUTHBOUND		WESTBOUND		EASTBOUND	
	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	OLA	Split	Auto	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	296	30
EastBound	581	581
WestBound	131	50
NorthBound	267	60

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{60 + 296 + 131 + 581}{*1425} = 0.679$$

LOS = B

Developed by Chun Wong, 12/94

EX_AM

May 10, 2004 ,Monday 05:16:41 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL | W/E: FLETCHER DR/SILVER RIDGE AV | I/S No: 4

AM/PM: AM | Comments: EXISTING 2004

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	272	630	6	0	1015	597	0	43	8	552	24	754
AMBIENT												
RELATED												
PROJECT												
TOTAL	272	630	6	0	1015	597	0	43	8	552	24	754

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	1	1	0	0	1	0	0	0	0	2	0	0	1	0	0	0	1	0	0	1	0	1	1	0	0	0	2	0

	NORTHBOUND		SOUTHBOUND		WESTBOUND		EASTBOUND	
	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Split	Auto	Split	OLA

Critical Movements Diagram

	A	B
SouthBound	508	0
EastBound	288	288
WestBound	43	0
NorthBound	318	272

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{272 + 508 + 43 + 288}{*1375} = 0.738$$

LOS = C

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EX_PM

May 10, 2004 ,Monday 05:26:58 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL

W/E: FLETCHER DR/SILVER RIDGE AV

I/S No: 4

AM/PM: PM

Comments: EXISTING 2004

COUNT DATE:

STUDY DATE:

GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	430	1165	8	0	614	515	0	66	43	683	36	513
AMBIENT												
RELATED												
PROJECT												
TOTAL	430	1165	8	0	614	515	0	66	43	683	36	513

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 1 0 0 1 0 0	0 0 2 0 0 1 0	0 0 1 0 0 1 0	1 1 0 0 0 2 0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Split	Auto	Split	OLA

Critical Movements Diagram

	A	B
SouthBound	335	0
EastBound	360	360
WestBound	66	0
NorthBound	587	430

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{430 + 335 + 66 + 360}{*1375} = 0.796$$

LOS = C

Developed by Chun Wong, 12/94

EX_AM

CalcaDB

May 10, 2004 ,Monday 05:16:41 PM

INTERSECTION DATA SUMMARY SHEET

N/S: FLETCHER DR | W/E: RIVERSIDE DR | I/S No: 5

AM/PM: AM | Comments: EXISTING 2004

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	40	963	263	170	1417	105	128	250	157	195	1129	57
AMBIENT												
RELATED												
PROJECT												
TOTAL	40	963	263	170	1417	105	128	250	157	195	1129	57

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 761
B: 170

EastBound
A: 593
B: 195

WestBound
A: 204
B: 128

NorthBound
A: 613
B: 40

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{40 + 761 + 128 + 593}{*1500} = 0.945$$

LOS = E

May 10, 2004 ,Monday 05:26:58 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: FLETCHER DR W/E: RIVERSIDE DR I/S No: 5

AM/PM: PM Comments: EXISTING 2004

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	69	1562	268	82	974	101	152	313	229	163	397	44
AMBIENT												
RELATED												
PROJECT												
TOTAL	69	1562	268	82	974	101	152	313	229	163	397	44

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	1	0	1	0	1	0	0	1	0	1	0	1	0	0	1	0	1	0	1	0	0	1	0	1	0	1	0	0

	NORTHBOUND		SOUTHBOUND		WESTBOUND		EASTBOUND	
	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 538
B: 82

EastBound
A: 221
B: 163

WestBound
A: 271
B: 152

NorthBound
A: 915
B: 69

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{915 + 82 + 271 + 163}{*1500} = 0.884$$

LOS = D

CalcaDB

May 10, 2004 ,Monday 05:19:27 PM

INTERSECTION DATA SUMMARY SHEET

N/S: BARHAM BL | W/E: FOREST LAWN DR | I/S No: 6

AM/PM: AM | Comments: EXISTING 2004

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	87	1401	660	227	1390	175	828	148	150	37	32	22
AMBIENT												
RELATED												
PROJECT												
TOTAL	87	1401	660	227	1390	175	828	148	150	37	32	22

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	1	0	2	0	0	1	0	1	0	2	0	0	1	0	1	1	1	0	0	1	0	1	0	1	0	1	1	0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Perm	OLA	Prot-Fix	Auto	Split	Auto	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	695	227
EastBound	18	37
WestBound	148	455
NorthBound	701	87

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + B(E/B)

$$V/C = \frac{701 + 227 + 455 + 37}{*1375} = 0.963$$

LOS = E

Developed by Chun Wong, 12/94

EX_PM

May 10, 2004 ,Monday 05:26:58 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S:	BARHAM BL	W/E:	FOREST LAWN DR	I/S No:	6
AM/PM:	PM	Comments:	EXISTING 2004		
COUNT DATE:		STUDY DATE:		GROWTH FACTOR:	

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	19	1418	793	161	1404	44	693	29	445	90	94	73
AMBIENT												
RELATED												
PROJECT												
TOTAL	19	1418	793	161	1404	44	693	29	445	90	94	73

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 2 0 0 1 0	1 0 2 0 0 1 0	1 1 1 0 0 1 0	1 0 1 0 1 1 0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Perm	OLA	Prot-Fix	Auto	Split	Auto	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	702	161
EastBound	56	90
WestBound	364	381
NorthBound	709	19

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + B(E/B)

$$V/C = \frac{709 + 161 + 381 + 90}{*1375} = 0.905$$

LOS = E

Developed by Chun Wong, 12/94

EX_AM

May 10, 2004 ,Monday 05:19:27 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S:	FOREST LAWN DR	W/E:	ZOO DR	I/S No:	7
AM/PM:	AM	Comments:	EXISTING 2004		
COUNT DATE:		STUDY DATE:		GROWTH FACTOR:	

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	434	94	69	1241	0	86	0	19	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	434	94	69	1241	0	86	0	19	0	0	0

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	0 0 1 0 0 1 0	1 0 1 0 0 0 0	1 0 0 0 0 1 0	0 0 0 0 0 0 0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	OLA	Perm	<none>	Split	Auto	<none>	<none>

Critical Movements Diagram

	A	B
SouthBound	1241	69
EastBound	0	0
WestBound	19	86
NorthBound	434	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{0 + 1241 + 86 + 0}{1500} = 0.885$$

LOS = D

Developed by Chun Wong, 12/94

EX_PM

May 10, 2004 ,Monday 05:26:58 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: FOREST LAWN DR | W/E: ZOO DR | I/S No: 7

AM/PM: PM | Comments: EXISTING 2004

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	0	731	458	311	697	0	89	0	35	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	731	458	311	697	0	89	0	35	0	0	0

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	0 0 1 0 0 1 0	1 0 1 0 0 0 0	1 0 0 0 0 1 0	0 0 0 0 0 0 0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Perm	OLA	Perm	<none>	Split	Auto	<none>	<none>

Critical Movements Diagram

	A	B
SouthBound	697	311
EastBound	0	0
WestBound	35	89
NorthBound	731	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{731 + 311 + 89 + 0}{1500} = 0.754$$

LOS = C

Developed by Chun Wong, 12/94

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
              2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #8 Riverside Dr & Zoo Drive
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap. (X):        0.993
Loss Time (sec):       0 (Y+R =  4 sec) Average Delay (sec/veh):      39.4
Optimal Cycle:         0              Level Of Service:                  E
********************************************************************************
Street Name:               Riverside Dr                        Zoo Drive
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign         Stop Sign         Stop Sign         Stop Sign
Rights:           Include           Include           Include           Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:         0  0  0  0  0   1  0  0  0  1   0  1  1  0  0   0  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0  587    0    63   70   61     0    0   48   146
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    0     0  587    0    63   70   61     0    0   48   146
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.98 0.98  0.98 0.98 0.98  0.98 0.98 0.98  0.98 0.98 0.98  0.98
PHF Volume:     0    0     0  600    0    64   72   62     0    0   49   149
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    0     0  600    0    64   72   62     0    0   49   149
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Final Vol.:     0    0     0  600    0    64   72   62     0    0   49   149
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.00 0.00  0.00 1.00 0.00  1.00 1.00 1.00  0.00 0.00 1.00  1.00
Final Sat.:     0    0     0  604    0   741  493  529     0    0  536   599
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx 0.99 xxxx  0.09 0.15 0.12  xxxx xxxx 0.09  0.25
Crit Moves:                  ****            ****                         ****
Delay/Veh:    0.0  0.0   0.0 58.8  0.0   7.9 11.1 10.3   0.0  0.0 10.0  10.6
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0   0.0 58.8  0.0   7.9 11.1 10.3   0.0  0.0 10.0  10.6
LOS by Move:    *    *     *    F    *     A    B    B     *    *    B     B
ApproachDel:     xxxxxx            53.9              10.8              10.5
Delay Adj:        xxxxx            1.00              1.00              1.00
ApprAdjDel:      xxxxxx            53.9              10.8              10.5
LOS by Appr:        *                F                 B                 B
********************************************************************************
```

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #8 Riverside Dr & Zoo Drive
********************************************************************************
Cycle (sec):          100               Critical Vol./Cap. (X):        0.780
Loss Time (sec):        0 (Y+R =  4 sec) Average Delay (sec/veh):       25.4
Optimal Cycle:          0               Level Of Service:                 D
********************************************************************************
Street Name:               Riverside Dr                    Zoo Drive
Approach:        North Bound      South Bound      East Bound       West Bound
Movement:       L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:            Include          Include          Include          Include
Min. Green:      0     0     0    0     0     0    0     0     0    0     0     0
Lanes:         0  0  0  0  0   1  0  0  0  1   0  1  1  0  0   0  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0     0     0  338     0    58  252   468     0    0    96   374
Growth Adj:   1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Initial Bse:     0     0     0  338     0    58  252   468     0    0    96   374
User Adj:     1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
PHF Adj:      0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95
PHF Volume:      0     0     0  355     0    61  265   492     0    0   101   393
Reduct Vol:      0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:     0     0     0  355     0    61  265   492     0    0   101   393
PCE Adj:      1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
MLF Adj:      1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Final Vol.:      0     0     0  355     0    61  265   492     0    0   101   393
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:   1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Lanes:        0.00  0.00  0.00 1.00  0.00  1.00 0.70  1.30  0.00 0.00  1.00  1.00
Final Sat.:      0     0     0  456     0   526  350   674     0    0   489   550
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      xxxx  xxxx  xxxx 0.78  xxxx  0.12 0.76  0.73  xxxx xxxx  0.21  0.71
Crit Moves:                    ****             ****                         ****
Delay/Veh:     0.0   0.0   0.0 31.9   0.0  10.1 28.5  25.6   0.0  0.0  11.6  23.1
Delay Adj:    1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
AdjDel/Veh:    0.0   0.0   0.0 31.9   0.0  10.1 28.5  25.6   0.0  0.0  11.6  23.1
LOS by Move:     *     *     *    D     *     B    D     D     *    *     B     C
ApproachDel:       xxxxxx            28.7             26.6             20.7
Delay Adj:          xxxxx            1.00             1.00             1.00
ApprAdjDel:        xxxxxx            28.7             26.6             20.7
LOS by Appr:          *                 D                D                C
********************************************************************************
```

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #9 Riverside Dr & SR-134 EB off-ramp
********************************************************************************
Cycle (sec):           1                Critical Vol./Cap. (X):        1.157
Loss Time (sec):       0 (Y+R =  4 sec) Average Delay (sec/veh):        36.8
Optimal Cycle:         0                Level Of Service:                  E
********************************************************************************
Street Name:            Riverside Dr                     SR-134 EB off-ramp
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Yield Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  2  0  0   0  0  2  0  0   1  0  1! 0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  215    0     0  517    0   631    0   156     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  215    0     0  517    0   631    0   156     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98
PHF Volume:     0  220    0     0  530    0   647    0   160     0    0     0
Reduct Vol:     0    0    0     0    0    0     0    0     0     0    0     0
Final Vol.:     0  220    0     0  530    0   647    0   160     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:       0    0    0     0    0    0     0    0     0     0    0     0
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 2.00  0.00  0.00 2.00  0.00  1.80 0.00  1.20  0.00 0.00  0.00
Final Sat.:     0  398    0     0  458    0   672    0   447     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.55  0.00  0.00 1.16  0.00  0.96 0.00  0.36  0.00 0.00  0.00
Crit Moves:       ****             ****        ****                         ****
Green/Cycle: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Volume/Cap:  0.00 0.55  0.00  0.00 1.16  0.00  0.96 0.00  0.36  0.00 0.00  0.00
Delay/Veh:    0.0  8.2   0.0   0.0 81.0   0.0  38.7  0.0   3.9   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  8.2   0.0   0.0 81.0   0.0  38.7  0.0   3.9   0.0  0.0   0.0
DesignQueue:    0    0    0     0    0    0     0    0     0     0    0     0
********************************************************************************
```

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #9 Riverside Dr & SR-134 EB off-ramp

Cycle (sec):	1		Critical Vol./Cap. (X):	1.224
Loss Time (sec):	0	(Y+R = 4 sec)	Average Delay (sec/veh):	48.9
Optimal Cycle:	0		Level Of Service:	F

Street Name:	Riverside Dr						SR-134 EB off-ramp					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 2 0 0			0 0 2 0 0			1 0 1! 0 1			0 0 0 0 0		
Volume Module:												
Base Vol:	0	578	0	0	335	0	536	0	56	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	578	0	0	335	0	536	0	56	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	607	0	0	352	0	563	0	59	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	607	0	0	352	0	563	0	59	0	0	0
Saturation Flow Module:												
Sat/Lane:	0	0	0	0	0	0	0	0	0	0	0	0
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.00	0.00	0.00	2.00	0.00	1.91	0.00	1.09	0.00	0.00	0.00
Final Sat.:	0	496	0	0	448	0	631	0	362	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	1.22	0.00	0.00	0.79	0.00	0.89	0.00	0.16	0.00	0.00	0.00
Crit Moves:		****			****		****					****
Green/Cycle:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume/Cap:	0.00	1.22	0.00	0.00	0.79	0.00	0.89	0.00	0.16	0.00	0.00	0.00
Delay/Veh:	0.0	105	0.0	0.0	19.8	0.0	29.7	0.0	1.9	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	105	0.0	0.0	19.8	0.0	29.7	0.0	1.9	0.0	0.0	0.0
DesignQueue:	0	0	0	0	0	0	0	0	0	0	0	0

EX_AM

CalcaDB

May 10, 2004 ,Monday 05:16:41 PM

INTERSECTION DATA SUMMARY SHEET

N/S: VICTORY BL W/E: WESTERN AVE I/S No: 10

AM/PM: AM Comments: EXISTING 2004

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	16	273	197	198	458	13	314	131	135	5	68	14
AMBIENT												
RELATED												
PROJECT												
TOTAL	16	273	197	198	458	13	314	131	135	5	68	14

LANE	1	0	1	0	1	0	0	1	0	1	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

	A	B
SouthBound	236	198
EastBound	82	5
WestBound	266	314
NorthBound	235	16

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{235 + 198 + 314 + 82}{1500} = 0.553$$

LOS = A

Developed by Chun Wong, 12/94

EX_PM

May 10, 2004 ,Monday 05:26:58 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: VICTORY BL W/E: WESTERN AVE I/S No: 10

AM/PM: PM Comments: EXISTING 2004

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	20	528	275	202	447	14	189	120	169	16	182	9
AMBIENT												
RELATED												
PROJECT												
TOTAL	20	528	275	202	447	14	189	120	169	16	182	9

LANE	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 0 0 1 0 0	1 0 0 0 1 0 0

SIGNAL	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

	A	B
SouthBound	231	202
EastBound	191	16
WestBound	289	189
NorthBound	402	20

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{402 + 202 + 189 + 191}{1500} = 0.656$$

LOS = B

Developed by Chun Wong, 12/94

CUMULATIVE BASE CONDITIONS

```
----------------------------------------------------------------------------
----------------------------------------------------------------------------
                  Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
****************************************************************************
Intersection #1 Silver Lake Bl & Van Pelt Pl
****************************************************************************
Average Delay (sec/veh):       0.6   Worst Case Level Of Service:     E[ 48.6]
****************************************************************************
Street Name:             Silver Lake Bl                       Van Pelt Pl
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
-----------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:         0  1  0  0  0    0  0  1  0  1    0  0  1! 0  0    0  0  0  0  0
-----------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        15  645    0      0 1165   46     10    0   11      0    0    0
Growth Adj:    1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:     15  645    0      0 1165   46     10    0   11      0    0    0
User Adj:      1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:       0.93 0.93 0.93   0.93 0.93 0.93   0.93 0.93 0.93   0.93 0.93 0.93
PHF Volume:      16  694    0      0 1253   49     11    0   12      0    0    0
Reduct Vol:       0    0    0      0    0    0      0    0    0      0    0    0
Final Vol.:      16  694    0      0 1253   49     11    0   12      0    0    0
-----------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:    4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2 xxxxx xxxx xxxxx
FollowUpTim:    2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3 xxxxx xxxx xxxxx
-----------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  1302 xxxx xxxxx   xxxx xxxx xxxxx  1978 xxxx  1253   xxxx xxxx xxxxx
Potent Cap.:   539 xxxx xxxxx   xxxx xxxx xxxxx    69 xxxx   212   xxxx xxxx xxxxx
Move Cap.:     539 xxxx xxxxx   xxxx xxxx xxxxx    67 xxxx   212   xxxx xxxx xxxxx
Volume/Cap:   0.03 xxxx  xxxx   xxxx xxxx  xxxx  0.16 xxxx  0.06   xxxx xxxx  xxxx
-----------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:          0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:   11.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:      B    *     *     *    *     *     *    *     *     *    *     *
Movement:        LT - LTR - RT     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  xxxx xxxx xxxxx   xxxx xxxx xxxxx   xxxx  105 xxxxx   xxxx xxxx xxxxx
SharedQueue:    0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.8 xxxxx xxxxx xxxx xxxxx
Shrd StpDel:   11.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 48.6 xxxxx xxxxx xxxx xxxxx
Shared LOS:       B    *     *     *    *     *     *    E     *     *    *     *
ApproachDel:        xxxxxx           xxxxxx            48.6            xxxxxx
ApproachLOS:           *                *                E                *
```

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #1 Silver Lake Bl & Van Pelt Pl
********************************************************************************
Average Delay (sec/veh):       1.6   Worst Case Level Of Service:       F[ 65.5]
********************************************************************************
Street Name:           Silver Lake Bl                     Van Pelt Pl
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:       L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       10 1203     0     0  748    50    24     0    25     0     0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:    10 1203     0     0  748    50    24     0    25     0     0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:      0.96 0.96  0.96  0.96 0.96  0.96  0.96  0.96  0.96  0.96  0.96  0.96
PHF Volume:     10 1253     0     0  779    52    25     0    26     0     0     0
Reduct Vol:      0    0     0     0    0     0     0     0     0     0     0     0
Final Vol.:     10 1253     0     0  779    52    25     0    26     0     0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2 xxxxx xxxx xxxxx
FollowUpTim:   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   831 xxxx xxxxx  xxxx xxxx xxxxx  2053 xxxx   779  xxxx xxxx xxxxx
Potent Cap.:   810 xxxx xxxxx  xxxx xxxx xxxxx    62 xxxx   399  xxxx xxxx xxxxx
Move Cap.:     810 xxxx xxxxx  xxxx xxxx xxxxx    61 xxxx   399  xxxx xxxx xxxxx
Volume/Cap:   0.01 xxxx  xxxx  xxxx xxxx  xxxx  0.41 xxxx  0.07  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:         0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:   9.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     *    *     *     *    *     *     *    *     *
Movement:       LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  108 xxxxx  xxxx xxxx xxxxx
SharedQueue:   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  2.1 xxxxx xxxxx xxxx xxxxx
Shrd StpDel:   9.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 65.5 xxxxx xxxxx xxxx xxxxx
Shared LOS:      A    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx            65.5            xxxxxx
ApproachLOS:         *                *                F                *
```

CalcaDB

May 20, 2004 ,Thursday 07:46:05 PM

INTERSECTION DATA SUMMARY SHEET

N/S:	SILVER LAKE BL	W/E:	VAN PELT PL	I/S No:	1
AM/PM:	AM	Comments:	CUMBASE		
COUNT DATE:		STUDY DATE:		GROWTH FACTOR:	

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	15	646	0	0	1165	46	0	0	0	10	0	11
AMBIENT												
RELATED												
PROJECT												
TOTAL	15	646	0	0	1165	46	0	0	0	10	0	11

LANE	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
	0 1 0 0 0 0 0	0 0 1 0 0 1 0	0 0 0 0 0 0 0	0 0 0 0 0 0 1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	Auto	<none>	<none>	Split	Auto

Critical Movements Diagram

SouthBound
A: 1165
B: 0

EastBound
A: 21
B: 10

WestBound
A: 0
B: 0

NorthBound
A: 661
B: 15

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{15 + 1165 + 0 + 21}{1500} = 0.801$$

LOS = D

Developed by Chun Wong, 12/94

CUMBPM

May 20, 2004 ,Thursday 07:52:55 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S:

W/E: VAN PELT PL

I/S No: 1

AM/PM: PM

Comments: CUMBASE plus PROJECT

COUNT DATE:

STUDY DATE:

GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	10	1203	0	0	748	50	0	0	0	24	0	25
AMBIENT												
RELATED												
PROJECT												
TOTAL	10	1203	0	0	748	50	0	0	0	24	0	25

LANE	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
	0 1 0 0 0 0 0	0 0 1 0 0 1 0	0 0 0 0 0 0 0	0 0 0 0 0 0 1

SIGNAL	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
	Perm	<none>	Perm	Auto	<none>	<none>	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	748	0
EastBound	49	24
WestBound	0	0
NorthBound	1213	10

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{1213 + 0 + 0 + 49}{1500} = 0.841$$

LOS = D

Developed by Chun Wong, 12/94

CUMBAS~1

May 10, 2004 ,Monday 05:31:58 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: SR-2 SB off-ramp/Waterloo St I/S No: 2

AM/PM: AM Comments: CUMBASE

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

Waterloo

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	31	340	0	0	863	40	967	330	33	22	0	45
AMBIENT												
RELATED												
PROJECT												
TOTAL	31	340	0	0	863	40	967	330	33	22	0	45

LANE	1	0	2	0	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	Auto	Split	Auto	Split	Auto

Critical Movements Diagram

SouthBound A: 452 B: 0

EastBound A: 67 B: 22

WestBound A: 665 B: 665

NorthBound A: 170 B: 31

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

Fargo
v
+33

$\frac{1248}{1375} = 0.908$.

LOS=D.

$$V/C = \frac{31 + 452 + 665 + 67}{\cancel{1425}\ 1375} = \cancel{0.853}$$

LOS = D

Developed by Chun Wong, 12/94

CUMBAS~2

May 10, 2004 ,Monday 05:36:04 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S:	GLENDALE BL	W/E:	SR-2 SB off-ramp/Waterloo St	I/S No:	2
AM/PM:	PM	Comments:	CUMBASE		
COUNT DATE:		STUDY DATE:		GROWTH FACTOR:	

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND (Waterloo) LT	EASTBOUND TH	EASTBOUND RT
EXISTING	47	473	0	0	482	23	40	159	107	26	0	36
AMBIENT												
RELATED												
PROJECT												
TOTAL	47	473	0	0	482	23	40	159	107	26	0	36

LANE							
NORTHBOUND	1	0	2	0	0	0	0
SOUTHBOUND	0	0	1	0	1	0	0
WESTBOUND	1	0	0	1	0	0	0
EASTBOUND	0	0	0	0	0	0	1

SIGNAL	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
	Perm	<none>	Perm	Auto	Split	Auto	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	253	0
EastBound	62	26
WestBound	266	40
NorthBound	237	47

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

Flargo ↓ +36

$\frac{664}{1375} = 0.483$. Los = A

V/C = $\frac{47 + 253 + 266 + 62}{\cancel{1425}\ 1375}$ = ~~0.441~~ LOS = A

Developed by Chun Wong, 12/94

CUMBAS~1

May 10, 2004 ,Monday 05:31:58 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: SILVER LAKE BL I/S No: 3

AM/PM: AM Comments: CUMBASE

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	62	369	5	11	1012	912	31	49	10	633	5	55
AMBIENT												
RELATED												
PROJECT												
TOTAL	62	369	5	11	1012	912	31	49	10	633	5	55

LANE							
NORTHBOUND	1	0	1	0	1	0	0
SOUTHBOUND	1	0	2	0	0	1	0
WESTBOUND	0	0	0	1	0	0	0
EASTBOUND	1	1	0	0	0	1	0

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	<none>
SOUTHBOUND	Perm	OLA
WESTBOUND	Split	Auto
EASTBOUND	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	593	11
EastBound	319	319
WestBound	90	31
NorthBound	187	62

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{62 + 593 + 90 + 319}{*1425} = 0.677$$

LOS = B

Developed by Chun Wong, 12/94

CUMBAS~2

May 10, 2004 ,Monday 05:36:04 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL | W/E: SILVER LAKE BL | I/S No: 3

AM/PM: PM | Comments: CUMBASE

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	65	575	8	33	652	607	55	68	21	1223	44	37
AMBIENT												
RELATED												
PROJECT												
TOTAL	65	575	8	33	652	607	55	68	21	1223	44	37

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	1	0	1	0	1	0	0	1	0	2	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0

	NORTHBOUND		SOUTHBOUND		WESTBOUND		EASTBOUND	
	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	OLA	Split	Auto	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	326	33
EastBound	634	634
WestBound	144	55
NorthBound	292	65

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{65 + 326 + 144 + 634}{*1425} = 0.750$$

LOS = C

Developed by Chun Wong, 12/94

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: FLETCHER DR/SILVER RIDGE AV I/S No: 4

AM/PM: AM Comments: CUMBASE

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	301	687	7	0	1106	651	0	47	9	602	26	827
AMBIENT												
RELATED												
PROJECT												
TOTAL	301	687	7	0	1106	651	0	47	9	602	26	827

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 1 0 0 1 0 0	0 0 2 0 0 1 0	0 0 1 0 0 1 0	1 1 0 0 0 2 0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Prot-Fix	<none>	Prot-Fix	Auto	Split	Auto	Split	OLA

Critical Movements Diagram

	A	B
SouthBound	553	0
EastBound	314	314
WestBound	47	0
NorthBound	347	301

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{301 + 553 + 47 + 314}{*1375} = 0.814$$

LOS = D

CUMBAS~2

May 10, 2004 ,Monday 07:56:17 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL   W/E: FLETCHER DR/SILVER RIDGE AV   I/S No: 4

AM/PM: PM   Comments: CUMBASE

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	471	1270	9	0	669	562	0	72	47	749	39	571
AMBIENT												
RELATED												
PROJECT												
TOTAL	471	1270	9	0	669	562	0	72	47	749	39	571

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 1 0 0 1 0 0	0 0 2 0 0 1 0	0 0 1 0 0 1 0	1 1 0 0 0 2 0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Split	Auto	Split	OLA

Critical Movements Diagram

	A	B
SouthBound	365	0
EastBound	394	394
WestBound	72	0
NorthBound	640	471

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{471 + 365 + 72 + 394}{*1375} = 0.877$$

LOS = D

Developed by Chun Wong, 12/94

CUMBAS~1

CalcaDB

May 10, 2004 ,Monday 05:31:58 PM

INTERSECTION DATA SUMMARY SHEET

N/S: FLETCHER DR | W/E: RIVERSIDE DR | I/S No: 5

AM/PM: AM | Comments: CUMBASE

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	44	1050	287	185	1545	114	140	273	171	213	1231	62
AMBIENT												
RELATED												
PROJECT												
TOTAL	44	1050	287	185	1545	114	140	273	171	213	1231	62

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

	A	B
SouthBound	830	185
EastBound	647	213
WestBound	222	140
NorthBound	669	44

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{44 + 830 + 140 + 647}{*1500} = 1.037$$

LOS = F

CUMBAS~2

May 10, 2004 ,Monday 05:36:04 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: FLETCHER DR W/E: RIVERSIDE DR I/S No: 5

AM/PM: PM Comments: CUMBASE

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	75	1707	292	89	1062	110	166	341	250	178	433	48
AMBIENT												
RELATED												
PROJECT												
TOTAL	75	1707	292	89	1062	110	166	341	250	178	433	48

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0

	NORTHBOUND Phasing	NORTHBOUND RTOR	SOUTHBOUND Phasing	SOUTHBOUND RTOR	WESTBOUND Phasing	WESTBOUND RTOR	EASTBOUND Phasing	EASTBOUND RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 586
B: 89

EastBound
A: 241
B: 178

WestBound
A: 296
B: 166

NorthBound
A: 1000
B: 75

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{1000 + 89 + 296 + 178}{*1500} = 0.972$$

LOS = E

Developed by Chun Wong, 12/94

CUMBAM

CalcaDB

May 20, 2004 ,Thursday 07:22:39 PM

INTERSECTION DATA SUMMARY SHEET

N/S: BARHAM BL W/E: FOREST LAWN DR I/S No: 6

AM/PM: AM Comments: CUMBASE

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	95	1660	720	247	1639	191	906	161	164	40	35	24
AMBIENT												
RELATED												
PROJECT												
TOTAL	95	1660	720	247	1639	191	906	161	164	40	35	24

LANE							
NORTHBOUND	1		2			1	
SOUTHBOUND	1		2			1	
WESTBOUND	1	1	1			1	
EASTBOUND	1		1		1	1	

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	OLA
SOUTHBOUND	Prot-Fix	Auto
WESTBOUND	Split	Auto
EASTBOUND	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	820	247
EastBound	20	40
WestBound	161	498
NorthBound	830	95

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + B(E/B)

$$V/C = \frac{830 + 247 + 498 + 40}{*1375} = 1.105$$

LOS = F

Developed by Chun Wong, 12/94

CUMBPM

May 20, 2004 ,Thursday 07:22:55 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: BARHAM BL W/E: FOREST LAWN DR I/S No: 6

AM/PM: PM Comments: CUMABSE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	21	1691	868	175	1678	48	756	32	485	98	102	80
AMBIENT												
RELATED												
PROJECT												
TOTAL	21	1691	868	175	1678	48	756	32	485	98	102	80

LANE							
NORTHBOUND	1	0	2	0	0	1	0
SOUTHBOUND	1	0	2	0	0	1	0
WESTBOUND	1	1	1	0	0	1	0
EASTBOUND	1	0	1	0	1	1	0

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	OLA
SOUTHBOUND	Prot-Fix	Auto
WESTBOUND	Split	Auto
EASTBOUND	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	839	175
EastBound	61	98
WestBound	397	416
NorthBound	846	21

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + B(E/B)

$$V/C = \frac{846 + 175 + 416 + 98}{*1375} = 1.046$$

LOS = F

Developed by Chun Wong, 12/94

CUMBAM

May 20, 2004 ,Thursday 07:22:39 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: FOREST LAWN DR W/E: ZOO DR I/S No: 7

AM/PM: AM Comments: CUMBASE

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	473	182	109	1370	0	97	0	22	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	473	182	109	1370	0	97	0	22	0	0	0

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	0	0	1	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	OLA	Perm	<none>	Split	Auto	<none>	<none>

Critical Movements Diagram

SouthBound
A: 1370
B: 109

EastBound
A: 0
B: 0

WestBound
A: 22
B: 97

NorthBound
A: 473
B: 0

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{0 + 1370 + 97 + 0}{1500} = 0.978$$

LOS = E

Developed by Chun Wong, 12/94

CUMBPM

May 20, 2004 ,Thursday 07:22:55 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: FOREST LAWN DR   W/E: ZOO DR   I/S No: 7

AM/PM: PM   Comments: CUMABSE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	0	805	527	339	798	0	173	0	41	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	805	527	339	798	0	173	0	41	0	0	0

LANE							
NORTHBOUND	0	0	1	0	0	1	0
SOUTHBOUND	1	0	1	0	0	0	0
WESTBOUND	1	0	0	0	0	1	0
EASTBOUND	0	0	0	0	0	0	0

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	OLA
SOUTHBOUND	Perm	<none>
WESTBOUND	Split	Auto
EASTBOUND	<none>	<none>

Critical Movements Diagram

	A	B
SouthBound	798	339
EastBound	0	0
WestBound	41	173
NorthBound	805	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{805 + 339 + 173 + 0}{1500} = 0.878$$

LOS = D

Developed by Chun Wong, 12/94

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--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #8 Riverside Dr & Zoo Drive
********************************************************************************
Cycle (sec):          100              Critical Vol./Cap. (X):         1.147
Loss Time (sec):        0 (Y+R =  4 sec) Average Delay (sec/veh):       63.8
Optimal Cycle:          0              Level Of Service:                  F
********************************************************************************
Street Name:                Riverside Dr                       Zoo Drive
Approach:         North Bound      South Bound       East Bound       West Bound
Movement:       L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:         Stop Sign        Stop Sign         Stop Sign        Stop Sign
Rights:            Include          Include           Include          Include
Min. Green:     0     0     0    0     0     0    0     0     0    0     0     0
Lanes:          0  0  0  0  0    1  0  0  0  1    0  1  1  0  0    0  0  1  1  0
------------|----------------||----------------||----------------||----------------|
Volume Module:
Base Vol:       0     0     0  644     0    73  195    66     0    0    52   172
Growth Adj:  1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Initial Bse:    0     0     0  644     0    73  195    66     0    0    52   172
User Adj:    1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
PHF Adj:     1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
PHF Volume:     0     0     0  644     0    73  195    66     0    0    52   172
Reduct Vol:     0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:    0     0     0  644     0    73  195    66     0    0    52   172
PCE Adj:     1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Final Vol.:     0     0     0  644     0    73  195    66     0    0    52   172
------------|----------------||----------------||----------------||----------------|
Saturation Flow Module:
Adjustment:  1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Lanes:       0.00  0.00  0.00 1.00  0.00  1.00 1.00  1.00  0.00 0.00  1.00  1.00
Final Sat.:     0     0     0  561     0   677  489   524     0    0   515   573
------------|----------------||----------------||----------------||----------------|
Capacity Analysis Module:
Vol/Sat:     xxxx  xxxx  xxxx 1.15  xxxx  0.11 0.40  0.13  xxxx xxxx  0.10  0.30
Crit Moves:                   ****             ****                         ****
Delay/Veh:    0.0   0.0   0.0 108.7  0.0   8.5 14.7  10.5   0.0  0.0  10.4  11.5
Delay Adj:   1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
AdjDel/Veh:   0.0   0.0   0.0 108.7  0.0   8.5 14.7  10.5   0.0  0.0  10.4  11.5
LOS by Move:    *     *     *    F     *     A    B     B     *    *     B     B
ApproachDel:     xxxxxx            98.5             13.7             11.3
Delay Adj:        xxxxx            1.00             1.00             1.00
ApprAdjDel:      xxxxxx            98.5             13.7             11.3
LOS by Appr:        *                F                B                B
```

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--------------------------------------------------------------------------------

--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #8 Riverside Dr & Zoo Drive
********************************************************************************
Cycle (sec):          100               Critical Vol./Cap. (X):        0.911
Loss Time (sec):        0 (Y+R =  4 sec) Average Delay (sec/veh):       39.0
Optimal Cycle:          0               Level Of Service:                 E
********************************************************************************
Street Name:              Riverside Dr                      Zoo Drive
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:         0  0  0  0  0    1  0  0  0  1    0  1  1  0  0    0  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0     0     0  374     0   139  303   510     0    0   108   408
Growth Adj: 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Initial Bse:   0     0     0  374     0   139  303   510     0    0   108   408
User Adj:   1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
PHF Adj:    0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95
PHF Volume:    0     0     0  393     0   146  319   536     0    0   114   429
Reduct Vol:    0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:   0     0     0  393     0   146  319   536     0    0   114   429
PCE Adj:    1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
MLF Adj:    1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Final Vol.:    0     0     0  393     0   146  319   536     0    0   114   429
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment: 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Lanes:      0.00  0.00  0.00 1.00  0.00  1.00 0.75  1.25  0.00 0.00  1.00  1.00
Final Sat.:    0     0     0  442     0   508  350   612     0    0   453   511
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    xxxx  xxxx  xxxx 0.89  xxxx  0.29 0.91  0.88  xxxx xxxx  0.25  0.84
Crit Moves:                  ****             ****                        ****
Delay/Veh:   0.0   0.0   0.0 47.1   0.0  12.3 49.3  42.4   0.0  0.0  12.8  35.6
Delay Adj:  1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
AdjDel/Veh:  0.0   0.0   0.0 47.1   0.0  12.3 49.3  42.4   0.0  0.0  12.8  35.6
LOS by Move:   *     *     *    E     *     B    E     E     *    *     B     E
ApproachDel:     xxxxxx            37.7             45.0             30.8
Delay Adj:        xxxxx            1.00             1.00             1.00
ApprAdjDel:      xxxxxx            37.7             45.0             30.8
LOS by Appr:        *                E                E                D
```

CUMBAM

May 20, 2004 ,Thursday 07:22:39 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: RIVERSIDE DR | W/E: ZOO DR | I/S No: 8

AM/PM: AM | Comments: CUMBASE

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	0	644	0	73	0	52	172	195	66	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	0	644	0	73	0	52	172	195	66	0

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	0 0 0 0 0 0 0	1 0 0 0 0 1 0	0 0 1 0 1 0 0	0 1 1 0 0 0 0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	<none>	<none>	Split	Auto	Perm	Auto	Perm	<none>

Critical Movements Diagram

	A	B
SouthBound	73	644
EastBound	66	195
WestBound	172	0
NorthBound	0	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{0 + 644 + 172 + 195}{1500} = 0.674$$

LOS = B

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CUMBPM

May 20, 2004 ,Thursday 07:22:55 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: RIVERSIDE DR | W/E: ZOO DR | I/S No: 8

AM/PM: PM | Comments: CUMBASE plus PROJECT

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	0	0	0	374	0	139	0	108	408	303	510	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	0	374	0	139	0	108	408	303	510	0

LANE							
NORTHBOUND	0	0	0	0	0	0	0
SOUTHBOUND	1	0	0	0	0	1	0
WESTBOUND	0	0	1	0	1	0	0
EASTBOUND	0	1	1	0	0	0	0

SIGNAL	Phasing	RTOR
NORTHBOUND	<none>	<none>
SOUTHBOUND	Split	Auto
WESTBOUND	Perm	Auto
EASTBOUND	Perm	<none>

Critical Movements Diagram

	A	B
SouthBound	139	374
EastBound	510	303
WestBound	408	0
NorthBound	0	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{0 + 374 + 408 + 303}{1500} = 0.723$$

LOS = C

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```
------------------------------------------------------------------------------
------------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #9 Riverside Dr & SR-134 EB off-ramp
******************************************************************************
Cycle (sec):          1                 Critical Vol./Cap. (X):        1.321
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):        66.4
Optimal Cycle:        0                 Level Of Service:                  F
******************************************************************************
Street Name:                Riverside Dr                  SR-134 EB off-ramp
Approach:        North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Yield Sign       Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:         0  0  2  0  0   0  0  2  0  0   1  0  1! 0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  366    0     0  575    0    781    0   170     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  366    0     0  575    0    781    0   170     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98
PHF Volume:     0  375    0     0  589    0    800    0   174     0    0     0
Reduct Vol:     0    0    0     0    0    0      0    0     0     0    0     0
Final Vol.:     0  375    0     0  589    0    800    0   174     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:       0    0    0     0    0    0      0    0     0     0    0     0
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 2.00  0.00  0.00 2.00  0.00  1.82 0.00  1.18  0.00 0.00  0.00
Final Sat.:     0  414    0     0  446    0    670    0   434     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.91  0.00  0.00 1.32  0.00  1.19 0.00  0.40  0.00 0.00  0.00
Crit Moves:       ****              ****       ****                        ****
Green/Cycle: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Volume/Cap:  0.00 0.91  0.00  0.00 1.32  0.00  1.19 0.00  0.40  0.00 0.00  0.00
Delay/Veh:    0.0 31.3   0.0   0.0  151   0.0  93.4  0.0   4.6   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0 31.3   0.0   0.0  151   0.0  93.4  0.0   4.6   0.0  0.0   0.0
DesignQueue:    0    0    0     0    0    0      0    0     0     0    0     0
```

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CUM BASE PM Thu May 20, 2004 16:50:24 Page 4-1

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #9 Riverside Dr & SR-134 EB off-ramp

Cycle (sec):	1	Critical Vol./Cap. (X):	1.411
Loss Time (sec):	0 (Y+R = 4 sec)	Average Delay (sec/veh):	96.4
Optimal Cycle:	0	Level Of Service:	F

Street Name:	Riverside Dr		SR-134 EB off-ramp	
Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Yield Sign	Stop Sign	Stop Sign	Stop Sign
Rights:	Include	Include	Include	Include
Lanes:	0 0 2 0 0	0 0 2 0 0	1 0 1! 0 1	0 0 0 0 0

	NB L	NB T	NB R	SB L	SB T	SB R	EB L	EB T	EB R	WB L	WB T	WB R
Volume Module:												
Base Vol:	0	650	0	0	447	0	650	0	62	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	650	0	0	447	0	650	0	62	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	683	0	0	470	0	683	0	65	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	683	0	0	470	0	683	0	65	0	0	0
Saturation Flow Module:												
Sat/Lane:	0	0	0	0	0	0	0	0	0	0	0	0
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.00	0.00	0.00	2.00	0.00	1.91	0.00	1.09	0.00	0.00	0.00
Final Sat.:	0	484	0	0	450	0	633	0	360	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	1.41	0.00	0.00	1.04	0.00	1.08	0.00	0.18	0.00	0.00	0.00
Crit Moves:		****			****		****					****
Green/Cycle:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume/Cap:	0.00	1.41	0.00	0.00	1.04	0.00	1.08	0.00	0.18	0.00	0.00	0.00
Delay/Veh:	0.0	213	0.0	0.0	52.7	0.0	60.2	0.0	2.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	213	0.0	0.0	52.7	0.0	60.2	0.0	2.0	0.0	0.0	0.0
DesignQueue:	0	0	0	0	0	0	0	0	0	0	0	0

CUMBAM

May 20, 2004 ,Thursday 07:22:39 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: RIVERSIDE DR W/E: SR-134 EB-off ramp I/S No: 9

AM/PM: AM Comments: CUMBASE

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	366	0	0	575	0	0	0	0	781	0	170
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	366	0	0	575	0	0	0	0	781	0	170

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	0 0 2 0 0 0 0	0 0 2 0 0 0 0	0 0 0 0 0 0 0	1 0 0 0 0 1 1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	<none>	<none>	<none>	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	287	0
EastBound	170	430
WestBound	0	0
NorthBound	183	0

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{0 + 287 + 0 + 430}{1500} = 0.478$$

LOS = A

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CUMBPM

May 20, 2004 ,Thursday 07:22:55 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: RIVERSIDE DR W/E: SR-134 EB-off ramp I/S No: 9

AM/PM: PM Comments: CUMBASE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	650	0	0	447	0	0	0	0	650	0	62
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	650	0	0	447	0	0	0	0	650	0	62

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	0 0 2 0 0 0 0	0 0 2 0 0 0 0	0 0 0 0 0 0 0	1 0 0 0 0 1 1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	<none>	<none>	<none>	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	224	0
EastBound	62	358
WestBound	0	0
NorthBound	325	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{325 + 0 + 0 + 358}{1500} = 0.455$$

LOS = A

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CalcaDB

May 20, 2004 ,Thursday 07:22:39 PM

INTERSECTION DATA SUMMARY SHEET

N/S: VICTORY BL W/E: WESTERN AVE I/S No: 10

AM/PM: AM Comments: CUMBASE

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	17	298	215	225	542	14	342	182	160	5	129	32
AMBIENT												
RELATED												
PROJECT												
TOTAL	17	298	215	225	542	14	342	182	160	5	129	32

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	1	0	1	0	1	0	0	1	0	1	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 278
B: 225

EastBound
A: 161
B: 5

WestBound
A: 342
B: 342

NorthBound
A: 257
B: 17

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{257 + 225 + 342 + 161}{1500} = 0.657$$

LOS = B

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CUMBPM

May 20, 2004 ,Thursday 07:22:55 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: VICTORY BL | W/E: WESTERN AVE | I/S No: 10

AM/PM: PM | Comments: CUMBASE plus PROJECT

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	22	579	313	220	488	15	206	249	189	17	220	10
AMBIENT												
RELATED												
PROJECT												
TOTAL	22	579	313	220	488	15	206	249	189	17	220	10

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 0 0 1 0 0	1 0 0 0 1 0 0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

	A	B
SouthBound	252	220
EastBound	230	17
WestBound	438	206
NorthBound	446	22

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{446 + 220 + 438 + 17}{1500} = 0.747$$

LOS = C

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CUMULATIVE BASE PLUS PROJECT CONDITIONS

CalcaDB

May 20, 2004 ,Thursday 07:23:37 PM

INTERSECTION DATA SUMMARY SHEET

N/S: VICTORY BL W/E: WESTERN AVE I/S No: 10

AM/PM: PM Comments: CUMBASE plus PROJECT w/ mitigation

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	22	579	326	220	488	15	207	249	189	17	220	10
AMBIENT												
RELATED												
PROJECT												
TOTAL	22	579	326	220	488	15	207	249	189	17	220	10

LANE							
NORTHBOUND	1	0	1	0	1	0	0
SOUTHBOUND	1	0	1	0	1	0	0
WESTBOUND	1	0	0	0	1	0	0
EASTBOUND	1	0	0	0	1	0	0

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	Auto
SOUTHBOUND	Perm	Auto
WESTBOUND	Perm	Auto
EASTBOUND	Perm	Auto

Critical Movements Diagram

	A	B
SouthBound	252	220
EastBound	230	17
WestBound	437	207
NorthBound	452	22

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{452 + 220 + 437 + 17}{1500} = 0.751$$

LOS = C

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May 20, 2004 ,Thursday 07:23:19 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: VICTORY BL   W/E: WESTERN AVE   I/S No: 10

AM/PM: AM   Comments: CUMBASE plus PROJECT w/ mitigation

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	17	298	216	225	542	14	355	182	160	5	129	32
AMBIENT												
RELATED												
PROJECT												
TOTAL	17	298	216	225	542	14	355	182	160	5	129	32

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	1	0	1	0	1	0	0	1	0	1	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

	A	B
SouthBound	278	225
EastBound	161	5
WestBound	342	355
NorthBound	257	17

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{257 + 225 + 355 + 161}{1500} = 0.665$$

LOS = B

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May 20, 2004 ,Thursday 07:23:37 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: RIVERSIDE DR   W/E: SR-134 EB-off ramp   I/S No: 9

AM/PM: PM   Comments: CUMBASE plus PROJECT w/ mitigation

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	663	0	0	448	0	0	0	0	650	0	62
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	663	0	0	448	0	0	0	0	650	0	62

LANE	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
	0 0 2 0 0 0 0	0 0 2 0 0 0 0	0 0 0 0 0 0 0	1 0 0 0 0 1 1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	<none>	<none>	<none>	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	224	0
EastBound	62	358
WestBound	0	0
NorthBound	332	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{332 + 0 + 0 + 358}{1500} = 0.460$$

LOS = A

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May 20, 2004 ,Thursday 07:23:19 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: RIVERSIDE DR W/E: SR-134 EB-off ramp I/S No: 9

AM/PM: AM Comments: CUMBASE plus PROJECT w/ mitigation

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	0	367	0	0	588	0	0	0	0	781	0	170
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	367	0	0	588	0	0	0	0	781	0	170

LANE	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
	0 0 2 0 0 0 0	0 0 2 0 0 0 0	0 0 0 0 0 0 0	1 0 0 0 0 1 1

SIGNAL	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
	Perm	<none>	Perm	<none>	<none>	<none>	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	294	0
EastBound	170	430
WestBound	0	0
NorthBound	184	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{0 + 294 + 0 + 430}{1500} = 0.483$$

LOS = A

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```
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #9 Riverside Dr & SR-134 EB off-ramp
*******************************************************************************
Cycle (sec):          1             Critical Vol./Cap. (X):        1.427
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):    102.1
Optimal Cycle:        0             Level Of Service:                  F
*******************************************************************************
Street Name:              Riverside Dr                  SR-134 EB off-ramp
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:        Yield Sign       Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:         0  0  2  0  0    0  0  2  0  0    1  0  1! 0  1    0  0  0  0  0
------------|----------------||----------------||----------------||----------------|
Volume Module:
Base Vol:        0  663     0     0  448     0   650    0    62     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  663     0     0  448     0   650    0    62     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:      0  696     0     0  471     0   683    0    65     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  696     0     0  471     0   683    0    65     0    0     0
------------|----------------||----------------||----------------||----------------|
Saturation Flow Module:
Sat/Lane:        0    0     0     0    0     0     0    0     0     0    0     0
Adjustment:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:        0.00 2.00  0.00  0.00 2.00  0.00  1.91 0.00  1.09  0.00 0.00  0.00
Final Sat.:      0  488     0     0  452     0   631    0   359     0    0     0
------------|----------------||----------------||----------------||----------------|
Capacity Analysis Module:
Vol/Sat:      0.00 1.43  0.00  0.00 1.04  0.00  1.08 0.00  0.18  0.00 0.00  0.00
Crit Moves:        ****              ****        ****                        ****
Green/Cycle:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Volume/Cap:   0.00 1.43  0.00  0.00 1.04  0.00  1.08 0.00  0.18  0.00 0.00  0.00
Delay/Veh:     0.0  227   0.0   0.0 52.3   0.0  61.0  0.0   2.0   0.0  0.0   0.0
Delay Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:    0.0  227   0.0   0.0 52.3   0.0  61.0  0.0   2.0   0.0  0.0   0.0
DesignQueue:     0    0     0     0    0     0     0    0     0     0    0     0
```

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #9 Riverside Dr & SR-134 EB off-ramp
********************************************************************************
Cycle (sec):            1                Critical Vol./Cap. (X):        1.339
Loss Time (sec):        0 (Y+R =  4 sec) Average Delay (sec/veh):        70.5
Optimal Cycle:          0                Level Of Service:                  F
********************************************************************************
Street Name:               Riverside Dr                  SR-134 EB off-ramp
Approach:        North Bound      South Bound      East Bound       West Bound
Movement:       L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Yield Sign       Stop Sign        Stop Sign        Stop Sign
Rights:            Include          Include          Include          Include
Lanes:          0  0  2  0  0   0  0  2  0  0   1  0  1! 0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  367     0     0  588     0   781    0   170     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0  367     0     0  588     0   781    0   170     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98
PHF Volume:      0  376     0     0  602     0   800    0   174     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  376     0     0  602     0   800    0   174     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:        0    0     0     0    0     0     0    0     0     0    0     0
Adjustment:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:        0.00 2.00  0.00  0.00 2.00  0.00  1.82 0.00  1.18  0.00 0.00  0.00
Final Sat.:      0  416     0     0  450     0   667    0   431     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.00 0.90  0.00  0.00 1.34  0.00  1.20 0.00  0.40  0.00 0.00  0.00
Crit Moves:        ****              ****       ****                         ****
Green/Cycle:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Volume/Cap:   0.00 0.90  0.00  0.00 1.34  0.00  1.20 0.00  0.40  0.00 0.00  0.00
Delay/Veh:     0.0 31.0   0.0   0.0  162   0.0  95.8  0.0   4.6   0.0  0.0   0.0
Delay Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:    0.0 31.0   0.0   0.0  162   0.0  95.8  0.0   4.6   0.0  0.0   0.0
DesignQueue:     0    0     0     0    0     0     0    0     0     0    0     0
```

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CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S:	RIVERSIDE DR	W/E:	ZOO DR	I/S No:	8
AM/PM:	PM	Comments:	CUMBASE plus PROJECT w/ mitigation		
COUNT DATE:		STUDY DATE:		GROWTH FACTOR:	

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	0	374	0	140	0	108	408	316	510	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	0	374	0	140	0	108	408	316	510	0

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	0 0 0 0 0 0 0	1 0 0 0 0 1 0	0 0 1 0 1 0 0	0 1 1 0 0 0 0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	<none>	<none>	Split	Auto	Perm	Auto	Perm	<none>

Critical Movements Diagram

	A:	B:
SouthBound	140	374
EastBound	510	316
WestBound	408	0
NorthBound	0	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{0 + 374 + 408 + 316}{1500} = 0.732$$

LOS = C

Developed by Chun Wong, 12/94

May 20, 2004 ,Thursday 07:23:19 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: RIVERSIDE DR W/E: ZOO DR I/S No: 8

AM/PM: AM Comments: CUMBASE plus PROJECT u/ mitigation

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	0	644	0	86	0	52	172	196	66	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	0	644	0	86	0	52	172	196	66	0

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	0 0 0 0 0 0 0	1 0 0 0 0 1 0	0 0 1 0 1 0 0	0 1 1 0 0 0 0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	<none>	<none>	Split	Auto	Perm	Auto	Perm	<none>

Critical Movements Diagram

	A	B
SouthBound	86	644
EastBound	66	196
WestBound	172	0
NorthBound	0	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{0 + 644 + 172 + 196}{1500} = 0.675$$

LOS = B

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Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #8 Riverside Dr & Zoo Drive

Cycle (sec):	100	Critical Vol./Cap. (X):	0.927
Loss Time (sec):	0 (Y+R = 4 sec)	Average Delay (sec/veh):	40.4
Optimal Cycle:	0	Level Of Service:	E

Street Name:	Riverside Dr						Zoo Drive					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	1 0	0	0 1	0 1	1	0 0	0 0	1	1 0
Volume Module:												
Base Vol:	0	0	0	374	0	140	316	510	0	0	108	408
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	374	0	140	316	510	0	0	108	408
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	393	0	147	332	536	0	0	114	429
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	393	0	147	332	536	0	0	114	429
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	393	0	147	332	536	0	0	114	429
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.77	1.23	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	441	0	506	358	602	0	0	451	510
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	0.89	xxxx	0.29	0.93	0.89	xxxx	xxxx	0.25	0.84
Crit Moves:				****			****					****
Delay/Veh:	0.0	0.0	0.0	47.5	0.0	12.4	52.4	44.7	0.0	0.0	12.9	36.0
Delay Adj:	1.00	1:00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	47.5	0.0	12.4	52.4	44.7	0.0	0.0	12.9	36.0
LOS by Move:	*	*	*	E	*	B	F	E	*	*	B	E
ApproachDel:		xxxxxx			37.9			47.6			31.2	
Delay Adj:		xxxxx			1.00			1.00			1.00	
ApprAdjDel:		xxxxxx			37.9			47.6			31.2	
LOS by Appr:		*			E			E			D	

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #8 Riverside Dr & Zoo Drive

Cycle (sec):	100	Critical Vol./Cap. (X):	1.178
Loss Time (sec):	0 (Y+R = 4 sec)	Average Delay (sec/veh):	69.3
Optimal Cycle:	0	Level Of Service:	F

Street Name:	Riverside Dr						Zoo Drive					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			1 0 0 0 1			0 1 1 0 0			0 0 1 1 0		
Volume Module:												
Base Vol:	0	0	0	644	0	86	196	66	0	0	52	172
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	644	0	86	196	66	0	0	52	172
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
PHF Volume:	0	0	0	658	0	88	200	67	0	0	53	176
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	658	0	88	200	67	0	0	53	176
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	658	0	88	200	67	0	0	53	176
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	558	0	673	487	523	0	0	513	571
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	1.18	xxxx	0.13	0.41	0.13	xxxx	xxxx	0.10	0.31
Crit Moves:				****			****					****
Delay/Veh:	0.0	0.0	0.0	120.1	0.0	8.7	15.0	10.5	0.0	0.0	10.5	11.7
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	120.1	0.0	8.7	15.0	10.5	0.0	0.0	10.5	11.7
LOS by Move:	*	*	*	F	*	A	C	B	*	*	B	B
ApproachDel:		xxxxxx			107.0			13.9			11.4	
Delay Adj:		xxxxx			1.00			1.00			1.00	
ApprAdjDel:		xxxxxx			107.0			13.9			11.4	
LOS by Appr:		*			F			B			B	

May 20, 2004 ,Thursday 07:23:37 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: FOREST LAWN DR W/E: ZOO DR I/S No: 7

AM/PM: PM Comments: CUMABSE plus PROJECT w/ mitigation

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	913	540	339	810	0	174	0	41	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	913	540	339	810	0	174	0	41	0	0	0

LANE	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
	0 0 1 0 0 1 0	1 0 1 0 0 0 0	1 0 0 0 0 1 0	0 0 0 0 0 0 0

SIGNAL	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
	Perm	OLA	Perm	<none>	Split	Auto	<none>	<none>

Critical Movements Diagram

	A	B
SouthBound	810	339
EastBound	0	0
WestBound	41	174
NorthBound	913	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{913 + 339 + 174 + 0}{1500} = 0.951$$

LOS = E

Developed by Chun Wong, 12/94

May 20, 2004 ,Thursday 07:23:19 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: FOREST LAWN DR | W/E: ZOO DR | I/S No: 7

AM/PM: AM | Comments: CUMBASE plus PROJECT w/ mitigation

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	485	183	109	1478	0	110	0	22	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	485	183	109	1478	0	110	0	22	0	0	0

LANE	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
	0 0 1 0 0 1 0	1 0 1 0 0 0 0	1 0 0 0 0 1 0	0 0 0 0 0 0 0

SIGNAL	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
	Perm	<none>	Perm	<none>	Split	Auto	<none>	<none>

Critical Movements Diagram

	A	B
SouthBound	1478	109
EastBound	0	0
WestBound	22	110
NorthBound	485	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{0 + 1478 + 110 + 0}{1500} = 1.059$$

LOS = F

Developed by Chun Wong, 12/94

May 20, 2004 ,Thursday 07:23:37 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: BARHAM BL W/E: FOREST LAWN DR I/S No: 6

AM/PM: PM Comments: CUMABSE plus PROJECT w/ mitigation

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	21	1691	868	175	1678	48	768	32	485	98	102	80
AMBIENT												
RELATED												
PROJECT												
TOTAL	21	1691	868	175	1678	48	768	32	485	98	102	80

LANE							
NORTHBOUND	1	0	2	0	0	1	0
SOUTHBOUND	1	0	2	0	0	1	0
WESTBOUND	1	1	1	0	0	1	0
EASTBOUND	1	0	1	0	1	1	0

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	OLA
SOUTHBOUND	Prot-Fix	Auto
WESTBOUND	Split	Auto
EASTBOUND	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	839	175
EastBound	61	98
WestBound	397	422
NorthBound	846	21

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + B(E/B)

$$V/C = \frac{846 + 175 + 422 + 98}{*1375} = 1.051$$

LOS = F

May 20, 2004 ,Thursday 07:23:19 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: BARHAM BL W/E: FOREST LAWN DR I/S No: 6

AM/PM: AM Comments: CUMBASE plus PROJECT w/ mitigation

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	95	1660	732	247	1639	191	906	161	164	40	35	24
AMBIENT												
RELATED												
PROJECT												
TOTAL	95	1660	732	247	1639	191	906	161	164	40	35	24

	NB							SB							WB							EB						
LANE	1	0	2	0	0	1	0	1	0	2	0	0	1	0	1	1	1	0	0	1	0	1	0	1	0	1	1	0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Perm	OLA	Prot-Fix	Auto	Split	Auto	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	820	247
EastBound	20	40
WestBound	161	498
NorthBound	830	95

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + B(E/B)

$$V/C = \frac{830 + 247 + 498 + 40}{*1375} = 1.105$$

LOS = F

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May 13, 2004 ,Thursday 11:14:11 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: FLETCHER DR W/E: RIVERSIDE DR I/S No: 5

AM/PM: PM Comments: FUTURE WITH MITIGATION

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	75	1712	297	89	1064	110	166	341	250	178	433	48
AMBIENT												
RELATED												
PROJECT												
TOTAL	75	1712	297	89	1064	110	166	341	250	178	433	48

LANE							
NORTHBOUND	1	0	1	0	1	0	0
SOUTHBOUND	1	0	1	0	1	0	0
WESTBOUND	1	0	1	0	1	0	0
EASTBOUND	1	0	1	0	1	0	0

SIGNAL	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
Phasing	Perm	Perm	Perm	Perm
RTOR	Auto	Auto	Auto	Auto

Critical Movements Diagram

	A	B
SouthBound	587	89
EastBound	241	178
WestBound	296	166
NorthBound	1005	75

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{1005 + 89 + 296 + 178}{*1500} = 0.975$$

LOS = E

MITI_AM2

CalcaDB

May 13, 2004 ,Thursday 11:06:43 AM

INTERSECTION DATA SUMMARY SHEET

N/S: FLETCHER DR | W/E: RIVERSIDE DR | I/S No: 5

AM/PM: AM | Comments: FUTURE WITH MITIGATION

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	44	1057	291	185	1554	114	140	273	171	213	1231	62
AMBIENT												
RELATED												
PROJECT												
TOTAL	44	1057	291	185	1554	114	140	273	171	213	1231	62

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

	A	B
SouthBound	834	185
EastBound	647	213
WestBound	222	140
NorthBound	674	44

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{44 + 834 + 140 + 647}{*1500} = 1.040$$

LOS = F

Developed by Chun Wong, 12/94

MITI_PM2

May 13, 2004 ,Thursday 11:14:11 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL | W/E: FLETCHER DR/SILVER RIDGE AV | I/S No: 4

AM/PM: PM | Comments: FUTURE WITH MITIGATION

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	471	1280	9	0	671	562	0	72	47	749	39	571
AMBIENT												
RELATED												
PROJECT												
TOTAL	471	1280	9	0	671	562	0	72	47	749	39	571

LANE

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 1 0 0 1 0 0	0 0 2 0 0 1 0	0 0 1 0 0 1 0	1 1 0 0 0 2 0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Split	Auto	Split	OLA

Critical Movements Diagram

	A	B
SouthBound	365	0
EastBound	394	394
WestBound	72	0
NorthBound	645	471

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{471 + 365 + 72 + 394}{*1375} = 0.877$$

LOS = D

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MITI_AM2

CalcaDB

May 13, 2004 ,Thursday 11:06:43 AM

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: FLETCHER DR/SILVER RIDGE AV I/S No: 4

AM/PM: AM Comments: FUTURE WITH MITIGATION

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	301	697	7	0	1116	651	0	47	9	602	26	827
AMBIENT												
RELATED												
PROJECT												
TOTAL	301	697	7	0	1116	651	0	47	9	602	26	827

LANE	1	2	3	4	5	6	7
NORTHBOUND	1	1	0	0	1	0	0
SOUTHBOUND	0	0	2	0	0	1	0
WESTBOUND	0	0	1	0	0	1	0
EASTBOUND	1	1	0	0	0	2	0

SIGNAL	Phasing	RTOR
NORTHBOUND	Prot-Fix	Auto
SOUTHBOUND	Prot-Fix	Auto
WESTBOUND	Split	Auto
EASTBOUND	Split	OLA

Critical Movements Diagram

	A	B
SouthBound	558	0
EastBound	314	314
WestBound	47	0
NorthBound	352	301

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{301 + 558 + 47 + 314}{*1375} = 0.817$$

LOS = D

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MITI_PM2

May 13, 2004 ,Thursday 11:14:11 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S:	GLENDALE BL	W/E:	SILVER LAKE BL	I/S No:	3
AM/PM:	PM	Comments:	FUTURE WITH MITIGATION		
COUNT DATE:		STUDY DATE:		GROWTH FACTOR:	

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	65	575	8	33	652	609	55	68	21	1232	44	39
AMBIENT												
RELATED												
PROJECT												
TOTAL	65	575	8	33	652	609	55	68	21	1232	44	39

LANE							
NORTHBOUND	1	0	1	0	1	0	0
SOUTHBOUND	1	0	2	0	0	1	0
WESTBOUND	0	0	0	1	0	0	0
EASTBOUND	1	1	0	0	0	1	0

SIGNAL	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
Phasing	Perm	Perm	Split	Split
RTOR	<none>	OLA	Auto	Auto

Critical Movements Diagram

	A	B
SouthBound	326	33
EastBound	638	638
WestBound	144	55
NorthBound	292	65

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{65 + 326 + 144 + 638}{*1425} = 0.753$$

LOS = C

Developed by Chun Wong, 12/94

MITI_AM2

May 13, 2004 ,Thursday 11:06:43 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: SILVER LAKE BL I/S No: 3

AM/PM: AM Comments: FUTURE WITH MITIGATION

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	73	369	5	11	1012	921	31	49	10	643	5	55
AMBIENT												
RELATED												
PROJECT												
TOTAL	73	369	5	11	1012	921	31	49	10	643	5	55

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 1 0 1 0 0	1 0 2 0 0 1 0	0 0 0 1 0 0 0	1 1 0 0 0 1 0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	OLA	Split	Auto	Split	Auto

Critical Movements Diagram

SouthBound
A: 597
B: 11

EastBound
A: 324
B: 324

WestBound
A: 90
B: 31

NorthBound
A: 187
B: 73

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{73 + 597 + 90 + 324}{*1425} = 0.691$$

LOS = B

Developed by Chun Wong, 12/94

MITI_PM2

May 12, 2004 ,Wednesday 03:36:17 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL   W/E: SR-2 SB off-ramp/Waterloo St   I/S No: 2

AM/PM: PM   Comments: FUTURE WITH MITIGATION

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	47	473	0	0	484	23	40	159	107	26	0	36
AMBIENT												
RELATED												
PROJECT												
TOTAL	47	473	0	0	484	23	40	159	107	26	0	36

LANE							
NORTHBOUND	1	0	2	0	0	0	0
SOUTHBOUND	0	0	1	0	1	0	0
WESTBOUND	1	0	0	1	0	0	0
EASTBOUND	0	0	0	0	0	0	1

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	<none>
SOUTHBOUND	Perm	Auto
WESTBOUND	Split	Auto
EASTBOUND	Split	Auto

Critical Movements Diagram

SouthBound
A: 254
B: 0

EastBound
A: 62
B: 26

WestBound
A: 266
B: 40

NorthBound
A: 237
B: 47

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{47 + 254 + 266 + 62^{+36}}{\cancel{1425}\ 1375} = 0.441$$

~~LOS = A~~

$\frac{665}{1375} = 0.484$

LOS = A

MITI_AM2

CalcaDB

May 12, 2004 ,Wednesday 03:36:05 PM

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL   W/E: SR-2 SB off-ramp/Waterloo St   I/S No: 2

AM/PM: AM   Comments: FUTURE WITH MITIGATION

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	31	341	0	0	863	40	967	330	42	22	0	45
AMBIENT												
RELATED												
PROJECT												
TOTAL	31	341	0	0	863	40	967	330	42	22	0	45

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 2 0 0 0 0	0 0 1 0 1 0 0	1 0 0 1 0 0 0	0 0 0 0 0 0 1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	Auto	Split	Auto	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	452	0
EastBound	67	22
WestBound	670	670
NorthBound	171	31

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{31 + 452 + 670 + 67 \; +33}{\cancel{1425} \; /1375} = \cancel{0.856}$$

~~LOS = D~~

$\frac{1253}{1375} = 0.911$

LOS = E

MITI_PM2

May 13, 2004 ,Thursday 11:14:05 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S:

W/E: VAN PELT PL

I/S No: 1

AM/PM: PM

Comments: FUTURE WITH MITIGATION

COUNT DATE:

STUDY DATE:

GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	10	1203	0	0	748	52	0	0	0	35	0	27
AMBIENT												
RELATED												
PROJECT												
TOTAL	10	1203	0	0	748	52	0	0	0	35	0	27

LANE							
NORTHBOUND	0	1	0	0	0	0	0
SOUTHBOUND	0	0	1	0	0	1	0
WESTBOUND	0	0	0	0	0	0	0
EASTBOUND	0	0	0	0	0	0	1

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	<none>
SOUTHBOUND	Perm	Auto
WESTBOUND	<none>	<none>
EASTBOUND	Split	Auto

Critical Movements Diagram

SouthBound
A: 748
B: 0

EastBound
A: 62
B: 35

WestBound
A: 0
B: 0

NorthBound
A: 1213
B: 10

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{1213 + 0 + 0 + 62}{1500} = 0.850$$

LOS = D

Developed by Chun Wong, 12/94

```
---------------------------------------------------------------------------------
---------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
*********************************************************************************
Intersection #1 Silver Lake Bl & Van Pelt Pl
*********************************************************************************
Average Delay (sec/veh):       1.2   Worst Case Level Of Service:       F[ 69.5]
*********************************************************************************
Street Name:              Silver Lake Bl                       Van Pelt Pl
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      18  646     0     0 1165    65    20    0    11     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   18  646     0     0 1165    65    20    0    11     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93
PHF Volume:    19  695     0     0 1253    70    22    0    12     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    19  695     0     0 1253    70    22    0    12     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1323 xxxx xxxxx  xxxx xxxx xxxxx  1986 xxxx  1253  xxxx xxxx xxxxx
Potent Cap.:  529 xxxx xxxxx  xxxx xxxx xxxxx    68 xxxx   212  xxxx xxxx xxxxx
Move Cap.:    529 xxxx xxxxx  xxxx xxxx xxxxx    66 xxxx   212  xxxx xxxx xxxxx
Volume/Cap:  0.04 xxxx  xxxx  xxxx xxxx  xxxx  0.33 xxxx  0.06  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del: 12.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    B    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx   87 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  1.5 xxxxx xxxxx xxxx xxxxx
Shrd StpDel: 12.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 69.5 xxxxx xxxxx xxxx xxxxx
Shared LOS:     B    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx             69.5            xxxxxx
ApproachLOS:         *                *                 F                *
```

CUMULATIVE BASE PLUS PROJECT CONDITIONS WITH MITIGATIONS

CP_PMREV

July 13, 2004 ,Tuesday 06:54:42 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: VICTORY BL | W/E: WESTERN AVE | I/S No: 10

AM/PM: PM | Comments: CUMBASE plus PROJECT

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	22	579	327	220	488	15	208	249	189	17	220	10
AMBIENT												
RELATED												
PROJECT												
TOTAL	22	579	327	220	488	15	208	249	189	17	220	10

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	1	0	1	0	1	0	0	1	0	1	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 252
B: 220

EastBound
A: 230
B: 17

WestBound
A: 437
B: 208

NorthBound
A: 453
B: 22

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{453 + 220 + 437 + 17}{1500} = 0.751$$

LOS = C

Developed by Chun Wong, 12/94

CP_AMREV

CalcaDB

July 13, 2004 ,Tuesday 06:52:03 PM

INTERSECTION DATA SUMMARY SHEET

N/S: VICTORY BL W/E: WESTERN AVE I/S No: 10

AM/PM: AM Comments: CUMBASE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	17	298	217	225	542	14	356	182	160	5	129	32
AMBIENT												
RELATED												
PROJECT												
TOTAL	17	298	217	225	542	14	356	182	160	5	129	32

LANE							
NORTHBOUND	1	0	1	0	1	0	0
SOUTHBOUND	1	0	1	0	1	0	0
WESTBOUND	1	0	0	0	1	0	0
EASTBOUND	1	0	0	0	1	0	0

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	Auto
SOUTHBOUND	Perm	Auto
WESTBOUND	Perm	Auto
EASTBOUND	Perm	Auto

Critical Movements Diagram

	A	B
SouthBound	278	225
EastBound	161	5
WestBound	342	356
NorthBound	258	17

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{258 + 225 + 356 + 161}{1500} = 0.667$$

LOS = B

Developed by Chun Wong, 12/94

CP_PMREV

July 13, 2004 ,Tuesday 06:54:42 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: RIVERSIDE DR W/E: SR-134 EB-off ramp I/S No: 9

AM/PM: PM Comments: CUMBASE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	664	0	0	449	0	0	0	0	650	0	62
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	664	0	0	449	0	0	0	0	650	0	62

LANE	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
	0 0 2 0 0 0 0	0 0 2 0 0 0 0	0 0 0 0 0 0 0	1 0 0 0 0 1 1

SIGNAL	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
	Perm	<none>	Perm	<none>	<none>	<none>	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	225	0
EastBound	62	358
WestBound	0	0
NorthBound	332	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{332 + 0 + 0 + 358}{1500} = 0.460$$

LOS = A

Developed by Chun Wong, 12/94

CP_AMREV

CalcaDB

July 13, 2004 ,Tuesday 06:52:03 PM

INTERSECTION DATA SUMMARY SHEET

N/S: RIVERSIDE DR | W/E: SR-134 EB-off ramp | I/S No: 9

AM/PM: AM | Comments: CUMBASE plus PROJECT

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	368	0	0	589	0	0	0	0	781	0	170
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	368	0	0	589	0	0	0	0	781	0	170

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	0 0 2 0 0 0 0	0 0 2 0 0 0 0	0 0 0 0 0 0 0	1 0 0 0 0 1 1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	<none>	<none>	<none>	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	295	0
EastBound	170	430
WestBound	0	0
NorthBound	184	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{0 + 295 + 0 + 430}{1500} = 0.483$$

LOS = A

Developed by Chun Wong, 12/94

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #9 Riverside Dr & SR-134 EB off-ramp

Cycle (sec):	1	Critical Vol./Cap. (X):	1.429
Loss Time (sec):	0 (Y+R = 4 sec)	Average Delay (sec/veh):	103.0
Optimal Cycle:	0	Level Of Service:	F

Street Name:	Riverside Dr						SR-134 EB off-ramp					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 2 0 0			0 0 2 0 0			1 0 1! 0 1			0 0 0 0 0		
Volume Module:												
Base Vol:	0	664	0	0	449	0	650	0	62	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	664	0	0	449	0	650	0	62	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	697	0	0	472	0	683	0	65	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	697	0	0	472	0	683	0	65	0	0	0
Saturation Flow Module:												
Sat/Lane:	0	0	0	0	0	0	0	0	0	0	0	0
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.00	0.00	0.00	2.00	0.00	1.91	0.00	1.09	0.00	0.00	0.00
Final Sat.:	0	488	0	0	452	0	631	0	359	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	1.43	0.00	0.00	1.04	0.00	1.08	0.00	0.18	0.00	0.00	0.00
Crit Moves:		****			****		****					****
Green/Cycle:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume/Cap:	0.00	1.43	0.00	0.00	1.04	0.00	1.08	0.00	0.18	0.00	0.00	0.00
Delay/Veh:	0.0	228	0.0	0.0	52.7	0.0	61.0	0.0	2.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	228	0.0	0.0	52.7	0.0	61.0	0.0	2.0	0.0	0.0	0.0
DesignQueue:	0	0	0	0	0	0	0	0	0	0	0	0

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #9 Riverside Dr & SR-134 EB off-ramp

Cycle (sec):	1	Critical Vol./Cap. (X):	1.341
Loss Time (sec):	0 (Y+R = 4 sec)	Average Delay (sec/veh):	71.0
Optimal Cycle:	0	Level Of Service:	F

Street Name:	Riverside Dr						SR-134 EB off-ramp					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 2 0 0			0 0 2 0 0			1 0 1! 0 1			0 0 0 0 0		
Volume Module:												
Base Vol:	0	368	0	0	589	0	781	0	170	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	368	0	0	589	0	781	0	170	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
PHF Volume:	0	377	0	0	603	0	800	0	174	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	377	0	0	603	0	800	0	174	0	0	0
Saturation Flow Module:												
Sat/Lane:	0	0	0	0	0	0	0	0	0	0	0	0
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.00	0.00	0.00	2.00	0.00	1.82	0.00	1.18	0.00	0.00	0.00
Final Sat.:	0	416	0	0	450	0	667	0	431	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.91	0.00	0.00	1.34	0.00	1.20	0.00	0.40	0.00	0.00	0.00
Crit Moves:		****			****		****					****
Green/Cycle:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume/Cap:	0.00	0.91	0.00	0.00	1.34	0.00	1.20	0.00	0.40	0.00	0.00	0.00
Delay/Veh:	0.0	31.3	0.0	0.0	163	0.0	95.8	0.0	4.6	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	31.3	0.0	0.0	163	0.0	95.8	0.0	4.6	0.0	0.0	0.0
DesignQueue:	0	0	0	0	0	0	0	0	0	0	0	0

CP_PMREV

July 13, 2004 ,Tuesday 06:54:42 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S:	RIVERSIDE DR	W/E:	ZOO DR	I/S No:	8
AM/PM:	PM	Comments:	CUMBASE plus PROJECT		
COUNT DATE:		STUDY DATE:		GROWTH FACTOR:	

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	0	374	0	141	0	108	408	317	510	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	0	374	0	141	0	108	408	317	510	0

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0

	NORTHBOUND		SOUTHBOUND		WESTBOUND		EASTBOUND	
	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	<none>	<none>	Split	Auto	Perm	Auto	Perm	<none>

Critical Movements Diagram

	A	B
SouthBound	141	374
EastBound	510	317
WestBound	408	0
NorthBound	0	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{0 + 374 + 408 + 317}{1500} = 0.733$$

LOS = C

Developed by Chun Wong, 12/94

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S:	RIVERSIDE DR	W/E:	ZOO DR	I/S No:	8
AM/PM:	AM	Comments:	CUMBASE plus PROJECT		
COUNT DATE:		STUDY DATE:		GROWTH FACTOR:	

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	0	644	0	87	0	52	172	197	66	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	0	644	0	87	0	52	172	197	66	0

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0

	NORTHBOUND		SOUTHBOUND		WESTBOUND		EASTBOUND	
	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	<none>	<none>	Split	Auto	Perm	Auto	Perm	<none>

Critical Movements Diagram

	A	B
SouthBound	87	644
EastBound	66	197
WestBound	172	0
NorthBound	0	0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{0 + 644 + 172 + 197}{1500} = 0.675$$

LOS = B

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #8 Riverside Dr & Zoo Drive

Cycle (sec):	100	Critical Vol./Cap. (X):	0.928
Loss Time (sec):	0 (Y+R = 4 sec)	Average Delay (sec/veh):	40.5
Optimal Cycle:	0	Level Of Service:	E

Street Name:	Riverside Dr						Zoo Drive					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0 0	0	1 0	0 0	1	0 1	1 0	0	0 0	1 1	0
Volume Module:												
Base Vol:	0	0	0	374	0	141	317	510	0	0	108	408
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	374	0	141	317	510	0	0	108	408
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	393	0	148	333	536	0	0	114	429
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	393	0	148	333	536	0	0	114	429
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	393	0	148	333	536	0	0	114	429
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.77	1.23	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	441	0	506	359	602	0	0	451	509
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	0.89	xxxx	0.29	0.93	0.89	xxxx	xxxx	0.25	0.84
Crit Moves:				****			****					****
Delay/Veh:	0.0	0.0	0.0	47.6	0.0	12.4	52.7	44.9	0.0	0.0	12.9	36.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	47.6	0.0	12.4	52.7	44.9	0.0	0.0	12.9	36.1
LOS by Move:	*	*	*	E	*	B	F	E	*	*	B	E
ApproachDel:	xxxxxx			37.9			47.9			31.2		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			37.9			47.9			31.2		
LOS by Appr:	*			E			E			D		

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
           2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #8 Riverside Dr & Zoo Drive
********************************************************************************
Cycle (sec):          100             Critical Vol./Cap. (X):        1.179
Loss Time (sec):        0 (Y+R =  4 sec) Average Delay (sec/veh):     69.3
Optimal Cycle:          0             Level Of Service:                  F
********************************************************************************
Street Name:                Riverside Dr                        Zoo Drive
Approach:        North Bound      South Bound      East Bound       West Bound
Movement:       L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:      0    0     0    0    0     0    0    0     0    0    0     0
Lanes:         0  0  0  0  0   1  0  0  0  1   0  1  1  0  0   0  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0    0     0  644    0    87  197   66     0    0   52   172
Growth Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:     0    0     0  644    0    87  197   66     0    0   52   172
User Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:      0.98 0.98  0.98 0.98 0.98  0.98 0.98 0.98  0.98 0.98 0.98  0.98
PHF Volume:      0    0     0  658    0    89  201   67     0    0   53   176
Reduct Vol:      0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:     0    0     0  658    0    89  201   67     0    0   53   176
PCE Adj:      1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:      1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Final Vol.:      0    0     0  658    0    89  201   67     0    0   53   176
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:        0.00 0.00  0.00 1.00 0.00  1.00 1.00 1.00  0.00 0.00 1.00  1.00
Final Sat.:      0    0     0  558    0   673  487  523     0    0  513   570
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      xxxx xxxx  xxxx 1.18 xxxx  0.13 0.41 0.13  xxxx xxxx 0.10  0.31
Crit Moves:                   ****             ****                        ****
Delay/Veh:     0.0  0.0   0.0 120.3  0.0   8.7 15.1 10.5   0.0  0.0 10.5  11.7
Delay Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:    0.0  0.0   0.0 120.3  0.0   8.7 15.1 10.5   0.0  0.0 10.5  11.7
LOS by Move:     *    *     *    F    *     A    C    B     *    *    B     B
ApproachDel:     xxxxxx           107.0             13.9             11.4
Delay Adj:        xxxxx            1.00             1.00             1.00
ApprAdjDel:      xxxxxx           107.0             13.9             11.4
LOS by Appr:        *                F                B                B
********************************************************************************
```

CP_PMREV

July 13, 2004 ,Tuesday 06:54:42 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: FOREST LAWN DR W/E: ZOO DR I/S No: 7

AM/PM: PM Comments: CUMABSE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	915	541	339	812	0	175	0	41	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	915	541	339	812	0	175	0	41	0	0	0

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	0	0	1	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0

	NORTHBOUND		SOUTHBOUND		WESTBOUND		EASTBOUND	
	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	OLA	Perm	<none>	Split	Auto	<none>	<none>

Critical Movements Diagram

SouthBound
A: 812
B: 339

EastBound
A: 0
B: 0

WestBound
A: 41
B: 175

NorthBound
A: 915
B: 0

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{915 + 339 + 175 + 0}{1500} = 0.953$$

LOS = E

Developed by Chun Wong, 12/94

CP_AMREV

CalcaDB

July 13, 2004 ,Tuesday 06:52:03 PM

INTERSECTION DATA SUMMARY SHEET

N/S: FOREST LAWN DR W/E: ZOO DR I/S No: 7

AM/PM: AM Comments: CUMBASE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	487	184	109	1480	0	110	0	22	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	487	184	109	1480	0	110	0	22	0	0	0

LANE							
NORTHBOUND	0	0	1	0	0	1	0
SOUTHBOUND	1	0	1	0	0	0	0
WESTBOUND	1	0	0	0	0	1	0
EASTBOUND	0	0	0	0	0	0	0

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	<none>
SOUTHBOUND	Perm	<none>
WESTBOUND	Split	Auto
EASTBOUND	<none>	<none>

Critical Movements Diagram

SouthBound A: 1480 B: 109

EastBound A: 0 B: 0

WestBound A: 22 B: 110

NorthBound A: 487 B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{0 + 1480 + 110 + 0}{1500} = 1.060$$

LOS = F

Developed by Chun Wong, 12/94

CP_PMREV

July 13, 2004 ,Tuesday 06:54:42 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: BARHAM BL W/E: FOREST LAWN DR I/S No: 6

AM/PM: PM Comments: CUMABSE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	21	1691	868	175	1678	48	768	32	485	98	102	80
AMBIENT												
RELATED												
PROJECT												
TOTAL	21	1691	868	175	1678	48	768	32	485	98	102	80

LANE

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 2 0 0 1 0	1 0 2 0 0 1 0	1 1 1 0 0 1 0	1 0 1 0 1 1 0
SIGNAL Phasing	Perm	Prot-Fix	Split	Split
SIGNAL RTOR	OLA	Auto	Auto	Auto

Critical Movements Diagram

SouthBound A: 839 B: 175

EastBound A: 61 B: 98

WestBound A: 397 B: 422

NorthBound A: 846 B: 21

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + B(E/B)

$$V/C = \frac{846 + 175 + 422 + 98}{*1375} = 1.051$$

LOS = F

Developed by Chun Wong, 12/94

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: BARHAM BL W/E: FOREST LAWN DR I/S No: 6

AM/PM: AM Comments: CUMBASE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	95	1660	732	247	1639	191	906	161	164	40	35	24
AMBIENT												
RELATED												
PROJECT												
TOTAL	95	1660	732	247	1639	191	906	161	164	40	35	24

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	1	0	2	0	0	1	0	1	0	2	0	0	1	0	1	1	1	0	0	1	0	1	0	1	0	1	1	0

	NORTHBOUND Phasing	NORTHBOUND RTOR	SOUTHBOUND Phasing	SOUTHBOUND RTOR	WESTBOUND Phasing	WESTBOUND RTOR	EASTBOUND Phasing	EASTBOUND RTOR
SIGNAL	Perm	OLA	Prot-Fix	Auto	Split	Auto	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	820	247
EastBound	20	40
WestBound	161	498
NorthBound	830	95

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + B(E/B)

$$V/C = \frac{830 + 247 + 498 + 40}{*1375} = 1.105$$

LOS = F

CP_PM

May 13, 2004 ,Thursday 11:06:04 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: FLETCHER DR | W/E: RIVERSIDE DR | I/S No: 5

AM/PM: PM | Comments: CUMBASE plus PROJECT

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	75	1718	304	89	1070	110	166	341	250	178	433	48
AMBIENT												
RELATED												
PROJECT												
TOTAL	75	1718	304	89	1070	110	166	341	250	178	433	48

LANE	Northbound	Southbound	Westbound	Eastbound
	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0

SIGNAL	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

	A	B
SouthBound	590	89
EastBound	241	178
WestBound	296	166
NorthBound	1011	75

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{1011 + 89 + 296 + 178}{*1500} = 0.979$$

LOS = E

Developed by Chun Wong, 12/94

CP_AM

May 13, 2004 ,Thursday 11:05:40 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: FLETCHER DR | W/E: RIVERSIDE DR | I/S No: 5

AM/PM: AM | Comments: CUMBASE plus PROJECT

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	44	1057	291	185	1556	114	140	273	171	213	1231	62
AMBIENT												
RELATED												
PROJECT												
TOTAL	44	1057	291	185	1556	114	140	273	171	213	1231	62

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0	1 0 1 0 1 0 0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

	A	B
SouthBound	835	185
EastBound	647	213
WestBound	222	140
NorthBound	674	44

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{44 + 835 + 140 + 647}{*1500} = 1.041$$

LOS = F

Developed by Chun Wong, 12/94

CP_PM

May 13, 2004 ,Thursday 11:06:04 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: FLETCHER DR/SILVER RIDGE AV I/S No: 4

AM/PM: PM Comments: CUMBASE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	471	1293	9	0	676	562	0	72	47	749	39	571
AMBIENT												
RELATED												
PROJECT												
TOTAL	471	1293	9	0	676	562	0	72	47	749	39	571

LANE	NB	SB	WB	EB
	1 1 0 0 1 0 0	0 0 2 0 0 1 0	0 0 1 0 0 1 0	1 1 0 0 0 2 0

SIGNAL	Phasing	RTOR
Northbound	Prot-Fix	Auto
Southbound	Prot-Fix	Auto
Westbound	Split	Auto
Eastbound	Split	OLA

Critical Movements Diagram

SouthBound A: 365 B: 0

EastBound A: 394 B: 394

WestBound A: 72 B: 0

NorthBound A: 651 B: 471

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{471 + 365 + 72 + 394}{*1375} = 0.877$$

LOS = D

Developed by Chun Wong, 12/94

CP_AM

May 13, 2004 ,Thursday 11:05:40 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: FLETCHER DR/SILVER RIDGE AV I/S No: 4

AM/PM: AM Comments: CUMBASE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	301	698	7	0	1118	651	0	47	9	602	26	827
AMBIENT												
RELATED												
PROJECT												
TOTAL	301	698	7	0	1118	651	0	47	9	602	26	827

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	1	1	0	0	1	0	0	0	0	2	0	0	1	0	0	0	1	0	0	1	0	1	1	0	0	0	2	0

	NORTHBOUND		SOUTHBOUND		WESTBOUND		EASTBOUND	
	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Split	Auto	Split	OLA

Critical Movements Diagram

SouthBound
A: 559
B: 0

EastBound
A: 314
B: 314

WestBound
A: 47
B: 0

NorthBound
A: 353
B: 301

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{301 + 559 + 47 + 314}{*1375} = 0.818$$

LOS = D

Developed by Chun Wong, 12/94

CP_PM

May 13, 2004 ,Thursday 11:06:04 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: SILVER LAKE BL I/S No: 3

AM/PM: PM Comments: CUMBASE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	69	575	8	33	652	614	55	68	21	1245	44	39
AMBIENT												
RELATED												
PROJECT												
TOTAL	69	575	8	33	652	614	55	68	21	1245	44	39

LANE							
NORTHBOUND	1	0	1	0	1	0	0
SOUTHBOUND	1	0	2	0	0	1	0
WESTBOUND	0	0	0	1	0	0	0
EASTBOUND	1	1	0	0	0	1	0

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	<none>
SOUTHBOUND	Perm	OLA
WESTBOUND	Split	Auto
EASTBOUND	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	326	33
EastBound	645	645
WestBound	144	55
NorthBound	292	69

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{69 + 326 + 144 + 645}{*1425} = 0.761$$

LOS = C

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CP_AM

May 13, 2004 ,Thursday 11:05:40 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S:	GLENDALE BL	W/E:	SILVER LAKE BL	I/S No:	3
AM/PM:	AM	Comments:	CUMBASE plus PROJECT		
COUNT DATE:		STUDY DATE:		GROWTH FACTOR:	

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	76	369	5	11	1012	923	31	49	10	644	5	55
AMBIENT												
RELATED												
PROJECT												
TOTAL	76	369	5	11	1012	923	31	49	10	644	5	55

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 1 0 1 0 0	1 0 2 0 0 1 0	0 0 0 1 0 0 0	1 1 0 0 0 1 0

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Perm	<none>	Perm	OLA	Split	Auto	Split	Auto

Critical Movements Diagram

	SouthBound	EastBound	WestBound	NorthBound
A:	599	325	90	187
B:	11	325	31	76

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{76 + 599 + 90 + 325}{*1425} = 0.695$$

LOS = B

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CP_PM

May 12, 2004 ,Wednesday 03:35:51 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: SR-2 SB off-ramp/Waterloo St I/S No: 2

AM/PM: PM Comments: CUMBASE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	47	473	0	0	484	23	40	159	111	26	0	36
AMBIENT												
RELATED												
PROJECT												
TOTAL	47	473	0	0	484	23	40	159	111	26	0	36

LANE							
NORTHBOUND	1	0	2	0	0	0	0
SOUTHBOUND	0	0	1	0	1	0	0
WESTBOUND	1	0	0	1	0	0	0
EASTBOUND	0	0	0	0	0	0	1

SIGNAL	Phasing	RTOR
NORTHBOUND	Perm	<none>
SOUTHBOUND	Perm	Auto
WESTBOUND	Split	Auto
EASTBOUND	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	254	0
EastBound	62	26
WestBound	270	40
NorthBound	237	47

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$\frac{669}{1375} = 0.487 \quad LOS = A$$

+36

$$V/C = \frac{47 + 254 + 270 + 62}{\cancel{1425}\ 1375} = \cancel{0.444}$$

LOS = A

Developed by Chun Wong, 12/94

CP_AM May 12, 2004 ,Wednesday 03:35:39 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: GLENDALE BL W/E: SR-2 SB off-ramp/Waterloo St I/S No: 2

AM/PM: AM Comments: CUMBASE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND LT	NORTHBOUND TH	NORTHBOUND RT	SOUTHBOUND LT	SOUTHBOUND TH	SOUTHBOUND RT	WESTBOUND LT	WESTBOUND TH	WESTBOUND RT	EASTBOUND LT	EASTBOUND TH	EASTBOUND RT
EXISTING	31	342	0	0	863	40	967	330	44	22	0	45
AMBIENT												
RELATED												
PROJECT												
TOTAL	31	342	0	0	863	40	967	330	44	22	0	45

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	1 0 2 0 0 0 0	0 0 1 0 1 0 0	1 0 0 1 0 0 0	0 0 0 0 0 0 1

	NB Phasing	NB RTOR	SB Phasing	SB RTOR	WB Phasing	WB RTOR	EB Phasing	EB RTOR
SIGNAL	Perm	<none>	Perm	Auto	Split	Auto	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	452	0
EastBound	67	22
WestBound	671	671
NorthBound	171	31

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{31 + 452 + 671 + 67 \; +33}{\cancel{1425}\; 1375} = \cancel{0.857}$$

~~LOS = D~~

$\frac{1254}{1375} = 0.912$

LOS = E

CP_PM

May 13, 2004 ,Thursday 11:05:59 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: W/E: VAN PELT PL I/S No: 1

AM/PM: PM Comments: CUMBASE plus PROJECT

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	10	1203	0	0	748	61	0	0	0	49	0	28
AMBIENT												
RELATED												
PROJECT												
TOTAL	10	1203	0	0	748	61	0	0	0	49	0	28

	NORTHBOUND							SOUTHBOUND							WESTBOUND							EASTBOUND						
LANE	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	Auto	<none>	<none>	Split	Auto

Critical Movements Diagram

SouthBound
A: 748
B: 0

EastBound
A: 77
B: 49

WestBound
A: 0
B: 0

NorthBound
A: 1213
B: 10

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{1213 + 0 + 0 + 77}{1500} = 0.860$$

LOS = D

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CP_AM

May 13, 2004 ,Thursday 11:05:31 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S:	SILVER LAKE BL	W/E:	VAN PELT PL	I/S No:	1
AM/PM:	AM	Comments:	CUMBASE plus PROJECT		
COUNT DATE:		STUDY DATE:		GROWTH FACTOR:	

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	18	646	0	0	1165	71	0	0	0	21	0	11
AMBIENT												
RELATED												
PROJECT												
TOTAL	18	646	0	0	1165	71	0	0	0	21	0	11

	NORTHBOUND	SOUTHBOUND	WESTBOUND	EASTBOUND
LANE	0 1 0 0 0 0 0	0 0 1 0 0 1 0	0 0 0 0 0 0 0	0 0 0 0 0 0 1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	<none>	Perm	Auto	<none>	<none>	Split	Auto

Critical Movements Diagram

	A	B
SouthBound	1165	0
EastBound	32	21
WestBound	0	0
NorthBound	664	18

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{18 + 1165 + 0 + 32}{1500} = 0.810$$

LOS = D

Developed by Chun Wong, 12/94

```
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #1 Silver Lake Bl & Van Pelt Pl
*******************************************************************************
Average Delay (sec/veh):       5.8   Worst Case Level Of Service:      F[155.7]
*******************************************************************************
Street Name:             Silver Lake Bl                      Van Pelt Pl
Approach:        North Bound      South Bound      East Bound       West Bound
Movement:       L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:            Include          Include         Include          Include
Lanes:          0  1  0  0  0   0  0  1  0  1   0  0  1! 0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:         10 1203    0     0  748   61    49    0   28     0    0    0
Growth Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:      10 1203    0     0  748   61    49    0   28     0    0    0
User Adj:       1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:        0.96 0.96 0.96  0.96 0.96 0.96  0.96 0.96 0.96  0.96 0.96 0.96
PHF Volume:       10 1253    0     0  779   64    51    0   29     0    0    0
Reduct Vol:        0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:       10 1253    0     0  779   64    51    0   29     0    0    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:     4.1 xxxx xxxxx xxxxx xxxx xxxxx  6.4 xxxx  6.2 xxxxx xxxx xxxxx
FollowUpTim:     2.2 xxxx xxxxx xxxxx xxxx xxxxx  3.5 xxxx  3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:     843 xxxx xxxxx  xxxx xxxx xxxxx 2053 xxxx  779  xxxx xxxx xxxxx
Potent Cap.:     802 xxxx xxxxx  xxxx xxxx xxxxx   62 xxxx  399  xxxx xxxx xxxxx
Move Cap.:       802 xxxx xxxxx  xxxx xxxx xxxxx   61 xxxx  399  xxxx xxxx xxxxx
Volume/Cap:     0.01 xxxx  xxxx  xxxx xxxx  xxxx 0.83 xxxx 0.07  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:           0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:     9.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:       A    *     *     *    *     *     *    *     *     *    *     *
Movement:       LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.:    xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx   88 xxxxx  xxxx xxxx xxxxx
SharedQueue:     0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  5.0 xxxxx xxxxx xxxx xxxxx
Shrd StpDel:     9.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  156 xxxxx xxxxx xxxx xxxxx
Shared LOS:        A    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:        xxxxxx           xxxxxx            155.7           xxxxxx
ApproachLOS:           *                *                F                *
```

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Silver Lake Bl & Van Pelt Pl

Average Delay (sec/veh): 1.3 Worst Case Level Of Service: F[71.7]

Street Name:	Silver Lake Bl						Van Pelt Pl					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0	1 0	0 0	0	0 1	0 1	0	0 1!	0 0	0	0 0	0 0
Volume Module:												
Base Vol:	18	646	0	0	1165	71	21	0	11	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	18	646	0	0	1165	71	21	0	11	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	19	695	0	0	1253	76	23	0	12	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	19	695	0	0	1253	76	23	0	12	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1329	xxxx	xxxxx	xxxx	xxxx	xxxxx	1986	xxxx	1253	xxxx	xxxx	xxxxx
Potent Cap.:	526	xxxx	xxxxx	xxxx	xxxx	xxxxx	68	xxxx	212	xxxx	xxxx	xxxxx
Move Cap.:	526	xxxx	xxxxx	xxxx	xxxx	xxxxx	66	xxxx	212	xxxx	xxxx	xxxxx
Volume/Cap:	0.04	xxxx	xxxx	xxxx	xxxx	xxxx	0.34	xxxx	0.06	xxxx	xxxx	xxxx
Level Of Service Module:												
Queue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Stopped Del:	12.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	B	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	87	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	1.6	xxxxx	xxxxx	xxxx	xxxxx
Shrd StpDel:	12.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	71.7	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	B	*	*	*	*	*	*	F	*	*	*	*
ApproachDel:		xxxxxx			xxxxxx			71.7			xxxxxx	
ApproachLOS:		*			*			F			*	

APPENDIX D

SUMMARY OF TRUCKLOADS ESTIMATES

APPENDIX D

SUMMARY OF TRUCKLOADS ESTIMATES

Activity	Sub-Activity	Required Amount	Truck Capacity	Duration (days)	Daily Truckloads Estimates	Daily Truck trips [a]
SLRC Site :						
Bypass pipeline construction	soil dump	6,625 cubic yards	10 cubic yards	187	3	15
	pipe delivery	5,040 feet	40 feet	21	6	30
	concrete delivery	2,542 cubic yards	10 cubic yards	31	9	45
					Total	90
Regulating Station Construction	concrete Delivery	330 cubic yards	10 cubic yards	5	15	75
HWSG Site:						
Reservoir Grading & Site Preparation	Soil dump	23,000 cubic yards	20 cubic yards	40	30	150
Inlet/outlet Vault Construction	concrete delivery	820 cubic yards	10 cubic yards	2	41	205
	vault delivery	8 vaults	1 vault	8	1	5
					Total	210
Reservoir Storage Structure Construction	concrete delivery	98,686 cubic yards	n/a	997	15	75
	gravel delivery	18,336 cubic yards	n/a	1019	2	10
					Total	85
Burying the Rerservoir Storage Structure	soil import	265,000 cubic yards	10 cubic yards	166	80	400
	concrete delivery	320 cubic yards	n/a	4	8	40
					Total	440
Hydroelectric Power Generating Facility	soil import	2600 cubic yards	16 cubic yards	20	8	40
	concrete delivery	960 cubic yards	12 cubic yards	80	1	5
	Equipment	312 tractor trailer trips	n/a	360	1	5
	Equipment	900 flat bed trucks	n/a	360	3	15
					Total	65

Note:
[a] Daily Truck trips = Required Daily truckloads *2 trips per truckload * 2.5 passenger equipvalent cars

Silver Lake Reservoir Complex Storage Replacement Project - Traffic Study Addendum

Introduction

This Technical Memorandum is an addendum to the *Traffic Study for the Silver Lake Reservoir Complex Storage Replacement Project* (Traffic Study) prepared by Kaku Associates, dated July 2004. The Traffic Study is incorporated herein by reference.

The purpose of this Addendum is to address additional, recently identified components of the Silver Lake Reservoir Complex (SLRC) Storage Replacement Project (SRP) that have the potential to impact traffic and transportation. These additional project elements were not considered in the Traffic Study, and include:

- Construction activities related to taking Silver Lake and Ivanhoe Reservoirs out of service that will overlap with bypass pipeline construction and increase the total traffic generated by the Project at the SLRC during construction
- Potential in-street construction in West Silver Lake Drive (for the trunkline for the regulating stations) that may have traffic impacts
- In-street construction for the relief stations that may have traffic impacts
- Construction activities related to taking Ivanhoe Reservoir out of service that will occur outside the timeframe previously identified for construction at the SLRC

These recently identified project elements occur only at the SLRC. These Project elements are addressed in the following sections, and only potential impacts associated with the SLRC are discussed.

Overlapping Construction Activities

The Traffic Study analyzed a worst-case construction scenario that reflected 2013 traffic volumes and the bypass pipeline construction scenario (which had the highest number of associated workers). With the addition of construction activities related to the removal of Silver Lake Reservoir scheduled for 2007-2008, there would be additional construction traffic during this phase. To assess the impact of additional construction traffic, an estimate of the additional trips was developed.

The original traffic study used a three-step process (trip generation, trip distribution, and trip assignment) to identify construction traffic. For trip generation, the first step is to identify additional trips. Activities related to removal of Silver Lake Reservoir from service require approximately 10 to 14 laborers and 6 trucks per day. Table 1 summarizes the revised estimates for the number of trips during the overlapping construction period (October 2007 to April 2008).

TABLE 1
Updated Trip Generation (October 2007 to April 2008)

Activity		Trip Types	Daily Trips	AM Peak			PM Peak		
				In	Out	Total	In	Out	Total
Original Project Description	Bypass pipeline construction only	Truck Deliveries	90	9	9	18	9	9	18
		Workers	42	21	0	21	0	21	21
		Total	132	30	9	39	9	30	39
Revised Project Description	Bypass pipeline construction and removal of Silver Lake Reservoir from service	Truck Deliveries	120	12	12	24	12	12	24
		Workers	70	35	0	35	0	35	35
		Total	190	47	12	59	12	47	59

A total of 68 additional daily trips are associated with the overlapping construction activities. There are 20 additional trips in both the AM and PM peak hours. Note that other construction activities (e.g., the Ivanhoe Reservoir removal and the construction of the relief stations) would change the amount of construction traffic, but the maximum period of construction traffic would still occur from October 2007 to April 2008. Therefore, this was the period analyzed.

The additional trips were distributed and assigned to the network (consistent with the approach used in the original traffic study). Then, an updated analysis of the Year 2013 Future Conditions (Table 9 from the original traffic study) was conducted. Analysis was based on a linear extrapolation of the projected volume-to-capacity (v/c) ratios, based on the ratio of the number of workers (revised Project description vs. original assumptions). Traffic Study Figures 11A and 12A are affected by the revised trip numbers, and revised versions of these figures are included at the end of this memorandum.

For the five intersections at the SLRC, the revisions to the original Table 9 are given in Table 2. With the additional trips, there are two intersections with a significant impact (per Los Angeles Department of Transportation [LADOT] standards): Silver Lake Boulevard/ Van Pelt Place and Riverside Drive/Fletcher Drive.

Riverside Drive/Fletcher Drive

At Riverside Drive/Fletcher Drive, the increase in v/c ratio is just over the threshold. The original traffic study calls for the preparation of a site-specific traffic control plan. This plan should be upgraded to a Transportation Management Plan (TMP), described below under Mitigation Measures. Implementation of the TMP would reduce the impact at the Riverside Drive/Fletcher Drive intersection to a less-than-significant level.

TABLE 2
Updated V/C Ratio and Assessment of Impacts

Intersection	Peak Hour	V/C Ratio			V/C Increase		Significant Impact?	
		No Project	Old[1]	New[2]	Old	New	Old	New
Silver Lake Boulevard/ Van Pelt Place (unsignalized)	AM	0.801	0.810	0.814	0.009	0.013	No	No
	PM	0.841	0.860	0.868	0.019	0.027	Yes	Yes
Glendale Boulevard/ SR 2 SB off-ramp	AM	0.908	0.912	0.914	0.004	0.006	No	No
	PM	0.483	0.487	0.489	0.004	0.006	No	No
Glendale Boulevard/ Silver Lake Boulevard	AM	0.677	0.695	0.703	0.018	0.026	No	No
	PM	0.75	0.761	0.766	0.011	0.016	No	No
Fletcher Drive/ Glendale Boulevard	AM	0.814	0.818	0.820	0.004	0.006	No	No
	PM	0.877	0.877	0.877	0.000	0.000	No	No
Riverside Drive/ Fletcher Drive	AM	1.037	1.041	1.043	0.004	0.006	No	No
	PM	0.972	0.979	0.982	0.007	0.010	No	Yes

[1]Original analysis, for the cumulative plus Project with mitigation

[2]Updated with additional trips for concurrent construction activities

Silver Lake Boulevard/Van Pelt Place

The Silver Lake Boulevard/Van Pelt Place intersection was identified as a significant impact in the original traffic study, and a mitigation measure was proposed to reduce the impact to less-than-significant levels. The mitigation measure was to schedule truck deliveries outside the PM peak period (4:00 to 6:00 p.m.) and to limit the number of construction work trips to no more than 15 during that same period.

With the overlapping construction activities, however, the last part of the mitigation measure would not be feasible. The original construction schedule had a maximum of 21 workers, so developing staggered schedules to limit trips to no more than 15 was feasible. With the addition of 10 to 14 laborers, schedules would have to be adjusted so that more than half of the workers leave outside the peak period. Therefore, Mitigation Measure TT-2: Silver Lake Boulevard and Van Pelt Place has been revised; see below for the revised measure. In addition, Mitigation Measure TT-3 would apply to potential impacts at this intersection. It is anticipated that traffic impacts at this intersection would remain significant following implementation of the proposed Mitigation Measures. However, because the construction duration is short term and would affect only the traffic from Van Pelt Boulevard (i.e., through traffic is not affected), most of the impacts would affect construction-related traffic only.

West Silver Lake Drive Construction

Initially, Los Angeles Department of Water and Power (LADWP) planned to construct the trunkline for the regulating station in the grassy area between the southern jacking pit and the regulating station. However, LADWP may need to construct the regulating station trunkline in West Silver Lake Drive between the southern jacking pit and the regulating station. This approach would require the short-term closure of West Silver Lake Drive in this area.

Construction on West Silver Lake Drive would follow the requirements of a permit to be issued by the City of Los Angeles for roadway construction activities. With implementation of a TMP (described above), the traffic impacts would be less than significant.

Relief Station Construction

Two relief stations would be constructed within streets in the Project area. The first relief station would be located on Silver Lake Boulevard, to the northeast of the Y-intersection with West Silver Lake Drive, just north of Effie Street. For most of the construction period, one lane of traffic in each direction would be maintained on Silver Lake Boulevard. However, during vault construction, Silver Lake Boulevard would be closed; and traffic would be detoured (via West Silver Lake Drive or North Occidental Boulevard).

The second relief station would be constructed on London Street, immediately east of Silver Lake Boulevard, just north of the U.S. 101 interchange. During construction, London Street would be reduced to a single lane of traffic. Flaggers would be used to allow for both directions of traffic.

In both cases, there is a potential for traffic impacts due to closures and detours. Specific plans for the lane and road closures required for the relief stations construction will be developed during detailed design for the relief stations. To minimize the impacts of construction, traffic handling and detours would be described in a TMP, which would be approved by the LADOT. With the TMP, traffic impacts would be less than significant.

Construction Activities to Remove Ivanhoe Reservoir from Service

Construction activities to remove Ivanhoe Reservoir from service are anticipated to occur in 2013. Because the baseline traffic analysis in the Traffic Study used a horizon year of 2013, and the number of construction workers for this phase is less than those anticipated for earlier, overlapping phases, the impacts are less than those previously analyzed. The total trips analyzed for the overlapping construction phase (see Table 1) would be less during the construction activities to remove Ivanhoe Reservoir from service, so the potential impacts would be less.

Revised Mitigation Measures

Changes to the Mitigation Measures identified in the Traffic Study are described below.

Mitigation Measure TT-2: Silver Lake Boulevard and Van Pelt Place

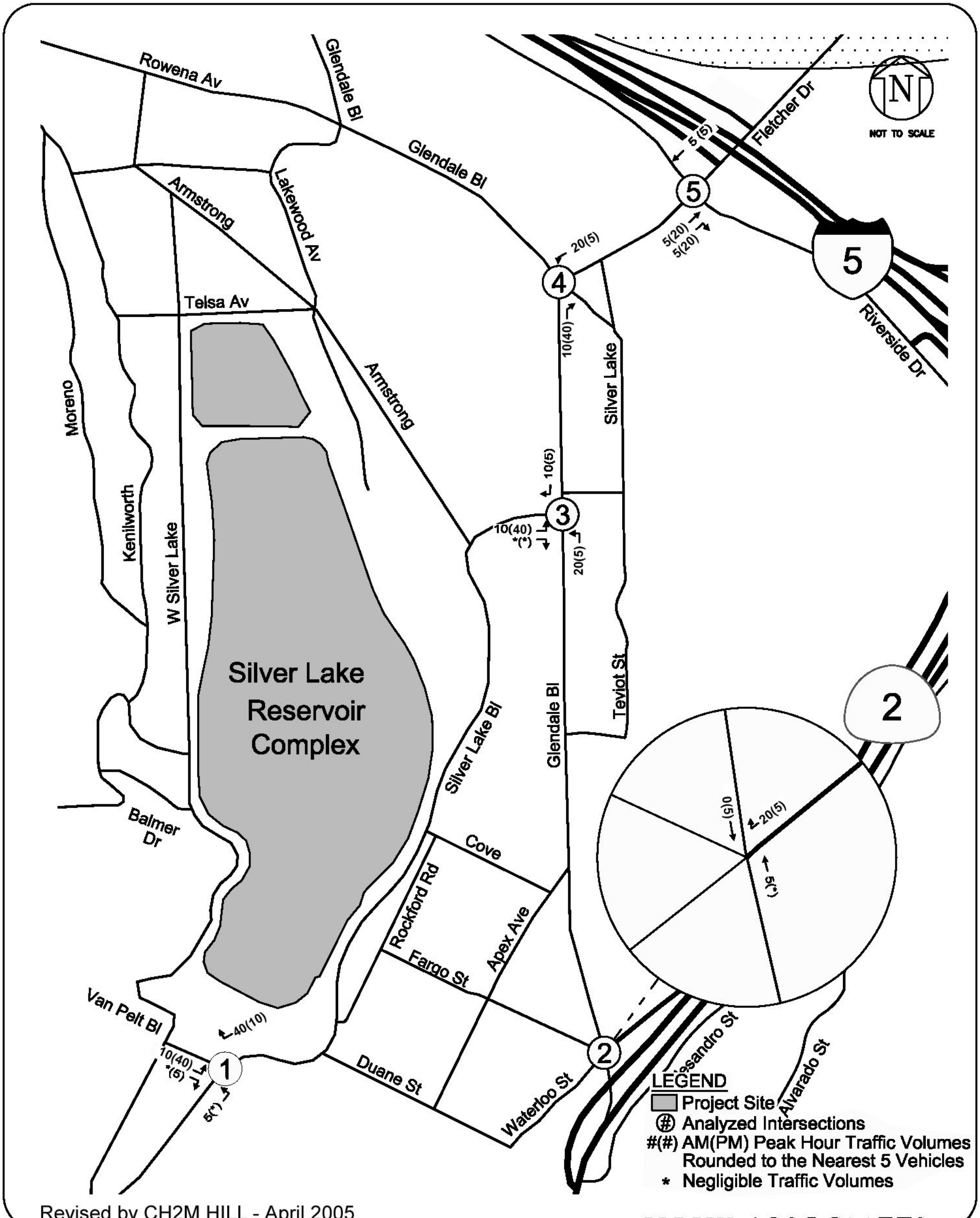
Truck deliveries for materials or equipment will be scheduled so that none of the truck trips would arrive or depart the SLRC during the afternoon peak period between 4:00 p.m. and 6:00 p.m. Any truck deliveries will occur before the afternoon peak period.

Mitigation Measure TT-3: Transportation Management Plan

The Traffic Study included preparation of a site-specific traffic control plan as a mitigation measure to address impacts during any stage of construction that may affect the traffic flow in the surrounding street system especially adjacent to the SLRC.

This plan should be upgraded to a TMP, described below. The TMP would be prepared in coordination with LADOT and would address the following, as appropriate:

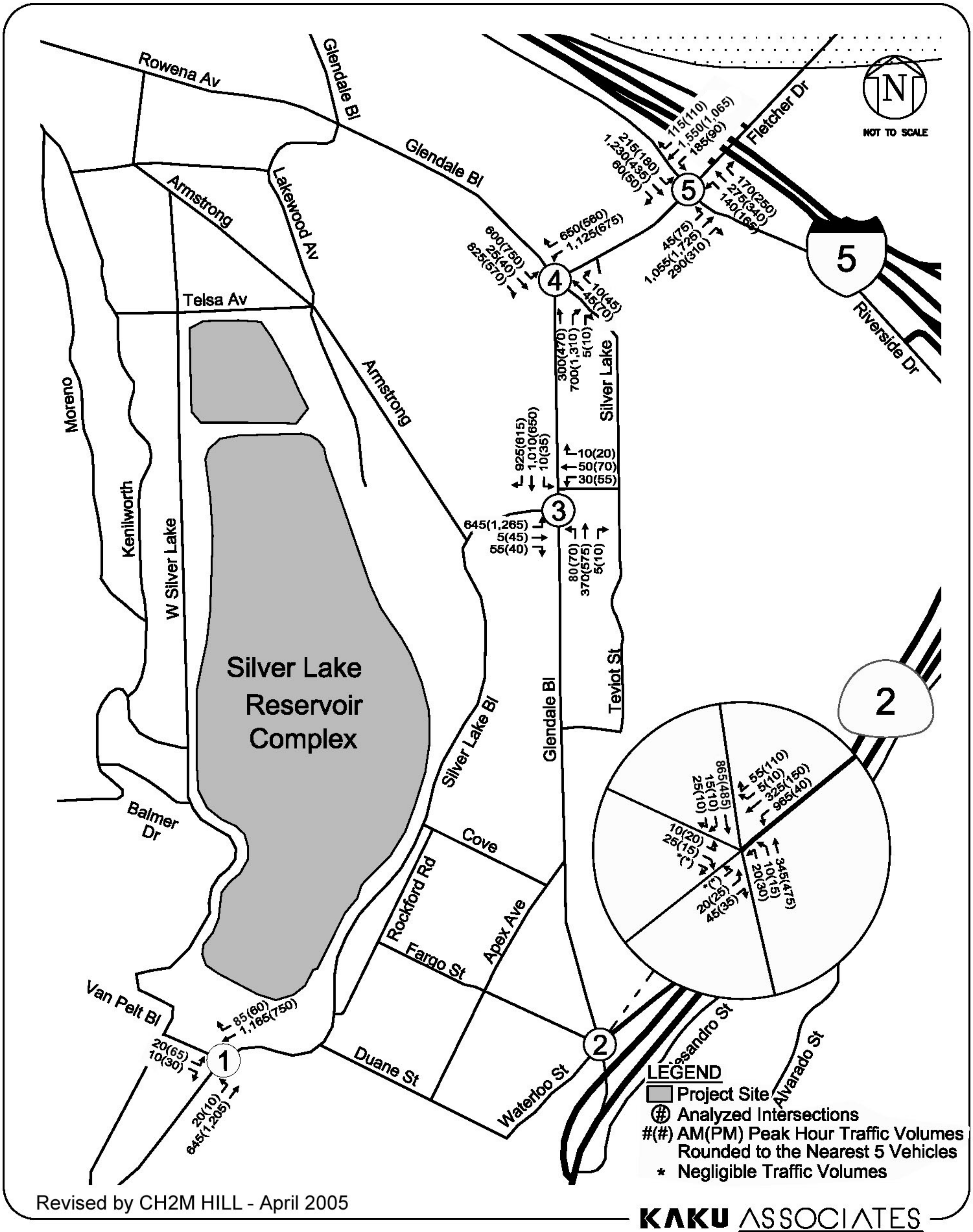
- Construction work traffic impacts and strategies, including detours and traffic handling.
- Strategies for reducing worker trips, including carpooling and transit.
- General access restrictions associated with the Proposed Project, including proper notification of affected residences, businesses, and other facilities prior to construction. Advance public notification will include posting of notices and appropriate signage of construction activity. The TMP must ensure adequate access to residences and facilities via existing roadway intersections and private driveways at all times or include alternate access, detours, or temporary mitigation to address access restrictions adequately.
- Emergency access restrictions associated with the Proposed Project, including proper notification of emergency providers and provision of alternate routes, if necessary. All construction activities will be coordinated with local law enforcement, fire protection, and other emergency service providers. These entities will be notified of the timing, location, and duration of construction activities.
- Where construction will result in temporary lane closures of sidewalks and other pedestrian facilities, the TMP would address temporary pedestrian access, through detours or safe areas alongside the construction zone. Any affected pedestrian facilities and alternative facilities or detours will be identified.



Revised by CH2M HILL - April 2005

KAKU ASSOCIATES

FIGURE 11A - REVISED
PROJECT ONLY PEAK HOUR TRAFFIC VOLUMES (SLRC SITE)



KAKU ASSOCIATES

FIGURE 12A - REVISED
YEAR 2013 CUMULATIVE PLUS PROJECT PEAK HOUR TRAFFIC VOLUMES (SLRC SITE)

Appendix G
Noise Study

Silver Lake Reservoir Complex Storage Replacement Project

Noise Study

Prepared for

Los Angeles Department of Water and Power

and

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Acronyms

μPa	micro Pascals
ANSI	American National Standards Institute
Calveno	California Vehicle Noise (see Remel below)
City	City of Los Angeles
CNEL	community noise equivalent level
dB	decibel
dBA	A-weighted decibel
DHS	California Department of Health Services
DWP	Los Angeles Department of Water and Power
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
hp	horsepower
Hz	hertz
IEC	International Electrotechnical Commission
ISO	International Standards Organization
kHz	kilohertz
kW	kilowatt
L_{eq}	equivalent sound level
L_{max}	highest sound pressure level in a specific time period
L_{min}	lowest sound pressure level in a specific time period
L_n	sound pressure level exceeded n percent of a specific time period
Remel	Reference Energy Mean Emission Level (see Calveno above)

1.0 Introduction

1.1 Study Purpose

The Los Angeles Department of Water and Power plans to construct and operate new facilities at the Silver Lake Reservoir Complex and the Headworks Spreading Grounds. These facilities together comprise the project called the "Silver Lake Reservoir Complex Storage Replacement Project".

The purpose of this noise study is to describe existing noise-sensitive land uses potentially affected by the proposed project; evaluate potential noise generated during construction and operation of the proposed project at noise-sensitive land uses; and determine whether project-related noise exposure would be significant and, if so, develop mitigation measures to reduce project noise exposure to less-than-significant levels. The findings of this study will be included in the Draft Environmental Impact Report (EIR) being prepared for the project. Potential vibration impacts are not considered in this study.

1.2 Project Description

1.2.1 Project Location

The project will have components located at both the Headworks Spreading Grounds and the Silver Lake Reservoir Complex. Headworks is a disused facility on the north side of Griffith Park, five miles northwest of Silver Lake. It lies along the south side of State Route 134 (SR 134) and the Los Angeles River, across from Forest Lawn and Mt. Sinai cemeteries. Silver Lake is an existing reservoir located in a residential area west of the intersection of I-5 and Route 2, four miles east of Hollywood.

1.2.2 Project Overview

A comprehensive project description will be available in Chapter 2 of the forthcoming Draft Environmental Impact Report. What follows is a brief description of those aspects of the project with potential noise impacts.

The Headworks component of the project will involve construction of a large buried reservoir on the east half of the Headworks site, and construction and operation of a hydroelectric generating facility on the west end. Staging areas for construction equipment and materials will be centrally located on the site.

The Silver Lake component will involve construction of a pipeline down the west side of the reservoir beneath West Silver Lake Drive and Redesdale Avenue. Pipeline construction will comprise tunneling beneath West Silver Lake Drive and Redesdale Avenue, with access to the tunnel via jacking and receiving pits. The Silver Lake component will further involve construction and operation of a regulator station in the park on the south side of the reservoir, across from the intersection of West Silver Lake Drive and Westerly Terrace. A staging area for construction machinery and materials will be established on open space on the east side of the reservoir property.

1.3 Fundamentals of Noise

Rapid variations in ambient air pressure are perceived as sound by the human ear when they occur within certain limits. Specifically, the ear is sensitive to variations which occur at the rate of twenty times per second (20 Hertz) to twenty-thousand times per second, and at pressure differentials of at least twenty millionths of a Pascal (20 micropascals).

These are extreme limits for healthy ears. Most human hearing takes place in the frequency range of 100 Hz to 10,000 Hz, with the highest sensitivity at about 4,000 Hz. The human voice contains most of its energy in the frequency range between 125 Hertz and 8,000 Hertz.

The pressure variation of 20 micropascals is the lower limit of perceptibility. Human hearing extends from this limit up to the threshold of discomfort where pressure variations approach 20 pascals—a range of one million to one. Because of this large range of values, sound pressure is usually measured in terms of "decibels" (dB):

$$L = 20\log(\frac{P}{P_o})$$

L is the value of sound pressure *level* in decibels, **P** is the mean pressure variation, and $\mathbf{P_o}$ is the lower limit described above. Sound pressure levels are referenced to the lower limit of hearing, meaning a level of zero decibels corresponds to that limit whereas a level of one-hundred decibels represents a pressure variation one-hundred thousand times greater than that limit. The logarithmic conversion provides a compression effect. Thus, sound pressure level is a method of expressing the wide range of human hearing in a manageable range of numerical values.

Because of the logarithmic conversion, decibel arithmetic works differently than ordinary arithmetic. Doubling the sound power in a measured environment results in only a three decibel addition to the measured values, not a doubling of the number of decibels; a ten-fold increase in the sound power results in an addition of ten decibels to the measured value. Similarly, averaging sound levels involves taking the anti-logarithms of measured sound levels. A simple arithmetic average of sound levels produces meaningless results, particularly if the two levels are widely divergent. (Note, however, that local ordinances often use a simple arithmetic average of sound levels when setting statutory thresholds on property-line limits involving two different zoning areas.)

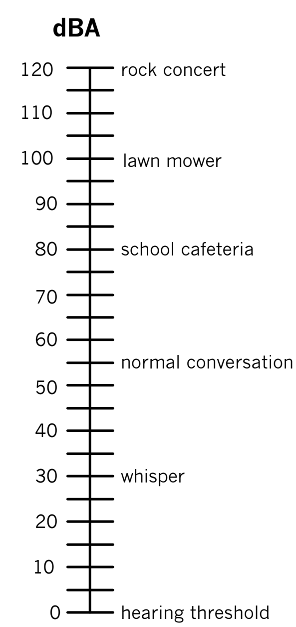

Figure 1

Conveniently, human perception of “loudness” is also approximately logarithmic. A three decibel change in sound level is just noticeable to most people. A five decibel change is readily noticeable, whereas a change of ten decibels is usually perceived as a doubling of the "volume".

Because human hearing is not equally sensitive at all frequencies, various weighting schemes have been developed to account for these variations. The most commonly used is the “A” weighting. It heavily discounts measured levels at lower frequencies, while providing slight emphasis around 2500 Hertz. The abbreviation for decibels is “dB”. When levels have been A-weighted, they are expressed as “dBA” or “dB(A)”. Figure 1 depicts several representative noise sources and the A-weighted sound levels they produce at a typical receiver location.

Objects in the environment rarely produce steady levels of noise. Fluctuating levels produce fluctuating measurements, thus requiring a method of describing the noise environment in a meaningful way. The common method in use is the equivalent-continuous sound level, abbreviated L_{eq}, which expresses the energy-average noise level over a specified interval of time (typically one hour). It is important to note that, like other averaging methods, L_{eq} does not indicate the range of noise level measurements. Two identical values of L_{eq} may represent two widely different ranges of actual noise measurements. Because of the logarithmic nature of expressing sound level, however, very loud sounds of any significant duration will tend to “swamp” quieter sounds of longer duration, thus biasing measurements in favor of the louder sounds.

Because quieter conditions are normally preferred during sleeping hours, various measures have been developed which account for additional annoyance produced by noises occurring at night. In California, the Community Noise Equivalent Level (CNEL) is standard in most statutes and requirements. CNEL is a twenty-four hour "equivalent" noise level. It accounts for the additional annoyance by adding approximately 5 decibels to noises measured between 7 p.m. and 10 p.m., and a 10 decibel penalty to noises between 10 p.m. and 7 a.m. . An alternative measure, the Day-Night Level (DNL or L_{dn}) is similar to CNEL but does not assess a penalty from 7 p.m. to 10 p.m.

DNL and CNEL are average values only. Because a noise source produces a DNL or CNEL value below a specified threshold does not mean that the noise will be inaudible. Rather, DNL and CNEL thresholds are normally set so that the occurrence of a disturbing noise is not so frequent that it causes substantial annoyance to people or other receivers in the affected area.

1.4 Applicable Regulations

Disturbing noises in the City of Los Angeles are regulated by the Municipal Code. Noises of a general nature are addressed in Chapter 11 (“Noise Regulation”), while construction noise is controlled by Section 41.40. For compliance with CEQA requirements, Los Angeles also has a draft CEQA guide which sets thresholds at which a finding of a significant impact would result for a proposed project.

1.4.1 Municipal Code

1.4.1.1 Non-Construction Noise

Chapter 11 of the Municipal Code addresses all noises other than those produced by construction activities. Applicable to this project are those sections which address noise produced by operation of (non-construction) equipment, specifically the Silver Lake regulator and the Headworks generator. Those sections are briefly described below:

Section 112.02: Prohibits noise emissions from machinery, including pumps, which would cause the noise level on an occupied property to exceed the ambient level by more than five decibels.

Section 112.04: Prohibits operation within a residential zone, or within 500 feet of a residence, of any machine which produces "a loud, raucous or impulsive sound" between the hours of 10 p.m. and 7 a.m. Further prohibits raising the noise level on an occupied property by more than five decibels, similar to above.

Section 112.05: Places permissible limits on noise levels generated by various types of powered equipment, as measured at a distance of 50 feet from the device:

- 75 dBA for construction, industrial, and agricultural machinery
- 75 dBA for equipment of 20 horsepower or less intended for infrequent use in residential areas
- 65 dBA for powered equipment intended for repetitive use in residential areas

While the above sections of the Municipal Code cite examples comprising common residential sources (air conditioners, lawn mowers, etc.), they do not specifically limit the nature of the source to these.

Sections 114.04 and 115.02 address audible signaling devices and amplified sound, respectively. Conditions on permissible use are manifold, however, it suffices to note that these sections may prohibit or limit the use of public address systems, machinery start-up alarms, or other such devices at either site.

Section 116.01 provides a blanket statement which prohibits "any loud, unnecessary, and unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area." It further provides a list of non-numerical criteria against which a noise may be judged to determine whether it violates this section. This section of the code therefore has implications regarding operation of the Silver Lake regulator station and the Headworks generator.

1.4.1.4 Construction Noise

Section 41.40 of the Municipal Code addresses construction noise in the city. Specifically, it limits the permissible hours of operation, including repair, servicing, and materials delivery, as follows:

- 9 pm – 7 am: No activities involving power-driven equipment which may disturb sleep at any residence. No repair or servicing of equipment or job-site delivery of materials which may disturb sleep at any residence.
- Saturday before 8 am or after 6 pm: No work on or within 500 feet of any residential land.
- National holiday before 8 am or after 6 pm: No work on or within 500 feet of any residential land.
- Sunday (any time): No work on or within 500 feet of any residential land.

This section allows for exemption from the above limitations if written permission is obtained from the Board of Police Commissioners.

1.4.2 Los Angeles CEQA Thresholds Guide

The City of Los Angeles Draft *CEQA Thresholds Guide* (14 May 1998) sets forth criteria to be considered in the assessment of environmental impacts. Included in these are criteria which address construction noise and operational noise. The criteria are broken into three categories: checklist questions, screening criteria, and significance thresholds. Methods to determine significance are set forth, along with example mitigation measures. The thresholds applicable to noise are as follows.

Construction Noise
The proposed project would have a significant impact on noise levels resulting from construction if:

- Construction activities lasting more than one day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise sensitive use (i.e., residences, transient lodging, schools, libraries, etc.)
- Construction activities lasting more than 10 days in a three month period would exceed existing ambient exterior noise levels by 5 dBA or more at a sensitive use
- Construction activities would exceed the ambient noise level by 5 dBA at a noise sensitive use between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday, or at anytime on Sunday

Operational Noise
The proposed project would have a significant impact on noise levels from project operation if the project causes the ambient noise level measured at the property line of affected uses to increase by 3 dBA in CNEL to or within the “normally unacceptable” or “clearly unacceptable” category, or any 5 dBA or greater noise increase (see Table 1 below).

Table 1: Noise/Land-Use Compatibility Matrix (CNEL)

Land Use	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Single Family, Duplex, Mobile Homes	50 - 60	55 - 70	70 - 75	above 70
Multi-Family Homes	50 - 65	60 - 70	70 - 75	above 70
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 - 70	70 - 80	above 80
Transient Lodging – Motels, Hotels	50 - 65	60 - 70	70 - 80	above 80
Auditoriums, Concert Halls, Amphitheaters	-	50 - 70	-	above 65
Sports Arena, Outdoor Spectator Sports	-	50 - 75	-	above 70
Playgrounds, Neighborhood Parks	50 - 70	-	67 - 75	above 72
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 75	-	70 - 80	above 80
Office Buildings, Business and Professional Commercial	50 - 70	67 - 77	above 75	-
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 - 80	above 75	-

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable: New construction or development should generally not be undertaken.

Source: Office of Noise Control, California Department of Health Services (DHS).

1.4.3 California CEQA Guidelines

According to the CEQA Guidelines Appendix G (State of California, 2002), impacts to noise would be considered significant if the project would:

- Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies
- Expose persons to or generate excessive groundborne vibration or groundborne noise levels
- Cause a permanent increase in ambient noise levels in the project vicinity above levels existing without the project

- Expose people residing or working in the project area to excessive noise levels for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport
- Expose people residing or working in the project area to excessive noise levels for a project located within the vicinity of a private airstrip

Only the first three criteria apply to this project as there are no airfields in the vicinity of either Headworks or Silver Lake. CEQA requirements are addressed by the city's *CEQA Thresholds Guide.*

2.0 Setting

2.1 Existing Land Uses

2.1.1 Headworks

The Headworks site is fairly isolated, surrounded by a freeway on one side and an arterial road on the other. The primary noise-sensitive land uses are two cemeteries, Forest Lawn Memorial and Mount Sinai Memorial, on the opposite side of Forest Lawn Drive. The only other receivers are a few residences which lie approximately 2000 feet southwest of the generator site, on Bob Hope Drive. These were the only residences noted in the vicinity of Headworks.

2.1.2 Silver Lake

The Silver Lake Reservoir Complex is entirely surrounded by single-family residences, with a few multi-family units at the south end. Many of these homes lie within 100 feet of the reservoir fence line, separated only by a local street. Residences subject to construction noise include all those along West Silver Lake Drive, Van Pelt, Silver Lake Boulevard, and possibly Armstrong Avenue. Residences subject to operational noise are those near the proposed regulator station, surrounding the intersection of West Silver Lake Drive, Castle Street, and Redesdale Avenue.

2.2 Existing Ambient Noise Levels

To establish existing ambient noise levels, long-term (25-hour) and short-term measurements were conducted at multiple locations in and around the project as described below. Long-term measurements were conducted 6-7 April 2004 using Quest model Q-300 Type-2 logging dosimeters. Dosimeters were calibration-checked, fitted with windscreens, and mounted approximately five feet above ground. All short-term measurements were conducted using two Larson Davis 824 Type-1 integrating sound level meters and spectrum analyzers, calibration-checked, fitted with windscreens, and mounted approximately five feet above ground.

2.2.1 Headworks

Ambient noise levels at the Headworks site are dominated by traffic. Most traffic noise emanates from SR 134, though Forest Lawn Drive is also a substantial contributor. Lawn maintenance at both cemeteries is a secondary contributor to ambient noise levels. Headworks produces no noise emissions, as there are currently no operations at this site. There is no significant air traffic in this area.

To establish ambient noise levels, one long-term (25-hour) and three short-term measurements were conducted in and around the site (Figure 3). A long-term measurement was performed at the location of the proposed hydroelectric generating facility (L5). This location is exposed to both Forest Lawn Drive and SR 134 noise. One short-term measurement was made at each cemetery, one set approximately 670 feet back from Forest Lawn Drive (S09), and the other approximately 330 feet back (S10). A third short-term measurement was performed at a residential location (Bob Hope Drive) about 2000 feet southwest of the generator location (S11 - not shown).

Figure 2 shows results of long-term (25-hour) monitoring at the Headworks generator location (L5). Measurements were taken as one-minute Leq values, shown in blue. The white line shows these values smoothed using linear coefficients, while the red line averages the measured values into one-hour Leq's. This location experiences little dispersion in noise levels due to constant traffic flow on the 134 freeway.

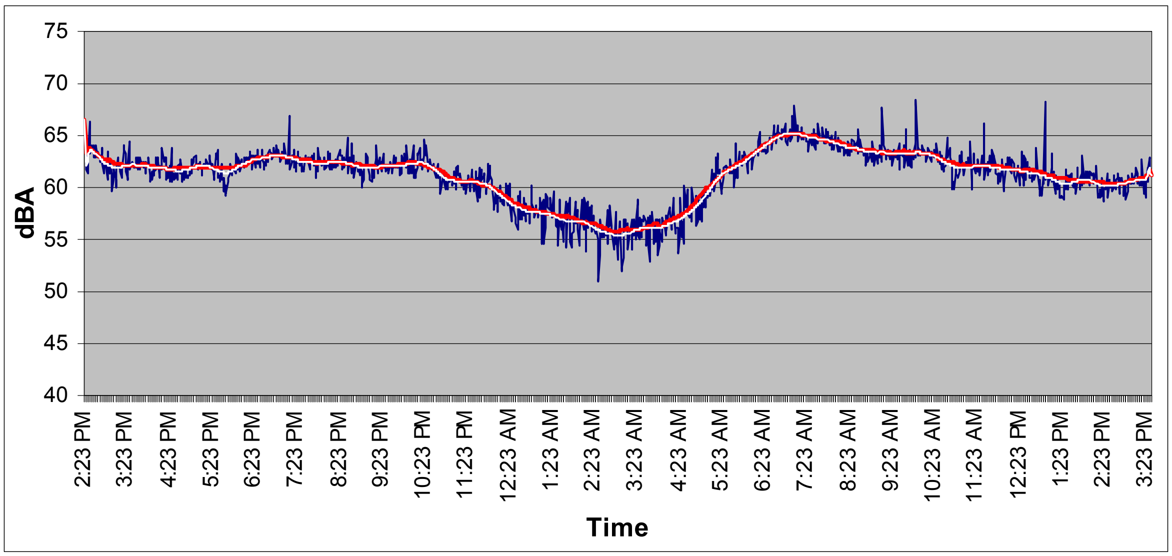

Figure 2: Headworks Generator Site (L5): CNEL-68

Table 2 summarizes all measurement results. Long-term monitoring is shown in CNEL. Short-term measurements are shown with both the actual Leq value (average over the measurement interval), as well as the projected CNEL (in italics). Projected CNEL values were derived from the long-term measurement, adjusting for differences in measured levels between the two locations.

Table 2: Headworks Ambient Measurements

#	Location	Duration (hr:min)	Leq	CNEL
L5	generator	25:08	-	67.6
S09	Mount Sinai cemetery	0:27	58.0	-
S10	Forest Lawn cemetery	0:30	62.7	-
S11	525 Bob Hope Dr.	0:10	56.6	*62.0*

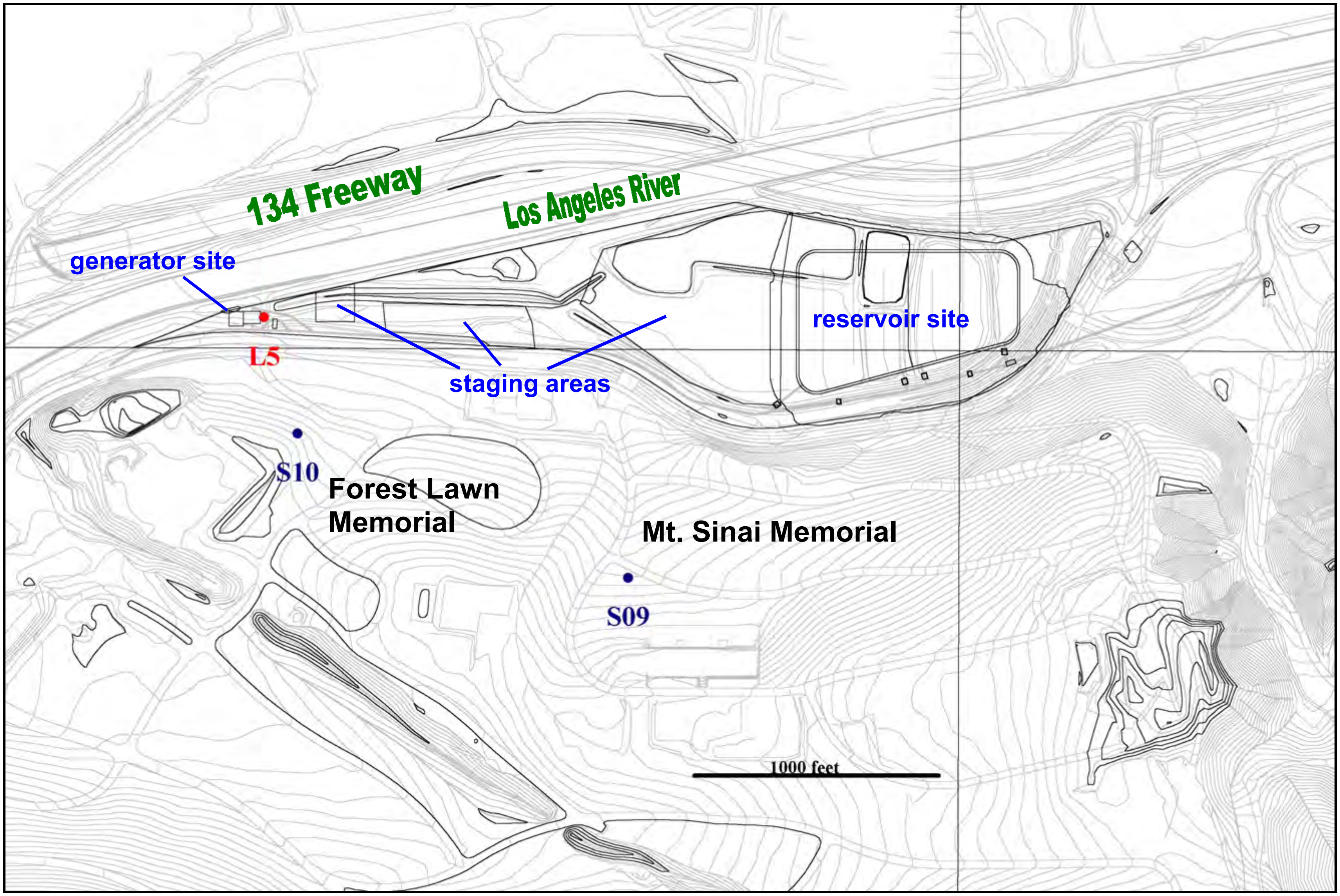

Figure 3: Headworks Measurement Locations

2.2.2 Silver Lake

Ambient noise levels in the vicinity of the Silver Lake Reservoir Complex are driven mainly by local traffic and residential activities. West Silver Lake Drive, Silver Lake Boulevard, and Armstrong Avenue all carry substantial amounts of vehicle traffic, including at least one bus route. Other noise sources include typical residential activities, particularly lawn maintenance. There is no significant air traffic.

Operation of the reservoir itself does not produce any significant noises. The complex is essentially a large water basin; any pumps or other machinery are either sufficiently muffled or located well inside the complex property such that they are not noticeable beyond the fence line. The only other noise-producing activities at the complex are occasional service vehicles and grounds maintenance, both of which are insignificant in the residential environment.

To establish ambient noise levels, measurements were taken at multiple locations around the reservoir and in the surrounding neighborhood (Figure 4).

Long-term (25 hour) measurements were conducted at four locations around the reservoir property. These locations were selected to coincide with planned areas of concentrated construction activity. Where feasible, the meters were set back from the nearest road by an amount approximately equal to the nearest residences, in order to approximate ambient noise levels experienced by these residences. Location L1 was selected to represent the material and equipment staging area. Machinery and trucks must pass this spot on the way to and from construction sites on the west and south sides of the reservoir. Though Armstrong Avenue is a shorter route to the north jacking pit, its use for hauling is unlikely as it is a narrow road with steeps hills. All construction traffic is therefore assumed to move down Silver Lake Boulevard, across Van Pelt, and onto West Silver Lake Drive. Location L2 represents the proposed regulator station and the south jacking pit. This area will be subject to both construction noise and operational noise from the regulator station. Location L3 represents the receiving pit, while location L4 represents the north end of the reservoir. Together, these two locations establish ambient noise conditions along West Silver Lake Drive, including the north jacking pit.

The figures below present measurement histories at the four Silver Lake long-term monitoring locations. Measurements were taken as one-minute Leq values, shown in blue. White lines show these values smoothed using linear coefficients, while red lines average the measured values into one-hour Leq's.

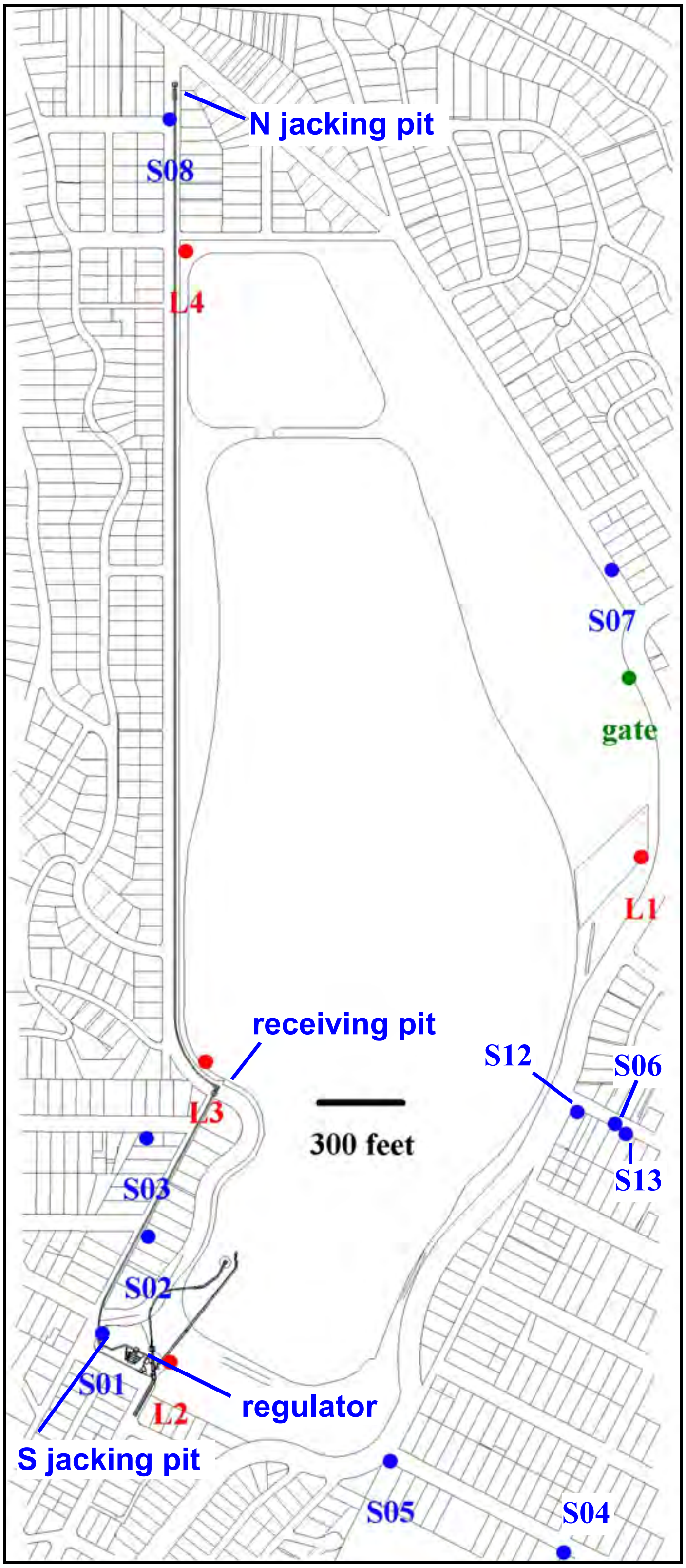

Figure 4: Silver Lake Measurement Locations

Figure 5 shows noise levels in the Silver Lake staging area (L1). This meter was set back approximately sixty feet from the road edge. Traffic on this road is fairly steady, resulting in little dispersion of daytime noise levels. Wider dispersion in nighttime levels reflects less frequent traffic.

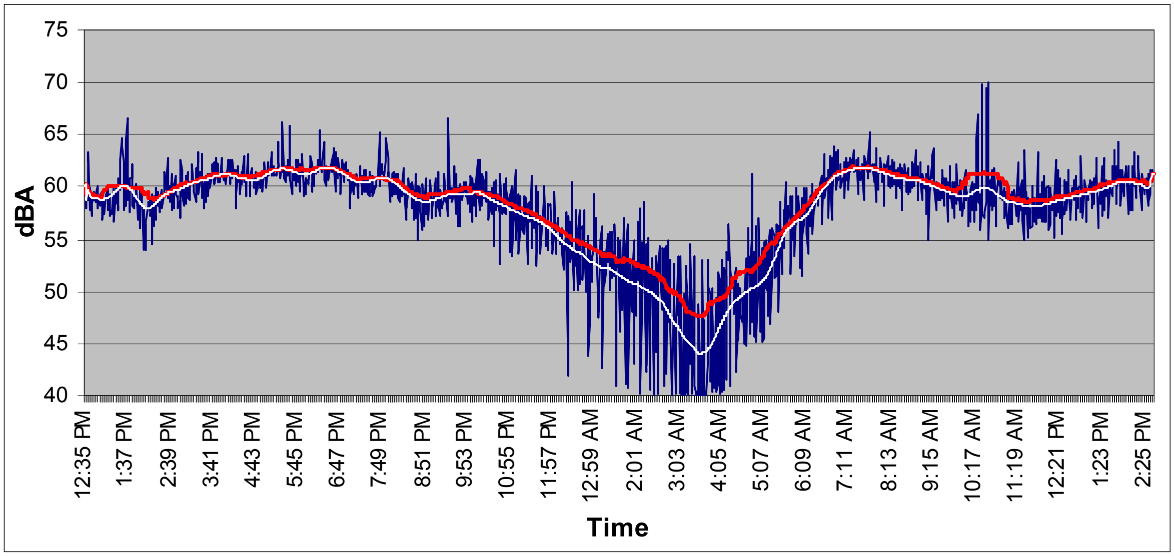

Figure 5: Silver Lake Staging Area (L1): CNEL-64

Figure 6 is from the park on the south side of the reservoir, where the proposed regulator station will be sited. Large, irregular spikes in this graph are likely due to park users near the meter. They contribute little to the overall level, however, and the CNEL value measured here was the lowest of all long-term monitoring locations.

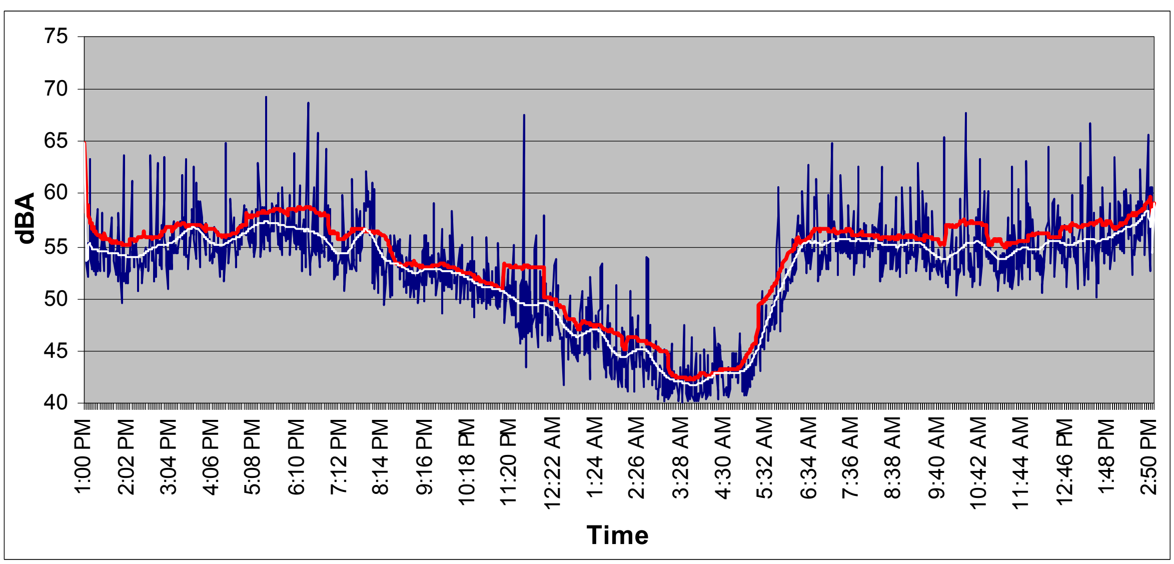

Figure 6: Silver Lake Regulator Station (L2): CNEL-59

Figure 7 represents the proposed receiving pit. This meter was set back approximately fifteen feet from the road edge. Regular daytime spikes are likely due to the municipal bus line which passes this spot.

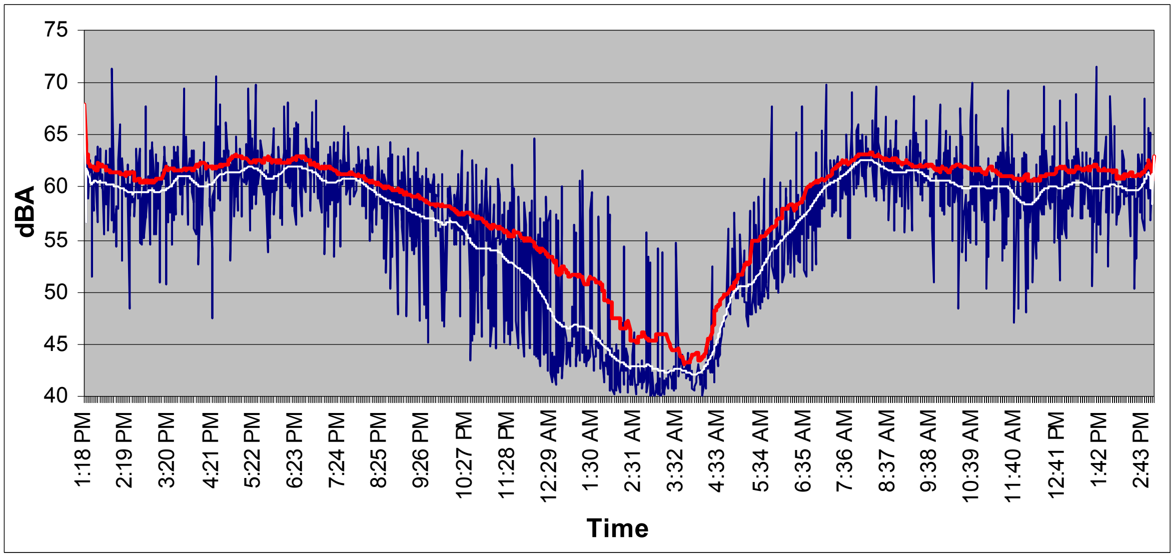

Figure 7: Silver Lake Receiving Pit (L3): CNEL-64

Figure 8 represents the intersection of West Silver Lake Drive and Tesla Avenue. This is the furthest northwest point within the reservoir property, and was selected to represent noise levels near the north jacking pit. The meter was set back approximately thirty feet from the road edge. Noise levels here closely reflect those from the receiving pit above.

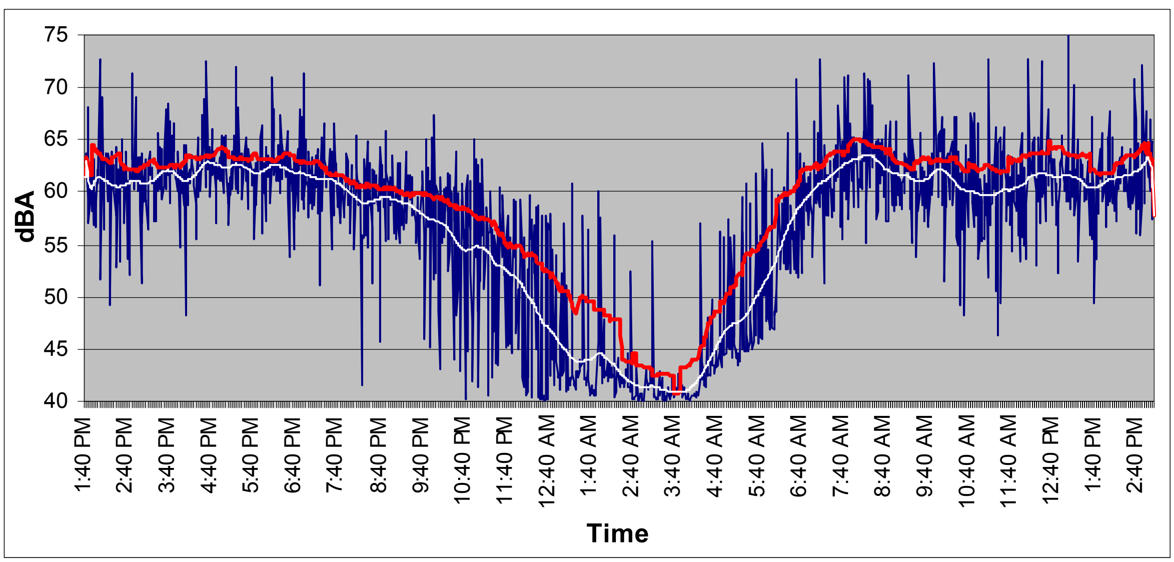

Figure 8: Tesla Avenue & West Silver Lake Drive (L4): CNEL-64

Short-term measurements were conducted on 6 & 21 April at additional locations in the residential areas in order to further define the noise environment. Locations were selected in the vicinity of those for long-term measurements, but further back into the hills. Locations S12 and S13 (Cove Ave.) included a one-hour traffic count.

Table 3 summarizes all measurement results. Long-term measurements are given in CNEL. Short-term measurements are shown with both their actual Leq value (average over the measurement interval), as well as their projected CNEL (in italics). Projected CNEL values were derived from the nearest long-term measurement, adjusting for differences in measured levels between the two locations.

Table 3: Silver Lake Ambient Measurements

#	Location	Duration (hr:min)	Leq	CNEL
L1	staging area	26:06	-	63.9
L2	regulator station	25:55	-	59.0
L3	receiving pit	25:43	-	63.5
L4	Tesla & West Silver Lake Dr.	25:25	-	64.3
S01	Redesdale Ave. & W. Silver Lake Dr.	0:19	59.3	-
S02	Windsor Ave. & Redesdale Ave.	0:15	56.2	-
S03	Landa St. & Castle St.	0:15	50.0	-
S04	Duane St. & Apex Ave.	0:15	63.2	-
S05	Duane St. & Silver Lake Blvd.	0:15	70.4	-
S06	2362 Cove Ave.	0:05	59.7	-
S07	2440 Armstrong Ave.	0:12	59.7	-
S08	2519 West Silver Lake Dr.	0:15	70.0	-
S12	Cove Ave. & Rockford Rd.	1:00	67.0	-
S13	top of Cove Ave.	1:00	56.3	-

3.0 Impacts

3.1 Headworks

Potential noise impacts at the Headworks component of the project arise from construction activities and from operation of the hydroelectric generating facility.

3.1.1 Construction Noise

Construction at Headworks will comprise five tasks:

- reservoir grading and site preparation
- inlet/outlet and vault construction
- hydroelectric generating facility construction
- reservoir storage structure (tank) construction
- burying the storage reservoir (tank)

These tasks will take place at various times, however, there will be overlap. Reservoir grading and site preparation, inlet/outlet and vault construction, and generator construction will all run concurrently at one point. Generator construction will also overlap reservoir storage structure construction for about three months. Only burying the storage reservoir will occur completely independent of the other tasks. The analysis below, therefore, considers the effects of overlapping construction activities in order to provide a worst-case noise impact assessment.

Noise-producing construction activities will include on-site equipment operation, and trucking to and from the sites. Construction will take place between the hours of 7 a.m. and 8 p.m. Monday through Friday, therefore falling within those times permitted by the municipal code.

Trucking

Noise level increases due to truck traffic are dependent upon the number of truck trips per hour and the existing traffic volumes and noise levels. Existing noise is due to traffic on both Forest Lawn Drive and SR 134. Both of these roads carry substantial volumes of traffic currently, particularly SR 134. Using the method described in Federal Highway Administration report FHWA-RD-77-108, noise levels due to heavy-truck traffic alone were estimated by solution of the equation:[1]

$$Leq = Lo + 10\log\left(\frac{N\pi Do}{ST}\right) + 10\log\left(\frac{Do}{D}\right)$$

[1] *FHWA Highway Traffic Noise Prediction Model,* Federal Highway Administration, 1978

This equation estimates the noise level produced by **N** trucks in one hour (**T**), passing by a fixed point **D** feet from an infinitely long road, at a speed **S**. **Lo** is the average noise level produced by a heavy truck moving at speed **S** when measured at a reference distance of **Do** (15 meters or ~50 feet). In the form stated above, this equation ignores attenuation due to barriers, ground absorption, and finite-length roads. It therefore produces a conservative estimate of trucking noise.

Table 4 through Table 8 show the projected volume of truck traffic for each task of Headworks construction. Projected hourly truck volumes were derived by dividing the projected daily volumes by ten work hours per day.

Table 4: Projected Truck Traffic Volume (grading & site prep)

Operation	Trucks/day	Trucks/hour	# of Days
soil removal	30	3.0	40
Peak truck volume	**30/day**	**3.0/hr**	**--**

Table 5: Projected Truck Traffic Volume (inlet/outlet & vault)

Operation	Trucks/day	Trucks/hour	# of Days
valve delivery	1	.1	8
concrete delivery	41	4.1	2
Peak truck volume	**42/day**	**4.2/hr**	**--**

Table 6: Projected Truck Traffic Volume (generator)

Operation	Trucks/day	Trucks/hour	# of Days
soil removal	8	.8	20
concrete delivery	0.4	0.04	180
equipment delivery	6.7	0.67	180
Peak truck volume	**15.1/day**	**1.51/hr**	**--**

Table 7: Projected Truck Traffic Volume (tank construction)

Operation	Trucks/day	Trucks/hour	# of Days
concrete delivery	11	1.1	750
gravel delivery	1	0.1	750
Peak truck volume	**12/day**	**1.2/hr**	**--**

Table 8: Projected Truck Traffic Volume (tank burial)

Operation	Trucks/day	Trucks/hour	# of Days
soil import	80	8.0	149
concrete delivery	30	3.0	8
Peak truck volume	**110/day**	**11/hr**	**--**

Applying these traffic volumes to the equation above, noise levels due to trucking alone were computed. Because trucks will be moving slowly while approaching and leaving the Headworks facility, a speed of 30 miles per hour was applied to the above equation. Additionally, the maximum Calveno Remel noise level of 85 dBA for heavy trucks was applied in order to account for the fact that trucks will be racing engines in low gear near the facility. Both of these assumptions will produce conservative results.

The resulting levels were then combined with levels measured at the cemeteries, as shown in Table 9. These levels represent the peaks of trucking activity, when construction tasks overlap. Table 10 shows the projected marginal increase in existing noise levels as a result of trucking. These marginal increases are all less than five decibels, and therefore fall below the CEQA thresholds of significance.

Table 9: Trucking Noise Levels (@ 30 mph; Lo = 85 dBA)

Overlapping Tasks	Trucks/hour	L @ 50 ft (trucks only)	L @ S09 (+ existing)	L @ S10 (+ existing)
grading/vault/generator	8.7	64.4 dBA	59.2 dBA	63.6 dBA
generator/tank-construction	2.7	59.3 dBA	58.4 dBA	63.0 dBA
tank burial	11.0	65.4 dBA	59.5 dBA	63.8 dBA

Table 10: Additional Noise Due To Trucking

Overlapping Tasks	Trucks/hour	L @ S09 (+ existing)	L @ S10 (+ existing)
grading/vault/generator	8.7	1.2 dB	0.9 dB
generator/tank-construction	2.7	0.4 dB	0.3 dB
tank burial	11.0	1.5 dB	1.1 dB

On-site Machinery

Construction activity will center around the generator site at the western end of Headworks, and the reservoir site to the east. Types of construction machinery required will vary depending upon the task. Table 11 through Table 15 show equipment to be used in the various tasks, and provide estimated noise-emissions at a distance of 50 feet.[2] Noise emissions from all machines are combined in each table, with respect to the number of machines of each type, to provide one single noise-emission level for each location. Such combination assumes continuous and concurrent operations of all machines, thus providing worst-case results.

Table 11: Grading & Site Prep Machinery Noise Emissions

Type	Quantity	Unit Level	Combined Level
Self-loading scrapers	6	89 dBA	97 dBA
D8 – Bulldozer	1	89 dBA	89 dBA
Excavator-Breaker	1	82 dBA	82 dBA
Motor Grader	2	85 dBA	88 dBA
Front-end Loader	1	85 dBA	85 dBA
Water Truck	3	68 dBA	73 dBA
Grizzley-Classifier	2	80 dBA	83 dBA
Rock Crushing Plant	1	95 dBA	95 dBA
Compactor, 825	4	82 dBA	88 dBA
Pick-up Truck	3	68 dBA	73 dBA
Dump Trucks	4	71 dBA	77 dBA
Combined Noise Emission (at 50 feet)	--	--	**100 dBA**

[2] Machinery noise emissions based on data in: *Noise from Construction Equipment and Operations, Building Equipment and Home Appliances,* U.S. Environmental Protection Agency, 1971; *Transit Noise and Vibration Impact Assessment,* Harris Miller Miller & Hanson Inc., 1995; and Medlin & Associates compiled noise measurements.

Table 12: Inlet/Outlet & Vault Construction Machinery Noise Emissions

Type	Quantity	Unit Level	Combined Level
Excavator	1	82 dBA	82 dBA
Loader	1	85 dBA	85 dBA
Crane	2	83 dBA	86 dBA
Dump Truck	1	71 dBA	71 dBA
Tractor with End Dump	1	65 dBA	65 dBA
Utility Truck	2	68 dBA	71 dBA
Flatbed Truck	1	68 dBA	68 dBA
Welding Truck	1	68 dBA	68 dBA
Ventilation Blower	1	82 dBA	82 dBA
Generator	1	81 dBA	81 dBA
Water Truck	1	68 dBA	68 dBA
Backhoe	1	84 dBA	84 dBA
Hydraulic Power Unit	1	81 dBA	81 dBA
370 foot Augers	1	78 dBA	78 dBA
Concrete Pump	1	84 dBA	84 dBA
Pipe Carrier	1	80 dBA	80 dBA
Paver	1	89 dBA	89 dBA
Roller	1	74 dBA	74 dBA
Grader	1	85 dBA	85 dBA
Combined Noise Emission (at 50 feet)	**--**	**--**	**95 dBA**

Table 13: Generator Facility Construction Machinery Noise Emissions

Type	Quantity	Unit Level	Combined Level
75 hp Bulldozer	1	66 dBA	66 dBA
200 hp Bulldozer	2	89 dBA	92 dBA
300 hp Bulldozer	1	89 dBA	89 dBA
30,000 lb. Grader	4	85 dBA	91 dBA
11 cubic yard Scraper	2	89 dBA	92 dBA
¾ cubic yard Hyd. Excavator	1	66 dBA	66 dBA
Front End Loader	1	85 dBA	85 dBA
Towed Sheep foots Roller	1	74 dBA	74 dBA
Crane	3	83 dBA	88 dBA
Concrete Pumper	3	84 dBA	89 dBA
Water Truck	1	68 dBA	68 dBA
Fork Loader	8	85 dBA	94 dBA
Combined Noise Emission (at 50 feet)	**--**	**--**	**100 dBA**

Table 14: Reservoir Tank Construction Machinery Noise Emissions

Type	Quantity	Unit Level	Combined Level
16 ton Dump Trucks	40	71 dBA	87 dBA
.75 cubic yard Power Shovels with FE Attachment	4	66 dBA	72 dBA
300 hp Bulldozers	4	89 dBA	95 dBA
1.5 cubic yard Front-end Loaders	4	66 dBA	72 dBA
40 ton Crawler Cranes	18	83 dBA	96 dBA
5,000 gallon Water Trucks	2	68 dBA	71 dBA
30,000 pound Grader	1	85 dBA	85 dBA
240 hp Tractor	1	86 dBA	86 dBA
Vibratory Roller	1	82 dBA	82 dBA
Combined Noise Emission (at 50 feet)	**--**	**--**	**99 dBA**

Table 15: Reservoir Tank Burial Machinery Noise Emissions

Type	Quantity	Unit Level	Combined Level
Front-end Loader	2	85 dBA	88 dBA
D8 – Bulldozer	6	89 dBA	97 dBA
Motor Grader	2	85 dBA	88 dBA
Water Truck	3	68 dBA	73 dBA
Compactor, 825	4	82 dBA	88 dBA
Pick-up Truck	3	68 dBA	73 dBA
Dump Truck	15	71 dBA	83 dBA
Combined Noise Emission (at 50 feet)	**--**	**--**	**98 dBA**

The highest projected noise levels result from grading and generating facility construction. These operations, along with inlet/outlet and vault construction, will at one point occur simultaneously, and therefore represent the worst-case scenario. Noise contours reflecting these three concurrent operations are shown in Figure 9. Since activities around the reservoir will likely be spread over a large area, noise emissions resulting from these activities were equally distributed over six locations along the southern portion of the reservoir site.

Construction at Headworks will last more than six years, with the multiple concurrent operations illustrated by Figure 9 occurring for at least one month. Comparison of these contours with Table 2 indicates that the projected noise levels will likely exceed existing ambient noise levels by five decibels, thus creating a significant impact in accordance with the Los Angeles *CEQA Thresholds Guide.*

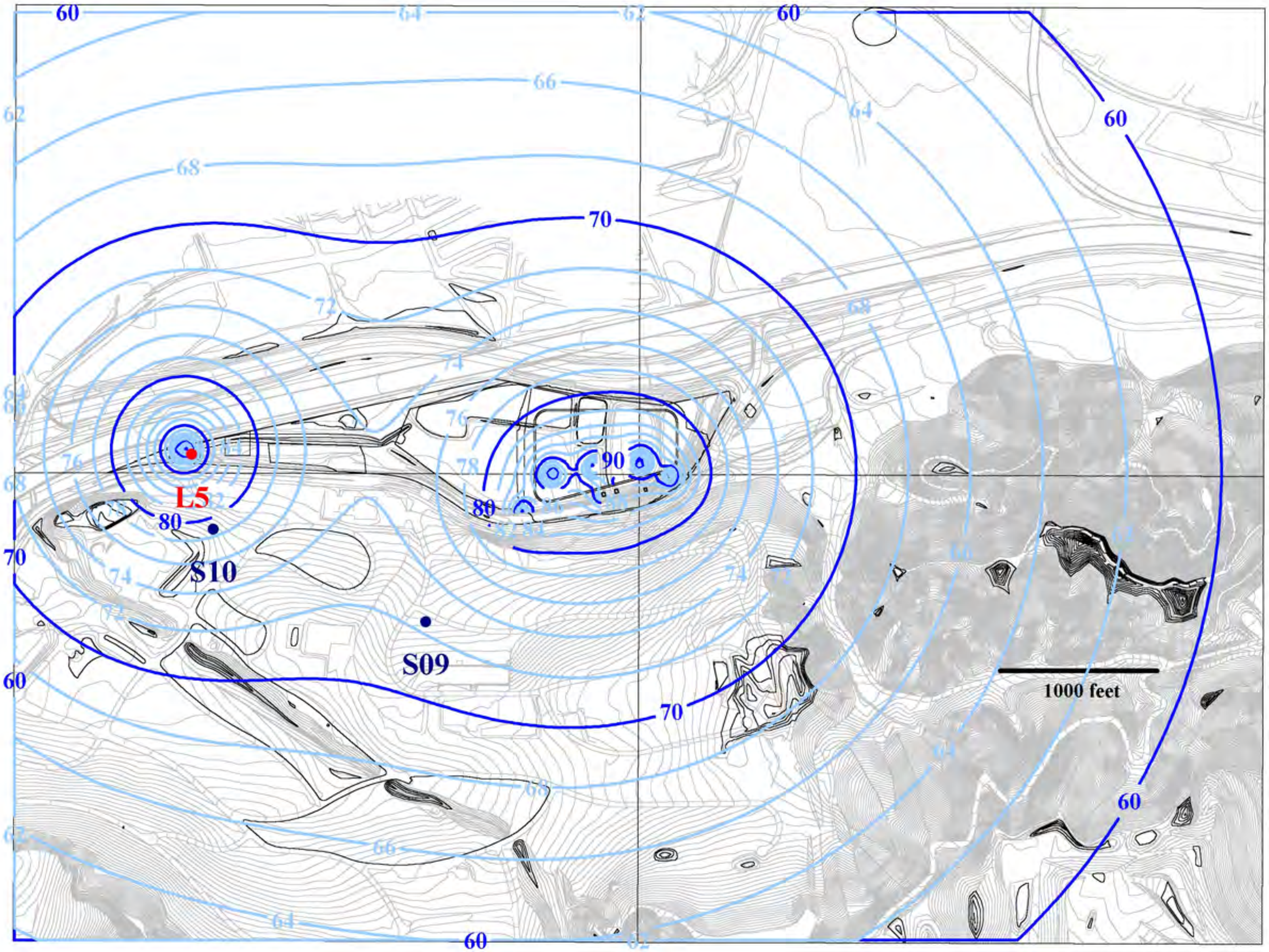

Figure 9: Headworks Construction Noise Contours - Grading/Vaults/Generator (dBA)

3.1.2 Operational Noise

Operation

The hydroelectric generating facility is expected to be the only significant source of operational noise at the Headworks site. Specific noise sources within the facility include the water-powered generator, a substation, and an emergency backup generator.

The generator will be housed in a reinforced concrete building, and will therefore be substantially noise-isolated from the exterior environment. Figure 10 shows a typical modern hydrogenerator building, this one being the Sawtelle plant near UCLA. Noise-level measurements at this plant were not possible as it is currently inoperative. Measurement were therefore taken at an alternate location, the Franklin Canyon Power House near Beverly Hills (Figure 11). This is an older facility (built 1929) with many windows in its design. These windows, together with numerous vents on the west side, allow substantial amounts of machinery noise to escape to the exterior. As such, noise emissions from this plant may be used to provide conservative projections of noise levels generated by the Headworks plant.

The measured noise level 100 feet from the south face of the Franklin Canyon building was 65.7 dBA. This figure also includes some low-level hum from the adjacent substation (behind fence on right of Figure 11). Based on this value, the contours of Figure 12 show predicted noise levels, in CNEL, due to operation the proposed generating facility. Comparison with levels shown in Table 2 indicates that noise levels created by the generator will fall substantially below existing ambient noise levels (due to traffic) on both cemeteries. Likewise, residences on Bob Hope Drive will experience noise levels well below existing ambients. Consequently, no significant noise impact exists at any sensitive receiver.

Figure 10: Sawtelle Power Plant (inoperative)

Figure 11: Franklin Canyon Power House

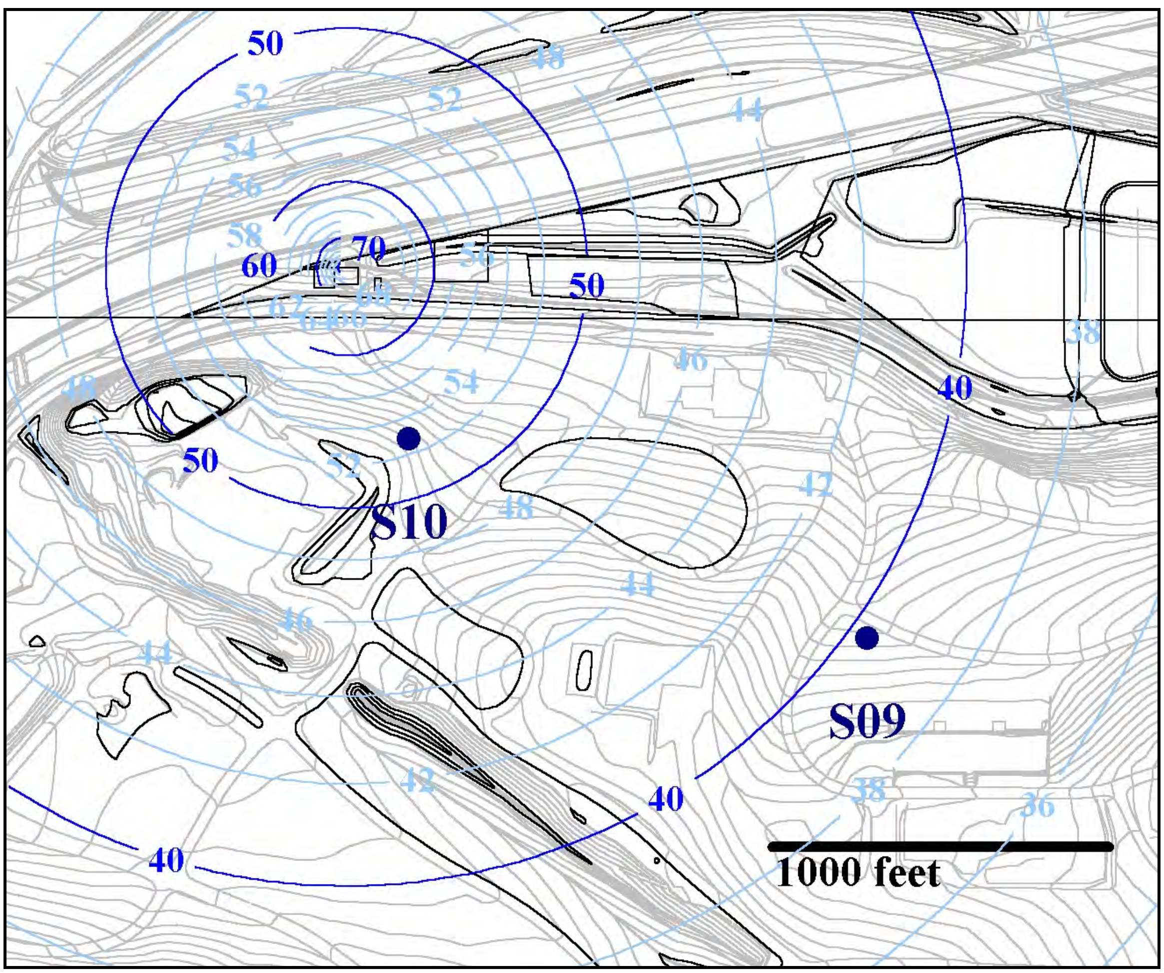

Figure 12: Generating Facility Operation Noise Contours (CNEL)

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A small (125 kW) emergency backup generator will be co-located on the generating facility site, an example of which is the Caterpillar XQ125. According to the manufacturer's specification sheet, this model produces a noise level of 68.4 dBA at 7 meters (23 feet) when running under prime load. This is equivalent to 55.6 dBA at 100 feet, substantially less than used to generate the contours of Figure 12. Therefore, the emergency backup generator will produce no significant noise impacts at any sensitive receiver.

Maintenance

Maintenance activities at the Headworks site will comprise infrequent use of service vehicles, and are therefore considered insignificant in the Headworks environment. Maintenance activities include:

- reservoir site inspection: once per week;
- reservoir tank cleaning: one utility truck and possibly one dump truck for approximately one week every two years;
- generating facility site inspection: once per week;
- generating facility quarterly preventive maintenance: one service truck for one day;
- generating facility annual inspection: three service trucks per day for two weeks each year;
- generating facility overhaul: three service trucks and one crane per day for four weeks every five years.

3.2 Silver Lake

Potential noise impacts at the Silver Lake location arise from construction activities and from operation of the regulator station.

3.2.1 Construction Noise

Construction at Silver Lake will comprise installation of a pipeline under West Silver Lake Drive and Redesdale Avenue, and installation of a regulator station in the park adjacent to the southwest corner of the reservoir (along West Silver Lake Drive). These two phases will not overlap. Noise-producing construction activities will include on-site equipment operation, and trucking to and from the construction sites. A materials and equipment staging area will be established on the east side of the reservoir property, necessitating passage of trucks and machinery along Silver Lake Boulevard.

Noise-producing construction activities will include on-site equipment operation, and trucking to and from the sites. Construction will take place between the hours of 7 a.m. and 8 p.m. Monday through Friday, therefore falling within those times permitted by the municipal code.

Trucking

Noise level increases due to truck traffic are dependent upon the number of truck trips per hour and the existing traffic volumes. In order to accurately estimate noise impacts from trucking on local streets surrounding the reservoir, a one-hour traffic-counted noise measurement was conducted from 6:49 a.m. to 7:48 a.m. on 21 April. The measurement location was the corner of Cove Avenue and Rockford Road, fifty-seven feet from the edge of Silver Lake Boulevard, and approximately 900 feet south of the staging area. During this hour, 1317 cars, 21 medium trucks (including school buses), and 3 heavy trucks passed the measurement point, producing a one-hour Leq of 67.0 dBA.

Using the method described in Federal Highway Administration report FHWA-RD-77-108 in conjunction with the California Vehicle Noise Reference Energy Mean Emission Levels (Calveno Remels), increased noise levels due to additional heavy trucks were predicted by solution of the equation:

$$Leq = Lo + 10\log\left(\frac{N\pi Do}{ST}\right)$$

Marginal differences in noise level were computed by adjusting the volume of heavy trucks while keeping constant the volume of automobiles and medium trucks. Speed-dependent noise-emission levels were obtained from the Calveno Remels. Adjustments due to distance, finite roadway, and shielding remained constant and therefore cancelled in computing differences. Figure 13 shows the predicted increase in noise level, over the existing level, for various hourly volumes of heavy-truck traffic, assuming a traffic speed of 40 miles per hour on Silver Lake Drive. According to this graph, a heavy-truck volume of 68 trucks per hour would be required to increase the ambient noise level by three decibels. Similar results may be expected for trucking on West Silver Lake Drive.

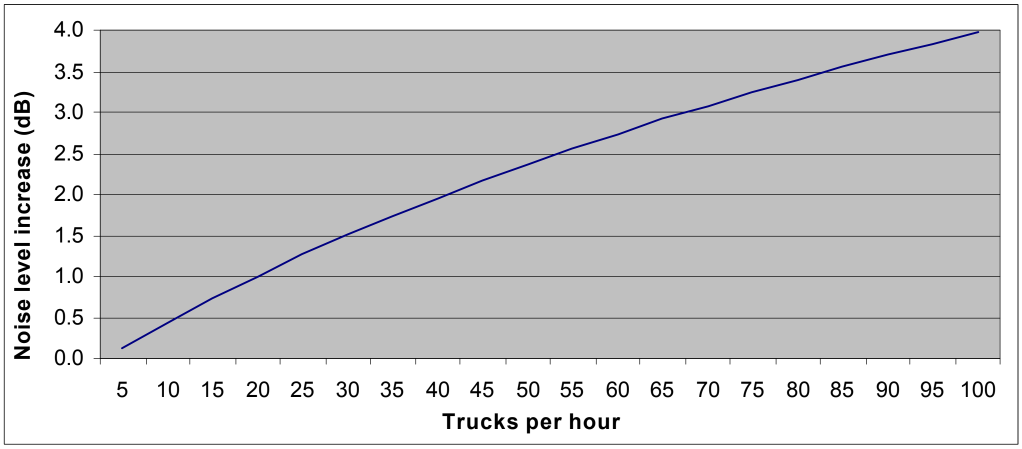

Figure 13: Noise Level Increase on Silver Lake Blvd. Due To Trucking

Table 16 shows the projected daily volume of truck traffic required to support construction of the pipeline, while Table 17 shows similar data for construction of the regulator station. Average hourly truck volumes were obtained by combining truck volumes for all operations and dividing by ten work hours per day. Since construction of the pipeline and regulator station will not overlap, truck volumes for these two phases are not combined. In neither case do average hourly truck volumes exceed two truck trips per hour, resulting in a negligible noise increase according to Figure 13.

Table 16: Projected Truck Traffic Volume (pipeline)

Operation	Trucks/day	Trucks/hour	# of Days
soil removal	3	.3	187
pipe delivery	6	.6	21
concrete delivery	9	.9	31
Peak truck volume	**18/day**	**1.8/hr**	**--**

Table 17: Projected Truck Traffic Volume (regulator station)

Operation	Trucks/day	Trucks/hour	# of Days
concrete delivery	15	1.5	5
Peak truck volume	**15/day**	**1.5/hr**	**--**

On-site Machinery

The pipeline will be installed primarily by tunneling (boring) under the streets. Trenching will only be used for a short length of pipeline under the park. Access to the tunnel would be via the two jacking pits and one receiving pit, and it is around these pits that all pipeline construction activity is assumed to be concentrated. Activities related to construction of the regulator station will be confined to the park south of the reservoir.

Table 18 shows equipment to be used in construction of the pipeline, and their estimated noise-emissions at a distance of 50 feet.[3] Tunnel-boring equipment is not listed as its use will be underground. Table 19 provides the same information for construction of the regulator station.

Table 18: Pipeline Construction Machinery Noise Emissions

Type	Quantity	Unit Level	Combined Level
Excavator	1	82 dBA	82 dBA
Loader	1	85 dBA	85 dBA
Crane	2	83 dBA	86 dBA
Dump Truck	1	71 dBA	71 dBA
Tractor with End Dump	1	65 dBA	65 dBA
Utility Truck	2	68 dBA	71 dBA
Flatbed Truck	1	68 dBA	68 dBA
Welding Truck	1	68 dBA	68 dBA
Ventilation Blower	1	82 dBA	82 dBA
Generator	1	81 dBA	81 dBA
Water Truck	1	68 dBA	68 dBA
Drill Rig	1	78 dBA	78 dBA
Backhoe	1	84 dBA	84 dBA
Hydraulic Power Unit	1	81 dBA	81 dBA
Concrete Pump	1	84 dBA	84 dBA
Pipe Carrier	1	80 dBA	80 dBA
Paver	1	89 dBA	89 dBA
Roller	1	74 dBA	74 dBA
Grader	1	85 dBA	85 dBA
Combined Noise Emission (at 50 feet)	**--**	**--**	**95 dBA**

[3] Machinery noise emissions based on data in: *Noise from Construction Equipment and Operations, Building Equipment and Home Appliances,* U.S. Environmental Protection Agency, 1971; *Transit Noise and Vibration Impact Assessment,* Harris Miller Miller & Hanson Inc., 1995; and Medlin & Associates compiled noise measurements.

Table 19: Regulator Station Construction Machinery Noise Emissions

Type	Quantity	Unit Level	Combined Level
Excavator	1	82 dBA	82 dBA
Loader	1	85 dBA	85 dBA
Crane	2	83 dBA	86 dBA
Dump Truck	1	71 dBA	71 dBA
Tractor with End Dump	1	65 dBA	65 dBA
Utility Truck	2	68 dBA	71 dBA
Flatbed Truck	1	68 dBA	68 dBA
Welding Truck	1	68 dBA	68 dBA
Ventilation Blower	1	82 dBA	82 dBA
Generator	1	81 dBA	81 dBA
Water Truck	1	68 dBA	68 dBA
Backhoe	1	84 dBA	84 dBA
Hydraulic Power Unit	1	81 dBA	81 dBA
Concrete Pump	1	84 dBA	84 dBA
Pipe Carrier	1	80 dBA	80 dBA
Paver	1	89 dBA	89 dBA
Roller	1	74 dBA	74 dBA
Grader	1	85 dBA	85 dBA
Combined Noise Emission (at 50 feet)	**--**	**--**	**95 dBA**

Noise emissions from all equipment were combined, with respect to the number of machines of each type, into one single noise-emission level for each location. As pipeline operations will take place at the three pits, the combined noise level from Table 18 was equally distributed between these three locations.

Figure 14 shows the resulting projected noise contours around each construction site for the pipeline construction phase. These contours assume continuous and concurrent operation of all equipment in the tables above, thus providing worst-case results. A more realistic scenario may be drawn by phasing the use of different machines, however, because aggregate noise levels are driven by the loudest machine(s) present, little reduction in the contours can be expected.[4] Figure 15 shows similar contours for the regulator station construction phase. In both figures, additional contours are shown at the staging area, representing simultaneous testing of three machines, each producing noise emissions of 85 dBA at fifty feet (or equivalently, a single machine producing 90 dBA).

Pipeline installation will take close to two years, while regulator station construction will last around six months. Comparison of the contours in Figure 14 and Figure 15 with Table 3 and Figure 5 through Figure 8 indicates that the projected noise levels will easily exceed existing ambient noise levels by five decibels, thus creating a significant impact in accordance with the Los Angeles *CEQA Thresholds Guide.*

[4] A detailed schedule of equipment use was not available for this study.

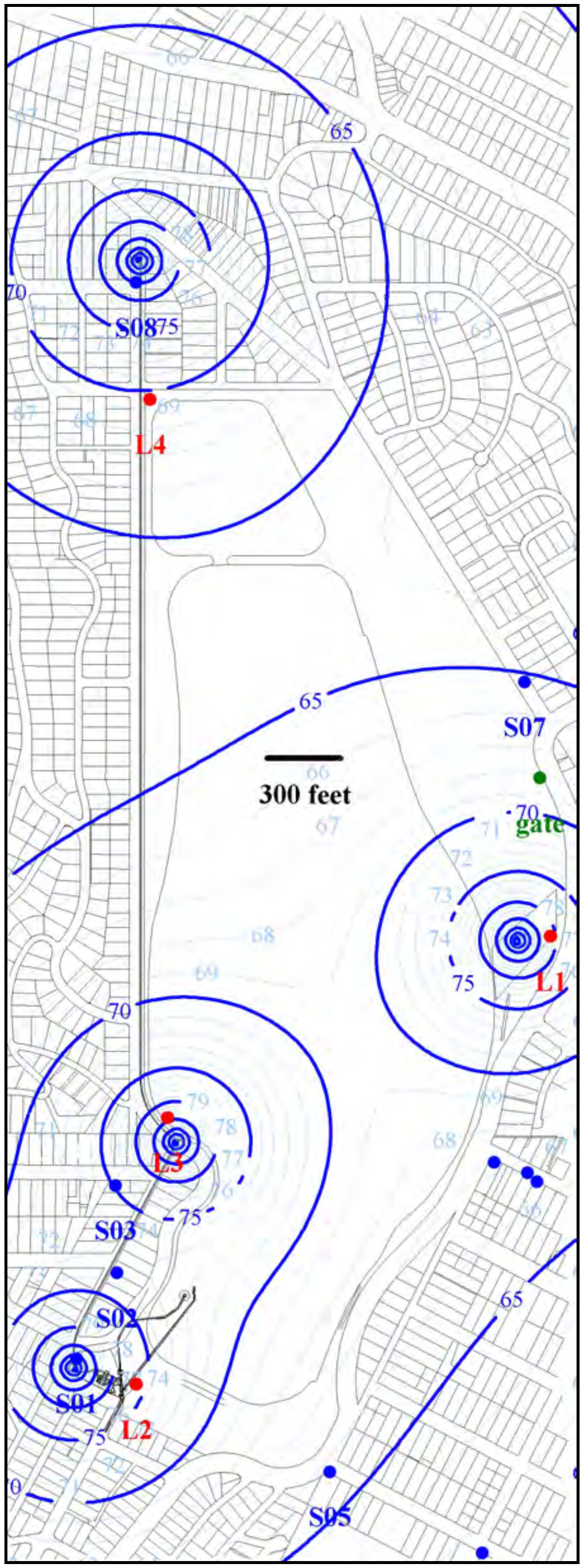

Figure 14: Pipeline Construction Noise Contours (dBA)

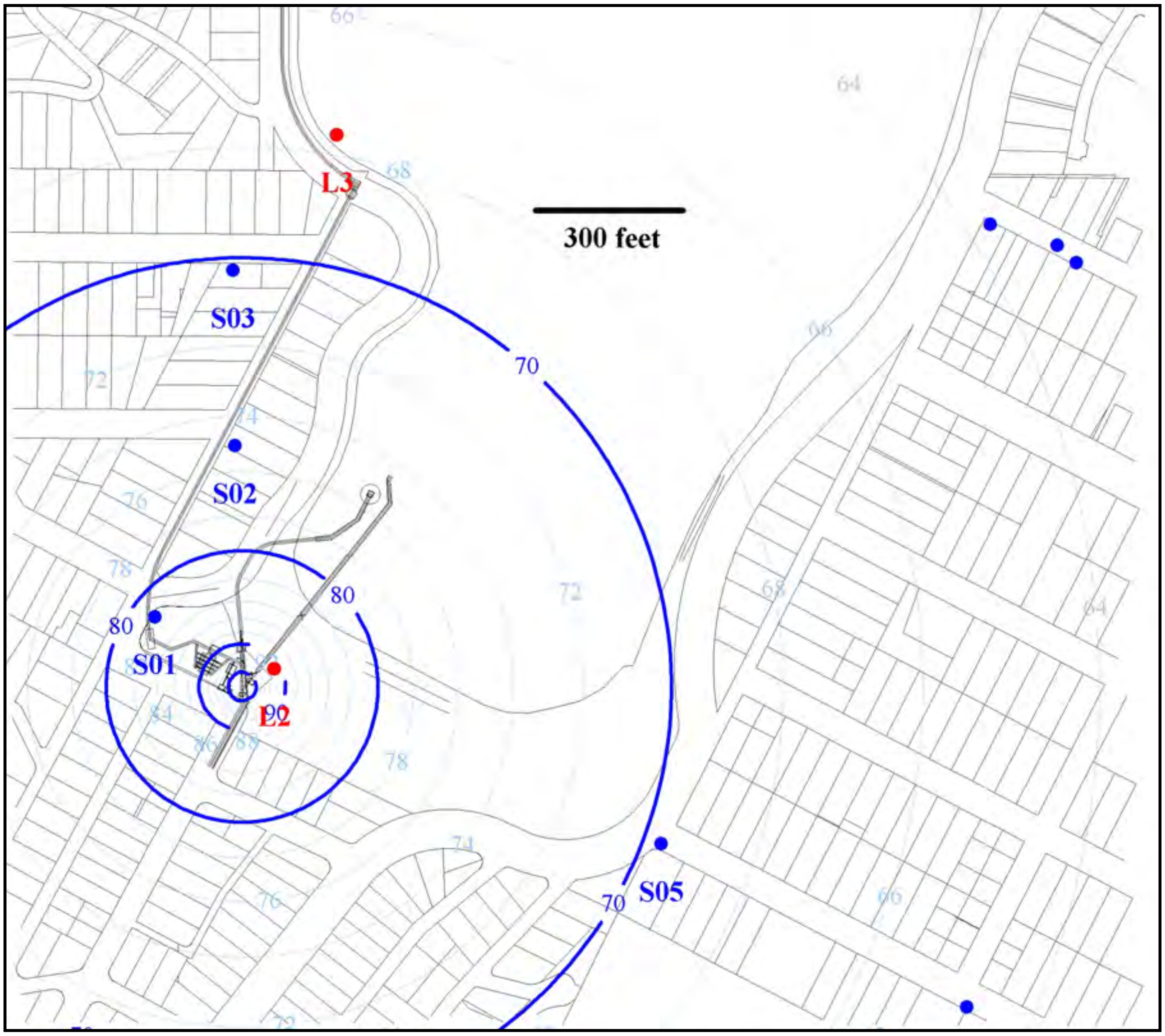

Figure 15: Regulator Station Construction Noise Contours (dBA)

3.2.2 Operational Noise

Operation

The only operational noise produced by the Silver Lake component is due to the regulator station, which will run 24 hours per day. Preliminary data indicates that the regulator station will produce a noise level of 60 dBA one hundred feet away. The nearest residence (1855 West Silver Lake Drive) lies around 120 feet away, and will therefore experience a noise level of approximately 58 dBA. This is comparable to the highest level measured during the long-term (25-hour) monitoring, and will therefore result in a 3dB increase in daytime ambient noise. Moreover, as the regulator will operate continuously, it will produce by itself a 24-hour average noise level of CNEL-65 at the nearest residence, six decibels higher than the existing ambient. This increase will breach the significance thresholds of the CEQA guidelines, move this residence from the "normally acceptable" category to "conditionally acceptable", and potentially violate Sections 112 and 116 of the Municipal Code.

Figure 16 illustrates noise levels in CNEL which can be expected from the regulator station. Primarily affected will be first-tier residences; buildings further back will be partially or completely shielded and therefore experience lower levels than shown. Little attenuation can be expected from the terrain near the regulator station. No physical barriers exist which would limit noise between the station and nearby residences, and the distances involved are too small to expect any significant attenuation from ground absorption.

In addition to nearby residences, users of the park will also be affected by noise emissions from the regulator station, experiencing levels greater than 70 dBA near the station. This is an uncomfortably high level, particularly in regard to existing levels, and will severely detract from park users' enjoyment.

Consequently, noise mitigation of the regulator station is required. As shown in Figure 6, nighttime low noise levels approach a minimum of 43 dBA. In order to maintain levels on this order, the regulator should produce no more than 40 dBA at the nearest residence (resulting in a total noise level of 45 dBA). This would require a reduction in noise emissions of nearly twenty decibels from the current estimate. Specific mitigation measures are beyond the scope of this study, however, mitigation efforts should focus on reducing emissions from the regulator itself rather than installing any kind of sound wall. Relocating the regulator station is not a likely option as its placement is dictated by hydraulic considerations.

Maintenance

Maintenance of the regulator station would comprise quarterly visits for about two hours each, and is therefore considered insignificant from a noise perspective.

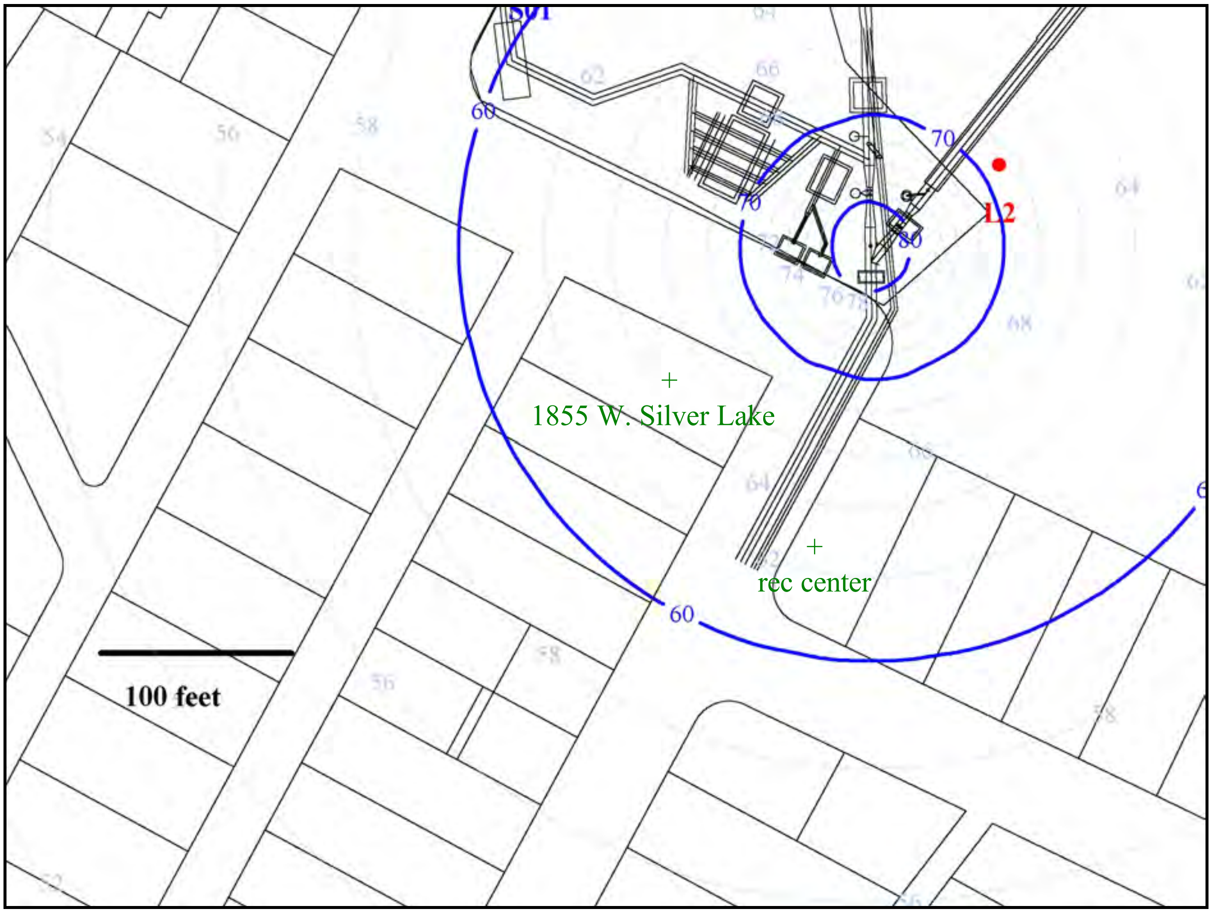

Figure 16: Regulator Station Operation Noise Contours (CNEL)

4.0 Conclusions and Recommendations

Conclusions regarding potential noise impacts due to the project are summarized below, along with notional recommendations for mitigation where required. All conclusions and recommendations are based on preliminary information available at the time of this study. Refined impact estimates and mitigation strategies may be generated when further information becomes available regarding construction schedules and machinery design.

4.1 Headworks

4.1.1 Construction

IMPACT: Significant.

Conservative estimates of on-site construction machinery noise result in increases of greater than ten decibels at nearby sensitive receivers. Construction at this site will continue for more than six years. A significant impact therefore exists according to the Los Angeles *CEQA Thresholds Guide,* which states that an impact exists if construction lasting more than ten days will exceed existing ambient levels by five decibels.

SPECIFIC CIRCUMSTANCES:

Mitigation by use of barriers (sound walls, curtains, etc.) may not be practical at this location. The sloped terrain limits the effectiveness of barriers unless they are inordinately tall. Moreover, the sheer size of the construction area limits the use of barriers, which must be relatively close to the noise source(s) in order to be effective.

Machinery noise emissions were estimated conservatively high, with the assumption that all machines will run concurrently and continuously. As detailed construction schedules become available, refined noise estimates will result in lower impacts, though a significant impact may still exist.

Frequent lawn maintenance operations take place at both cemeteries. Combined with traffic noise from the 134 freeway and Forest Lawn Drive, construction noise may actually be less noticeable than numerical estimates would suggest.

RECOMMENDATIONS:

1. Institute a noise monitoring and mitigation program at Headworks in order to continuously assess construction noise impacts and implement mitigation where required. Such program should account for the perceived impact as well as actual measured noise levels.

2. Focus mitigation efforts on extreme noise producers. Aggregate noise levels are generally driven by a few loud machines. Activities such as rock crushing which produce noises that are both loud and dissimilar to ambient noise should be minimized. Every effort should be made to complete such activities as soon as possible, rather than extending them over the duration of construction. Where feasible, they should be shielded by a sound barrier and located as far as possible from noise-sensitive receivers. Where feasible, such activities should be conducted off-site at a non-sensitive location.
3. Fixed-location machinery such as generators and compressors should be shielded from sensitive receivers. Shielding may comprise any arrangement which produces substantial noise reductions including manufactured enclosures, plywood barriers, terrain (berms, dirt piles), and other large fixed-location machinery.
4. Activities which may be performed at a fixed location (e.g. sawing lumber) should be shielded similar to #3 above.
5. Equip all machinery with high-performance mufflers and other noise-reducing equipment. Maintain all machinery in good running condition; frequent lubrication to minimize squealing and additional engine load will reduce annoying noise emissions.
6. Strictly enforce construction hours. Secure staging area with a locked fence in order to prevent early start-up or late-night maintenance.

OTHER:

Trucking in support of construction activities is deemed insignificant.

4.1.2 Operation

IMPACT: Not significant.

Worst-case estimates indicate noise levels produced by operation of the hydroelectric generating facility will be substantially below existing ambient at sensitive receivers. Loudest noise emissions will likely be from exhaust fans, which are spectrally similar to, and therefore difficult to distinguish from, traffic noise. Any exhaust fan noise impacts that may occur are relatively easy to mitigate.

SPECIFIC CIRCUMSTANCES: None.

RECOMMENDATIONS:

1. Construct the generator housing such that any exhaust fans or other devices with potential noise impacts are located to direct noise away from sensitive receivers.
2. Perform a post-startup noise test of the generating facility to verify no significant noise impacts.

3. If a significant noise impact is identified, equip noise source(s) with commercially available sound trap(s).

OTHER: None.

4.2 Silver Lake

4.2.1 Construction

IMPACT: Significant.

Conservative estimates of on-site construction machinery noise result in increases of greater than twenty decibels at some nearby sensitive receivers. Construction at this site will continue for more than two years. A significant impact therefore exists according to the Los Angeles *CEQA Thresholds Guide,* which states that an impact exists if construction lasting more than ten days will exceed existing ambient levels by five decibels. Proximity of construction to sensitive receivers introduces the possibility of creating hazardous noise levels at such receivers.

SPECIFIC CIRCUMSTANCES:

Close proximity between construction sites and nearby residences introduces the possibility of creating hazardous noise levels for these residents. Hazardous noise levels are generally defined in relation to the noise level and duration of exposure. Operations lasting ten hours per day at the levels estimated above could result in hazardous conditions for unprotected residents. Protection of residents from hazardous conditions is essential.

Machinery noise emissions were estimated conservatively high, with the assumption that all machines will run concurrently and continuously. As detailed construction schedules become available, refined noise estimates will result in lower impacts, though a significant impact will likely still exist.

RECOMMENDATIONS:

1. Institute a noise monitoring and mitigation program at Silver Lake in order to continuously assess construction noise impacts and implement mitigation where required. Said program should focus primarily on ensuring no hazardous noise levels exist at nearby residences. Long-term (all-day) monitoring should be conducted to verify that noise doses at sensitive receivers do not exceed permissible limits as determined by the appropriate authority.

2. Shield construction areas with noise control barriers, particularly the area surrounding the regulator station. Barriers may be of any configuration sufficient to control the immediate noise levels; specifically, they should be heavy, continuous (no gaps), and have a sound-absorptive surface on the construction side. Typical construction sound barriers include ¾″ plywood with a glass or mineral wool facing, commercially available post-and-panel noise-control fencing, and commercially available noise-control curtains. Barrier height should be as tall as can be practically and safely erected, but should be a minimum of eight feet high. Entrances to the noise-controlled areas should be located away from sensitive receivers. If feasible, the entrance to the regulator station area should be to the east or southeast (facing the dog park).

3. Focus mitigation efforts on extreme noise producers. Aggregate noise levels are generally driven by a few loud machines. Every effort should be made to complete such activities as soon as possible, rather than extending them over the duration of construction. Where feasible, they should be shielded by a sound barrier and located as far as possible from noise-sensitive receivers. Where feasible, such activities should be conducted off-site at a non-sensitive location.

4. Fixed-location machinery such as generators and compressors should be shielded from sensitive receivers. Shielding may comprise any arrangement which produces substantial noise reductions including manufactured enclosures, plywood barriers, terrain (berms, dirt piles), and other large fixed-location machinery.

5. Activities which may be performed at a fixed location (e.g. sawing lumber) should be shielded similar to #4 above.

6. Shield equipment maintenance and testing facilities at the staging area per #3 above.

7. Equip all machinery with high-performance mufflers and other noise-reducing equipment. Maintain all machinery in good running condition; frequent lubrication to minimize squealing and additional engine load will reduce annoying noise emissions.

8. Avoid loudest operations in the late afternoons and evenings, particularly after 7:00 p.m.

9. Avoid (noise producing) equipment maintenance & testing at the staging area in the evenings, particularly after 7:00 p.m. Attempt to schedule testing of loud machinery in order to coincide with peak morning and afternoon traffic hours.

10. Shut down all unnecessary equipment overnight (e.g. do not leave any blowers or generators running unnecessarily).

11. Strictly enforce construction hours. Secure staging area with a locked fence in order to prevent early start-up or late-night maintenance.

OTHER:

Trucking in support of construction activities is deemed insignificant.

4.2.2 Operation

IMPACT: Significant.

Preliminary data indicates the regulator station will produce noise levels of 60 dBA at a distance of 100 feet (66 dBA at fifty feet). This will result in a continuous level of 59 dBA at the nearest residence, 1855 West Silver Lake Drive, and a 24-hour average level of CNEL-65. These levels exceed the significance thresholds in the Los Angeles *CEQA Thresholds Guide,* moving this residence into the "conditionally acceptable" category. Moreover, the level produced by the regulator station will likely violate sections 112 and 116 of the municipal code. Furthermore, the regulator station would produce levels in excess of 70 dBA within 25 feet, substantially detracting from enjoyment of this park.

A minimum twenty decibel reduction in emissions is necessary to reduce noise to levels comparable with existing nighttime levels.

SPECIFIC CIRCUMSTANCES:

Because of the proximity of the regulator station to nearby residences, its location in a public park, and infeasibility of any barrier type of mitigation, noise emissions from the regulator station must be controlled at the source.

The noise level cited above was provided for this study by DWP, however, no confirmation of its accuracy could be obtained. The regulator will be contained in a concrete vault, which should provide a substantial amount of noise containment. It is possible that this level is overstated, and its reliability should be confirmed prior to implementing mitigation. No specific design details were provided for this study, however, the most likely source of noise emissions would be from the above-ground ventilation hoods and standpipes. If noise emissions are due to ventilation ducts, these can be mitigated with commercially available sound traps.

RECOMMENDATIONS:

1. Confirm that the noise level provided for this study is correct. Revise noise estimates if more accurate data become available.
2. Install commercially available sound traps (duct silencers, vent louvers, plenums) in order to reduce noise emissions to an acceptable level.

OTHER:

No operational noise is associated with the pipeline.

Noise Study Addendum, Silver Lake Reservoir Complex Storage Replacement Project

This is an addendum to the Silver Lake Reservoir Complex Storage Replacement Project (SLRC SRP) Noise Study, dated May 2004. The purpose of the addendum is to update the analysis of potential construction noise effects of the proposed SLRC SRP. The need for the additional analysis was necessitated by changes in the proposed schedule for construction activities at the HWSG site. The current proposed construction schedule has the reservoir excavation and subgrade preparation and the inlet/outlet and vault construction occurring simultaneously for the period between January and August 2007. Trucking and construction machinery noise levels were evaluated for this period of construction to determine potential noise impacts of most active period of construction at the HWSG site.

Trucking Noise

Noise level increases due to truck traffic are dependent upon the number of hourly truck trips and the existing traffic volumes and noise levels. Consistent with the methodology used in the Noise Study (i.e., Federal Highway Administration report FHWA-RD-77-108), noise levels due to heavy-truck traffic generated during the above construction period were estimated. Table 1 shows the estimated truck traffic noise levels at noise-sensitive locations near the HWSG site and compares the resultant overall noise levels to existing background noise levels at those locations.

TABLE 1
Trucking Noise Levels (@ 30 mph; Lo = 85 dBA)

			L @ Site S09		L @ Site S10	
Overlapping Tasks	**Trucks/hour**	**L @ 50 ft (trucks only)**	**Trucks+ Existing**	**Increase over Existing**	**Trucks+ Existing**	**Increase over Existing**
Reservoir excavation and grading + vault construction	7.2	63.6 dBA	59.0 dBA	1.0 dBA	63.5 dBA	0.8 dBA

Note: The noise receiver sites represent typical locations within Forest Lawn Memorial and Mt. Sinai Memorial. See Figure 3 of the project Noise Study report for details.

From the noise calculation results, it is apparent that truck traffic generated during the construction at the HWSG site would not significantly change the existing noise environment at nearby noise-sensitive locations.

Onsite Machinery Noise

The reservoir excavation and subgrade preparation and the inlet/outlet and vault construction activities will occur in and around the reservoir site located at the eastern side of the HWSG site. Types of construction machinery required will vary depending upon the construction task. Tables 2 and 3 show equipment to be used in the various tasks, and provide estimated noise emissions at a distance of 50 feet. Consistent with the approach in the Noise Study, noise emissions from all machines were combined in each table, with respect to the number of machines of each type, to provide one single noise-emission level for each location. Such a combination assumes continuous and concurrent operations of all machines, thus providing worst-case results.

TABLE 2
Reservoir Excavation and Subgrade Preparation Noise Levels @ 50 Feet From Equipment (dBA)

Equipment	Quantity	Unit Level	Combined Level
400-hp, 23-cubic-yard, self-loading scrapers	4	89	95
340-hp D8 – Bulldozer	4	89	95
500-hp Excavator-Breaker	1	82	82
240-hp Motor Grader	2	85	88
230-hp, 4-cubic-yard Front-end Loader	1	85	85
5,000-gallon Water Truck	3	68	73
Grizzley-Classifier	2	80	83
Rock Crushing Plant	1	95	95
180-hp Compactor	4	82	88
Drill Rig and Augers	6	78	86
400-hp, 20-cubic-yard Dump Trucks	8	71	80
Combined Noise Emission (at 50 feet)	**---**	**---**	**101**

TABLE 3
Inlet/outlet and Vault Construction Noise Levels @ 50 Feet From Equipment (dBA)

Equipment	Quantity	Unit Level	Combined Level
188-hp Excavator	1	82	82
196-hp Loader	1	85	85
345-hp Crane	2	83	86
600-hp Dump Truck	1	71	71
600-hp Tractor with End Dump	1	65	65
300-hp Utility Truck	2	68	71
340-hp Flatbed Truck	1	68	68
Welding Truck	1	68	68
Ventilation Blower	1	82	82
Generator	1	81	81
270-hp Water Truck	1	68	68
110-hp Backhoe	1	84	84
40-hp Hydraulic Power Unit	1	81	81
370-foot Augers	1	78	78

TABLE 3
Inlet/outlet and Vault Construction Noise Levels @ 50 Feet From Equipment (dBA)

Equipment	Quantity	Unit Level	Combined Level
Concrete Pump	1	84	84
Pipe Carrier	1	80	80
112-hp Paver	1	89	89
Roller	1	74	74
145-hp Grader	1	85	85
Combined Noise Emission (at 50 feet)	**---**	**---**	**95**

The expected noise contours from activities listed in Tables 2 and 3 would be similar to the circular noise contours centered on the reservoir site in Figure 9 of the original Noise Study report. Therefore, expected worst-case construction noise levels at location S09 from the combined reservoir site grading and inlet/outlet vault construction would be in the 72- to-74-dBA range. The highest construction noise levels at location S10 are expected to occur during the construction of the generator facility, which is to be located near the western end of the HWSG site. Maximum construction noise levels at location S10 during generator facility construction would exceed 80 dBA.

From the above discussion, it is evident that projected worst-case construction noise levels at either of the selected noise receiver locations would exceed the existing background noise levels by greater than 5 dBA, therefore resulting in significant noise impacts relative to the City of Los Angeles CEQA Thresholds Guide.

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Addendum to the Noise Study Report for the Silver Lake Reservoir Complex Storage Replacement Project

Introduction

This Technical Memorandum is a second addendum to the *Silver Lake Reservoir Complex Storage Replacement Project – Noise Study* prepared by Medlin & Associates in July 2004. The original Noise Study is incorporated herein by reference. The first Noise Study Addendum addressed potential construction noise effects of the Proposed Project due to changes in the proposed schedule for construction activities at the Headworks Spreading Grounds (HWSG) site. The first addendum was submitted in November 2004. This and the previous addendum were prepared by CH2M HILL's noise specialist, Farshad Farhang.

The purpose of this Addendum is to address additional, recently identified changes to the Proposed Project and their noise implications. The Proposed Project changes only affect the Silver Lake Reservoir Complex (SLRC). There are no changes to or at the HWSG site. The additional Proposed Project components that were not considered in the original Noise Study include:

- An extra day of construction each week, on Saturdays between 8:00 a.m. and 5:00 p.m.
- Construction of a proposed pipeline immediately to the east of Ivanhoe Reservoir
- Excavation for cut-and-plug operations at the northeast end of Silver Lake Reservoir
- Potential trenching along West Silver Lake Drive immediately southwest of the Silver Lake Reservoir for the Regulating Station Trunk Line
- Construction of two relief stations along Silver Lake Boulevard southeast of the SLRC, one at West Silver Lake Drive and the other at London Street

Analysis

Trucking Noise

The proposed changes in the Project construction would not result in increased truck traffic compared to the original estimates of truck trips in the area during construction. Therefore, based on the finding in the original Noise Study, noise effects from truck trips in the SLRC area would be negligible.

Onsite Machinery Noise

Calculations of construction machinery noise for each set of construction activities were conducted. Types of construction machinery required will vary depending upon the construction task. Tables 1 through 3 show equipment to be used in the various tasks, and provide estimated noise-emissions at a distance of 50 feet. Consistent with the approach in the Noise Study, noise emissions from all machines were combined in each table, with respect to the number of machines of each type, to provide one single noise-emission level for each task. Such combination assumes continuous and concurrent operations of all machines, thus providing worst-case or conservative results.

TABLE 1
Bypass Pipeline Estimated Construction Noise Levels @ 50 Feet from Equipment (dBA)

Equipment	Quantity	Unit Level	Combined Level
Excavator	1	82	82
Loader	1	85	85
Crane	2	83	86
Dump Truck	1	71	71
Tractor with End Dump	1	65	65
Utility Truck	2	68	71
Flatbed Truck	1	68	68
Welding Truck	1	68	68
Ventilation Blower	1	82	82
Generator	1	81	81
Water Truck	1	68	68
Drill Rig	1	78	78
Backhoe	1	84	84
Hydraulic Power Unit	1	81	81
Auger	1	78	78
Concrete Pump	1	84	84
Pipe Carrier	1	80	80
Paver	1	89	89
Roller	1	74	74
Grader	1	85	85
Combined Noise Emission (at 50 feet)	**---**	**---**	**95**

TABLE 2
Regulator and Relief Stations Estimated Construction Noise Levels @ 50 Feet from Equipment (dBA)

Equipment	Quantity	Unit Level	Combined Level
Excavator	1	82	82
Loader	1	85	85
Crane	2	83	86
Dump Truck	1	71	71
Tractor with End Dump	1	65	65

TABLE 2
Regulator and Relief Stations Estimated Construction Noise Levels @ 50 Feet from Equipment (dBA)

Equipment	Quantity	Unit Level	Combined Level
Utility Truck	2	68	71
Flatbed Truck	1	68	68
Welding Truck	1	68	68
Ventilation Blower	1	82	82
Generator	1	81	81
Water Truck	1	68	68
Drill Rig	1	78	78
Backhoe	1	84	84
Concrete Pump	1	84	84
Paver	1	89	89
Roller	1	74	74
Grader	1	85	85
Combined Noise Emission (at 50 feet)	**---**	**---**	**95**

TABLE 3
Estimated Construction Noise Levels of Activities Related to Taking Silver Lake and Ivanhoe Reservoirs Out of Service @ 50 Feet from Equipment (dBA)

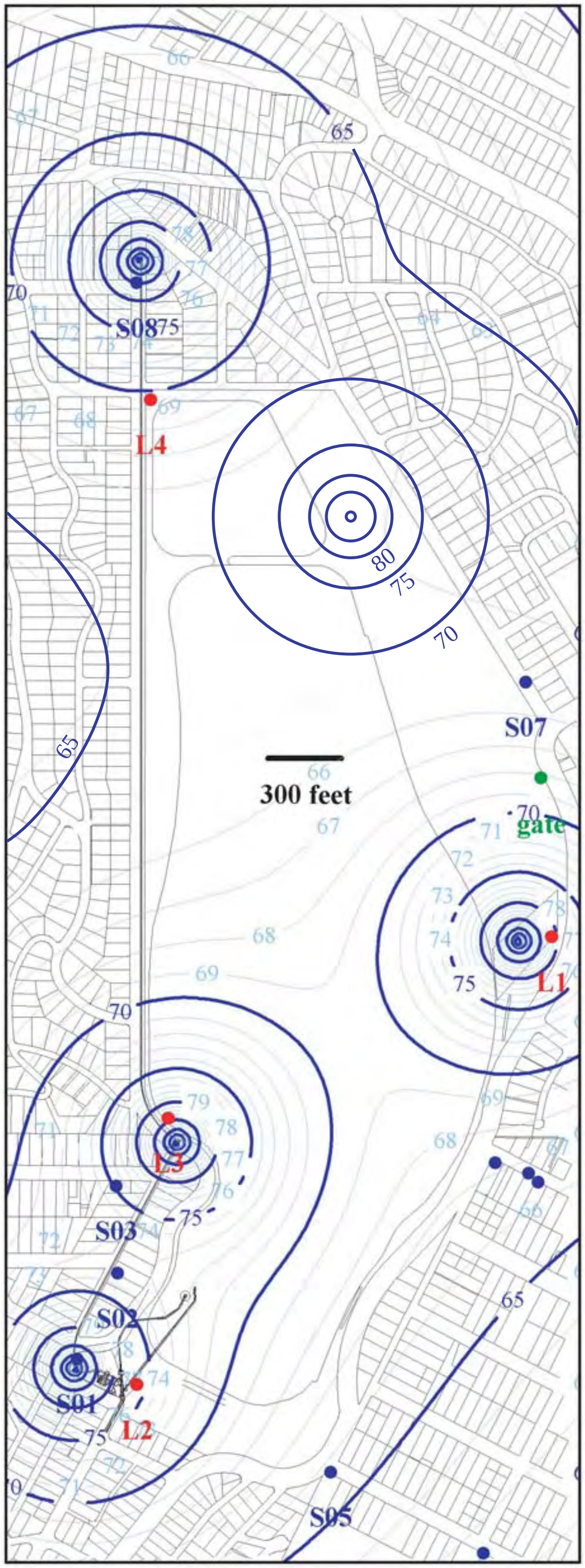
Equipment	Quantity	Unit Level	Combined Level
Excavator	1	82	82
Loader	1	85	85
Crane	2	83	86
Dump Truck	1	71	71
Tractor with End Dump	1	65	65
Utility Truck	2	68	71
Flatbed Truck	1	68	68
Welding Truck	1	68	68
Ventilation Blower	1	82	82
Generator	1	81	81
Water Truck	1	68	68
Drill Rig	1	78	78
Backhoe	1	84	84
Concrete Pump	1	84	84

TABLE 3
Estimated Construction Noise Levels of Activities Related to Taking Silver Lake and Ivanhoe Reservoirs Out of Service @ 50 Feet from Equipment (dBA)

Equipment	Quantity	Unit Level	Combined Level
Paver	1	89	89
Roller	1	74	74
Grader	1	85	85
Combined Noise Emission (at 50 feet)	**---**	**---**	**95**

Previously, construction activities at the SLRC did not overlap. The new construction schedule, however, has a window where construction activities to remove Silver Lake Reservoir from service would overlap with bypass pipeline construction. This worst-case construction scenario is reflected in revised Figure 14 (attached), which shows expected noise contours from the activities listed in Tables 1 and 3 above. As previously described, expected worst-case construction noise levels would exceed the California Environmental Quality Act (CEQA) thresholds (i.e., construction noise levels would exceed the existing background noise levels by greater than 5 dBA) and result in significant impacts relative to the City of Los Angeles CEQA Thresholds Guide.

Noise mitigation recommendations outlined in Section 4.2.1 of the Noise Study would apply to the additional project elements.



Revised Figure 14: Overlapping Construction Noise Contours at the SLRC (dBA)

Source: Medlin & Associates, Revised by CH2M HILL, April 2005

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Appendix H
Air Quality Assessment

Silver Lake Reservoir Complex Storage Replacement Project (SLRC SRP) Air Quality Assessment

Prepared for

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July 2004

Contents

Tables

1.0 Silver Lake Reservoir Complex (SLRC) Storage Replacement Project (SRP) Air Quality Technical Report

The Proposed Project would remove Silver Lake and Ivanhoe Reservoirs from direct service to the Los Angeles Department of Water and Power (LADWP) water distribution system. Water storage currently provided by the Silver Lake Reservoir Complex (SLRC) would be replaced by a 110-million gallon (MG) underground covered storage reservoir at the former Headworks Spreading Grounds (HWSG) site. The new storage reservoir would be accompanied by a 4-megawatt (MW) hydroelectric power-generating facility at the HWSG site to capture energy from the water pressure coming into the reservoir. A regulating station at the southern end of the SLRC and a new bypass pipeline around the reservoir complex would convey water delivery flow to existing service areas, while Silver Lake and Invanhoe Reservoirs would be removed from the LADWP water distribution system and maintained as view lakes.

1.1 Setting

1.1.1 HWSG Site

The Proposed Project would be located at the HWSG site and at the SLRC. The HWSG site consists of 43 acres of vacant land adjacent to the Los Angeles River, between the City of Burbank and Griffith Park. It is bounded on the north by the Los Angeles River and the 134 Freeway, and on the east and south by Forest Lawn Drive. The property is owned by the City of Los Angeles Department of Parks and Recreation; LADWP retains an easement over the entire property.

1.1.2 SLRC

The SLRC is located in the community of Silver Lake in the City of Los Angeles. It consists of LADWP-owned Silver Lake and Ivanhoe Reservoirs and related facilities. Silver Lake is 5 miles northwest of downtown Los Angeles and just east of Griffith Park. The SLRC is approximately 4.5 miles south of the proposed HWSG site.

1.1.3 Regional Air Quality Setting

National Ambient Air Quality Standards (NAAQS) have been established for seven "criteria" air pollutants. The primary national standards were established to protect public health with a built-in margin of safety. The secondary standards were established to protect and account for air pollutant effects on soil, water, visibility, vegetation, and other aspects of the general welfare of the human population. The State of California also has established California Ambient Air Quality Standards (CAAQS) for the criteria pollutants, as well as several additional pollutants. The NAAQS and CAAQS are presented in Table 1-1 (all tables are provided at the end of this report).

The project is located in Los Angeles County, which is part of the South Coast Air Basin (SCAB). This region is regulated by the South Coast Air Quality Management District (SCAQMD). As shown in Table 1-2, the United States Environmental Protection Agency (USEPA) has designated the SCAB as being in severe nonattainment for ozone (O_3) and serious nonattainment for particulate matter less than 10 microns (PM_{10}). The region also is expected to be in nonattainment with the $PM_{2.5}$ standards, because the 2003 Air Quality Management Plan (AQMP) indicates that USEPA is expected to give the region until 2014 to comply with the 1997 standards. The region has demonstrated attainment with all other criteria pollutants (SCAQMD 2003 AQMP, p. ES-8).

The SCAQMD has set up a network of air quality monitoring facilities throughout the SCAB. The criteria pollutants carbon monoxide (CO), O_3, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), PM_{10}, and $PM_{2.5}$ are measured at the Burbank/Glendale monitoring station in Los Angeles County, which is the closest monitoring site to both the HWSG and SLRC project sites. Table 1-3 shows the highest monitored levels of these air pollutants during 2000 through 2002, the last 3 years of available data. Both the California and Federal O_3 standards were exceeded at this location. Also, the California NO_2 standard was exceeded on 1 day in 2002, and both the PM_{10} and $PM_{2.5}$ standards were exceeded.

Criteria pollutants were established based on the effects of the pollutants on human health. This section describes the adverse effects of criteria pollutants, as well as the primary sources of pollutant emissions in urban areas.

Carbon Monoxide (CO)

In urban areas, the primary cause of CO pollution is incomplete combustion of gasoline in motor vehicles. CO levels can vary substantially over short distances. Typically, higher concentrations are found near intersections or along heavily traveled roadways with slow moving traffic. CO is a colorless and odorless gas, which makes high concentrations dangerous because they cannot be detected by human senses. High concentrations can cause headaches, aggravation of cardiovascular disease, and the impairment of the central nervous system.

Sulfur Oxide (SOx)

Sulfur oxides (SO_X) consist mainly of sulfur dioxide and sulfur trioxide. SO_X can have adverse health effects on the respiratory system, causing damage to the respiratory tract and bronchi constriction.

Nitrogen Oxides (NO_X)

Nitrogen oxides (NO_X) are of concern because of the role they play in the formation of ozone. Because reactions to form ozone are slow and occur as pollutants diffuse downwind, ozone is addressed on a regional basis.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter consists of both liquid and solid particles with particular attention given to PM_{10} and $PM_{2.5}$. Relatively minor particulate matter emissions would be associated with project operation, but construction would generate temporary fugitive PM_{10} and $PM_{2.5}$ emissions.

Lead (Pb)

Lead (Pb) emissions from vehicles have decreased substantially since leaded gasoline was phased out in the United States. As a result, an analysis of lead impacts is only conducted on projects that emit significant quantities of lead.

Ozone (O_3)

The most widespread air quality problem in the state, ozone is a colorless gas with a pungent, irritating odor. Ozone is not emitted directly into the atmosphere, but is formed primarily when reactive organic gases (ROG) and NO_X react in the presence of sunlight. Ozone is present in relatively high concentrations in the SCAB, and the damaging effects of photochemical smog are generally related to the concentrations of ozone. Ozone may pose its worst health threat to those who already suffer from respiratory diseases. Ozone also hurts healthy people. The health effects of ozone can include reduced lung function, aggravated existing respiratory illness, and irritated eye, nose, and throat tissues. Chronic exposure can cause permanent damage to the alveoli of the lungs. The SCAB has peak ozone levels 2.5 times higher than the federal health standard, and 3 times higher than the more stringent state standard.

1.2 Significance Thresholds

Air quality standards of significance for the proposed project were determined from adopted standards from the following sources:

- SCAQMD California Environmental Quality Act (CEQA) Guidelines
- City of Los Angeles CEQA Guidelines
- State CEQA Guidelines, Appendix G

Based on guidance from the above sources, impacts to air quality would be considered significant if construction or operation of the project would result in any of the following:

- Conflict with, or obstruct implementation of, the applicable air quality plan
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)
- Expose sensitive receptors to substantial pollutant concentrations
- Create objectionable odors affecting a substantial number of people

The SCAQMD CEQA Handbook lists the following levels as significant for construction projects:

Pollutant	Quarterly Significance Threshold (tons/quarter)	Daily Significance Threshold (lbs/day)
Reactive Organic Gases (ROG)	2.5	75
Nitrogen Oxides (NO_X)	2.5	100
Carbon Monoxide (CO)	24.75	550
Particulate Matter (PM_{10})	6.75	150
Sulfur oxides (SO_X)	6.75	150

Impacts to air quality from the proposed project would be significant if the above daily and/or quarterly pollutant levels were exceeded during construction.

1.3 Project-Related Air Quality Construction Impacts

Construction of the proposed reservoir project would occur over approximately 7 years and include nine construction phases as described below. Emissions associated with each phase have been quantified based on number of employees, number and type of equipment, potential for generation of fugitive dust, etc. Where a range of employees or equipment is assumed, the highest number was used to develop a conservative analysis. Where construction phases overlap, the calculations have been combined regardless of the physical location of the construction activities. Phases 1 through 5 below are expected to occur at the HWSG site. Phases 6 through 9 are expected to occur at the SLRC. Maximum daily emission days occur when several phases of the project occur simultaneously, regardless of location. Those months were used to calculate the worst-case emissions estimates. Those estimates were then compared to the SCAQMD CEQA significance for construction on both a daily and quarterly basis. Various construction phases at the two sites overlap during various times during the construction period. Maximum daily construction emissions for the project (where phases overlap) are given in Table 1-4. Maximum quarterly construction emissions for the project are given in Table 1-5. Maximum daily emissions for each individual phase are given in Tables 1-T1 through 1-T9.

Because some of the significance thresholds would be exceeded, the tables include emissions both before and after mitigation. Mitigation measures are described in Section 1.5.

1.3.1 HWSG Site

Phase 1 – Reservoir Excavation and Subgrade Preparation

Reservoir excavation and subgrade preparation would take place approximately from January 2007 through September 2008. Approximately 470,000 cubic yards of soil material would be excavated for the construction of the reservoir. Of the 470,000 cubic yards, approximately 5 percent, or 23,000 cubic yards, would be disposed offsite due to its unsuitability as fill material. Based on using 20-cubic-yard capacity dump trucks to export the soil material needed, a total of 30 truckloads per day for approximately 40 days would be necessary to export 23,000 cubic yards of soil. A total of 1,200 truck trips would occur during the period from May 2008 through July 2008. Material and equipment would be staged onsite and approximately 28 to 63 laborers would be required onsite during the grading and site preparation phase of construction.

Maximum daily emissions from this phase are shown in Table 1-T1 at the end of this chapter. Phase 1 emissions are anticipated to exceed maximum daily levels for NO_X and PM_{10} even after mitigation.

Phase 2 – Inlet/Outlet Vault Construction

Inlet/outlet and vault construction would take place approximately from January through August 2007. Excavation for the inlet/outlet and vault construction would be done as part of the grading and reservoir site preparation, as described above. Inlet/outlet and vault construction would require approximately 810 cubic yards of concrete. Approximately 41 trucks per day would deliver 410 cubic yards of concrete per day to the site for 2 days. Concrete would be obtained from the Southern California area, specifically Los Angeles and Orange Counties. Valves would be delivered on a flat bed truck. Approximately one valve per day for 8 days would be delivered to the site. Construction of this phase will overlap with Phase 1 above. Approximately 10 to 14 laborers would be required onsite during inlet/outlet and vault construction.

Maximum daily emissions from this phase are given in Table 1-T2 at the end of this chapter. Phase 2 emissions are anticipated to exceed maximum daily levels for NO_X and PM_{10} even after mitigation.

Phase 3 – Reservoir Construction

Reservoir construction activities include construction of the reservoir itself, construction of the reservoir access structures, and relocation of the 24-inch water distribution line to Forest Lawn Drive. Reservoir construction would take place approximately from September 2008 through August 2011. Materials required for reservoir tank construction include concrete and gravel. A total of approximately 98,686 cubic yards of concrete would be required. Approximately 15 trucks per day would deliver 135 cubic yards of concrete per day to the site. A total of approximately 18,336 cubic yards of gravel would be required. Approximately two trucks per day would deliver 36 cubic yards of gravel per day to the site. Concrete and gravel would be obtained from the Southern California area, specifically Los Angeles and Orange Counties. On average, 14 pieces of equipment would be onsite each day. A peak of approximately 50 pieces of equipment would be onsite between approximately April 2011 through July 2011. During the tank construction phase, the average number of laborers onsite would be approximately 80 per day. A peak of 180 laborers per day for concrete work would occur approximately from September through December 2009.

Construction of the water distribution line in Forest Lawn Drive would require an approximately 4-foot-wide open trench. The pipeline would be placed roughly south of the Forest Lawn Drive centerline, in the eastbound lanes. Construction would require closing one or two lanes of eastbound traffic for the approximately 1-month construction period. A six- to seven-person crew is anticipated, using a backhoe, crane, compactor, dump truck, two pick-up trucks, welding truck, and water truck.

Maximum daily emissions from this phase are given in Table 1-T3 at the end of this chapter. Phase 3 emissions are anticipated to exceed maximum daily levels for ROG, NO_X, and PM_{10} even after mitigation.

Phase 4 – Burying the Reservoir

Activities related to burying the reservoir would occur from approximately August 2011 through April 2013. Approximately 420,000 cubic yards of fill material would be required to bury the storage structure. Of this amount, 156,000 would be obtained onsite from excavation of the reservoir pad, and 264,000 cubic yards would be imported. Approximately 80 truckloads per day for 166 days would be necessary to import all the soil material, resulting in a total of approximately 13,250 truck trips between August 2011 and March 2012. Approximately 320 cubic yards of concrete would be required to construct benches around the reservoir. An estimated eight truckloads of concrete per day for 4 days would be required. Approximately 19 to 42 laborers would be required onsite during the reservoir tank-burying phase of construction.

Maximum daily emissions from this phase are given in Table 1-T4 at the end of this chapter. Phase 4 emissions are anticipated to exceed maximum daily levels for NO_X and PM_{10} even after mitigation.

Phase 5 – Hydroelectric Power-Generating Facility

Construction of the hydroelectric power-generating facility would last approximately 18 months, from January 2010 to June 2011. The hydroelectric plant would be constructed at the west end of the HWSG site. Approximately 2 acres would be disturbed during construction.

Approximately 6,000 cubic yards of soil material would be excavated for the construction of the hydroelectric plant. Of this excavated soil, 2,600 cubic yards would be exported, and 3,400 cubic yards would be retained onsite for burial of the hydroelectric plant. Based on using dump trucks with a 16-cubic-yard capacity to export the soil material, a total of eight truckloads per day for a duration of 20 days would be necessary for a total of 160 truck trips between January and May 2010. During construction, 960 cubic yards of concrete would be needed, which would require approximately 80 trips by a 12-cubic-yard concrete mixer between June and December 2010. Other equipment required for the facility would be delivered by tractor-trailer and flat bed truck. Approximately 312 tractor/trailer trips and 900 flat-bed trucks would be required over the duration of construction. An average of 40 laborers would be required onsite each day during construction.

Maximum daily emissions from this phase are given in Table 1-T5 at the end of this chapter. Phase 5 emissions are anticipated to exceed maximum daily levels for NO_X and PM_{10} even after mitigation.

1.3.2 SLRC

Phase 6 – Bypass Pipeline

Construction of the bypass pipeline would take place approximately from May 2007 through April 2009. Jacking and receiving pits for bypass pipeline tunneling would be located in West Silver Lake Drive. Roughly 5 to 15 feet around each pit would be blocked off, and the traffic around each pit would be reduced to one lane in each direction. An additional jacking pit would be likely located in the grassy area south of Silver Lake Reservoir dam. The portion of the bypass pipeline within the grassy area south of Silver Lake Reservoir dam would likely be constructed by open trench methods.

Approximately 6,625 cubic yards of soil would be removed during bypass pipeline construction. This soil would be exported to the HWSG site. Based on an estimate of 20 feet of tunneling per day and dump trucks with 10-cubic-yard capacity, two to three truckloads of soil would be exported from the site each day for 278 days from June 2007 through February 2008, and from October 2008 through February 2009. Steel pipe would be delivered to the site on flat bed trucks. Approximately six trucks per day would deliver 240 feet of pipe per day for approximately 21 days, staggered throughout the construction period. Approximately nine trucks per day would deliver 90 cubic yards of concrete per day to the site for approximately 31 days, for a total of roughly 2,542 cubic yards of concrete.

Maximum daily emissions from this phase are given in Table 1-T6 at the end of this chapter. Phase 6 emissions are anticipated to exceed maximum daily levels for NO_X and PM_{10} even after mitigation.

Phase 7 – Regulating Station and Relief Stations

Construction of the regulating station and relief stations would take place approximately from April through November 2009. Approximately 330 cubic yards of concrete would be required for construction of the regulating station. Approximately 5 to 15 trucks per day would deliver up to 130 cubic yards of concrete per day to the site for approximately 5 days. Concrete would be obtained from the Southern California area, specifically Los Angeles and Orange Counties.

Maximum daily emissions from this phase are given in Table 1-T7 at the end of this chapter. Phase 7 emissions are anticipated to exceed maximum daily levels for NO_X and PM_{10} even after mitigation.

Phase 8 – Removal of Silver Lake Reservoir from Service

Activities required to remove Silver Lake Reservoir from service would be conducted approximately between October 2007 and April 2008. It would take roughly 2 months for the reservoirs to be lowered, approximately 2 months for the valves and appurtenances to be installed, and roughly 2 months for reservoir elevation to return to operating levels.

Approximately 12 concrete trucks would be needed for vault lid and base construction, and was assumed to be the maximum number of concrete trucks onsite on any one day during the removal of the Silver Lake Reservoir from service. The average number of laborers required would be approximately 10 to 14 per day.

Maximum daily emissions from this phase are given in Table 1-T8 at the end of this chapter. Phase 6 emissions are anticipated to exceed maximum daily levels for NO_X and PM_{10} even after mitigation.

Phase 9 – Removal of Ivanhoe Reservoir from Service

Construction activities related to removal of Ivanhoe Reservoir from service would include routing a new conveyance pipe to the reservoir from an existing 16-inch pipe on Armstrong Avenue. Also required would be installation of valves and a vault within the SLRC. The construction activities would take 2 to 3 months, estimated to be between May and July 2013.

Approximately 13 concrete trucks would be needed for 5 days during the period of removal of Ivanhoe Reservoir from service. The average number of laborers required would be approximately 10 to 14 per day.

Maximum daily emissions from this phase are given in Table 1-T9 at the end of this chapter. Phase 6 emissions are anticipated to exceed maximum daily levels for NO_X and PM_{10} even after mitigation.

1.3.3 Combined Construction Emissions at HWSG Site and SRLC

Tables 1-4 and 1-5 show maximum daily and quarterly construction emissions for the combined phases. When two or more phases of the project overlap (even for days or weeks), the highest emitting days of each of the individual phases were combined to estimate the most conservative, worst-case emissions for that time period. The overlapping emissions were then compared to the SCAQMD daily and quarterly significance levels. Table 1-4 shows that even after mitigation, maximum daily emissions exceed significance thresholds for ROG, CO, NO_X, and PM_{10}. Table 1-5 shows that after mitigation, maximum quarterly emissions exceed significance thresholds for ROG, NO_X, and PM_{10}.

1.3.4 Best Management Practices to be Incorporated Within the Project

To minimize construction emissions, the project would implement standard construction practices. Fugitive dust produced during grading, excavation, and construction activities would be controlled pursuant to SCAQMD Rule 403. SCAQMD recommends minimizing fugitive dust (PM_{10} emissions) during all construction activities. The following measures would minimize fugitive dust emissions:

- The area disturbed by clearing, grading, earth moving, or excavation operations shall be as small as feasible to prevent excessive dust.
- Pregrading/excavation activities shall include watering the area to be graded or excavated before commencement of grading or excavation. Application of water (reclaimed, if available) shall penetrate sufficiently to minimize fugitive dust during grading activities.
- Trucks shall be required to cover their loads as required by the SCAQMD.
- Graded and excavated material, exposed soil areas, and active portions of the construction site, including unpaved onsite roadways, shall be treated to prevent fugitive dust. Treatment shall include, but not be limited to, periodic watering, application of environmentally safe soil stabilization materials, and/or roll compaction as appropriate. Watering shall be done at least twice daily.

- Inactive graded and/or excavated areas shall be monitored at least weekly for dust stabilization. Soil stabilization methods, such as water and roll-compaction, and application of environmentally safe dust control materials, shall be periodically implemented over portions of the construction site that are inactive for over 4 days.
- Signs shall be posted limiting traffic to 15 miles per hour (mph) or less.
- During periods of high winds (i.e., wind speed sufficient to cause fugitive dust to impact adjacent properties), clearing, grading, earth moving, and excavation operations shall be curtailed to the degree necessary to prevent fugitive dust created by onsite activities and operations from being a nuisance or hazard to offsite properties.
- Adjacent streets and roads shall be swept at least once per day, preferably at the end of the day, if visible soil material is carried over to adjacent streets and roads.

Each of the aforementioned PM_{10} measures is assumed to be included in the SCAQMD Rule 403 – Dust Control Plan required for this project. These combined measures are assumed to reduce fugitive PM_{10} by 50 percent, and are accounted for in the maximum daily and quarterly emissions calculated.

1.4 Project-Related Air Quality Operational Impacts

1.4.1 HWSG Site

Storage Reservoir Operation and Maintenance

Following construction, native vegetation would be planted on the side slopes and top of the reservoir. The remainder of the HWSG site that would be disturbed during construction would be returned to its original condition.

During operation of the reservoir at the HWSG site, LADWP staff would check the facility once a week, while security would check the facility daily. The reservoir inlet/outlet valves would be checked once a year. The tanks that make up the reservoir require cleaning once every 4 years. It is likely that the LADWP would stagger tank cleaning such that one tank is cleaned every 2 years. Tank cleaning takes approximately 1 week and requires a utility truck and possibly a dump truck if there is a significant amount of sand at the bottom of the reservoir.

Significant air quality impacts are not anticipated as a result of operation and maintenance of the storage reservoir.

Hydroelectric Power Generating Facility Operation

The 4-MW hydroelectric power-generating facility would generate electricity while reducing water pressure coming into the new storage reservoir. The hydroelectric facility would require a powerhouse, connection to the existing 35-kilovolt (kV) LADWP distribution system, an outdoor substation, and a backup emergency generator. The hydroelectric generated power would be connected to the existing 35-kV LADWP distribution system.

For backup station service power, an emergency generator with a capacity of approximately 125 kW would be housed in a separate enclosure from the powerhouse and switchyard. The enclosure would be either an outdoor metal shed type or a brick building 30 feet wide by 25 feet long by 10 feet tall.

All generators (including emergency generators) rated in excess of 50 bhp require an SCAQMD Permit to Construct/Operate. This generator is assumed to run on diesel fuel and, as such, SCAQMD staff will confirm that all criteria and toxic air pollutants resulting from its use comply with the SCAQMD New Source Review and Rule 1401 permitting standards. Permit conditions issued for emergency generators generally restrict their allowable use to less than 50 hours per year according to the Air Borne Toxic Control Measure for Stationary Compression Ignition Engines (ATCM, CARB, November 2004). Therefore, air quality impacts from testing this equipment are assumed to be negligible. The hydroelectric facility would not require staff onsite; rather, the facility would be operated remotely, from the LADWP area control center. An LADWP operator would visit the facility once a week. Security would check the facility daily.

Quarterly preventative maintenance would be performed on the plant ancillary equipment (cooling water system, air compressor, electric motor actuators), requiring one service truck for 1 day. Once a year, the facility would be shut down for internal and external inspection. This maintenance activity would require three service trucks per day for 2 weeks. The facility would be shut down for overhaul once every 5 years. This maintenance activity would require three service trucks and one crane per day for 4 weeks.

Significant air emissions are not anticipated as a result of operation or maintenance of the hydroelectric power-generating facility for the following reasons:

- Regular operation of the hydroelectric power plant is not expected to result in any emissions since no fossil fuels are burned. In fact, the electricity produced by the plant could result in a net reduction in emissions by decreasing the load on regional power plants burning fossil fuels.
- The pumps are electric and, therefore, would not produce direct emissions associated with the burning of fossil fuels.
- No employees are required to work onsite at the plant.
- Quarterly maintenance activities and annual inspections are not expected to result in significant emissions.

1.4.2 SLRC

Bypass Pipeline

Operation of the bypass pipeline would not be expected to result in air quality impacts.

Regulating Station and Relief Stations

Operation of the regulating station and relief stations would not be anticipated to result in air quality impacts for the following reasons:

- The pumps associated with the regulating station and relief stations would be electric and, therefore, would not produce direct emissions associated with the burning of fossil fuels.
- No employees are required to work onsite at the regulating station and the relief stations.
- Maintenance activities are not expected to result in significant emissions.

Silver Lake Reservoir and Ivanhoe Reservoir

Following the removal of Silver Lake Reservoir and Ivanhoe Reservoir from the water distribution system, the reservoirs would be allowed to revert to a more natural state. The level of operation and maintenance of the two reservoirs after they are removed from service are not expected to increase compared to current operation levels. Air quality impacts are not anticipated as a result of operation and maintenance of the reservoirs.

1.5 Mitigation Measures

CEQA Guidelines require that all feasible mitigation measures be identified and implemented wherever significant adverse environmental impacts are identified. There were no significant adverse environmental impacts identified as a result of the project operations. Therefore, the mitigation measures discussed below pertain to the construction-related air quality impacts of the project.

Fugitive dust control measures during construction were identified in Section 1.3.4 and would be included as part of the proposed project. Emissions of NOx, ROG, PM_{10}, and CO are expected to be significant during the worst-case months of overlapping construction impacts. The following mitigation measures would be implemented for construction-related air quality impacts during all nine phases of project construction:

- Equipment idling time shall be minimized to the extent possible.
- Equipment engines shall be maintained in good condition and in proper tune in accordance with manufacturer specifications.
- All construction equipment shall utilize emulsified diesel fuel. The use of such fuel has been demonstrated by the California Air Resources Board to reduce NOx by 14 percent and reduce PM_{10} (from engine combustion) by 63 percent.

1.6 Significant Impacts after Mitigation

Construction-related emissions are expected to be significant even with the implementation of fugitive dust control measures and use of emulsified diesel fuel in the construction equipment. Construction-related emissions for this project were quantified using the worst-case, most conservative assumptions. For example, it is assumed that all equipment needed for a particular construction phase will be operating all day at its rated load capacity. Also, where any of the phases overlap (even for a few weeks) those overlapping emissions were used to determine significance. The SCAQMD threshold levels for significance during construction are very conservative and generally even minor construction projects exceed the allowable emission levels.

TABLES

TABLE 1-1
Ambient Air Quality Standards

Pollutant	Average Time	California Standards	Federal Standards	
		Concentration	Primary	Secondary
Ozone	1 hour	0.09 ppm	0.12 ppm	Same as Primary Standards
	8 hours		0.08 ppm	
Carbon Monoxide	8 hours	9.0 ppm	9.0 ppm	None
	1 hour	20 ppm	35 ppm	
Nitrogen Dioxide	Annual Average	—	0.053 ppm	Same as Primary Standard
	1 hour	0.25 ppm	—	
Sulfur Dioxide	Annual Average	—	0.030 ppm	—
	24 hours	0.04 ppm	0.14 ppm	—
	3 hours	—	—	0.5 ppm
	1 hour	0.25 ppm	—-	—
Suspended Particulate Matter (PM_{10})	24 hours	50 µg/m^3	150 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m^3	50 µg/m^3	Same as Primary Standard
Suspended Particulate Matter ($PM_{2.5}$)	24 hours	65 µg/m^3	—	—
	Annual Arithmetic Mean	12 µg/m^3	15 µg/m^3	—
Sulfates	24 hours	25 µg/m^3	—	—
Lead	30-day Average	1.5 µg/m^3	—	—
	Calendar Quarter	—	1.5 µg/m^3	Same as Primary Standard

Source: California Air Resources Board. June 9, 2003.

Note: There are also CAAQS for visibility reducing particles, hydrogen sulfide, and vinyl chloride; however, they are not currently being monitored in the SCAB.

TABLE 1-2
Federal and State Designations of the South Coast Air District

Pollutant	Federal		State Standards
	Designation	**Classification**	
Ozone	Nonattainment	Severe*	Nonattainment
PM_{10}	Nonattainment	Serious	Nonattainment
CO	Attainment		Attainment
NO_2	Attainment		Attainment
SO_2	Attainment		Attainment

Source: South Coast Air Quality Management District air quality data from www.aqmd.gov and the 2003 Air Quality Management Plan Executive Summary Chapter.

*The likely attainment date from EPA for meeting the ozone standard is 2021 (2003 AQMP, page ES-8)

TABLE 1-3
Maximum Ambient Levels for Criteria Pollutants at Nearest Air Monitoring Station (Station #7)

Air Pollutant	Standard Exceedance	Burbank/Glendale		
		2000	2001	2002
Carbon Monoxide (CO)	Max. 1-hr Concentration (ppm)	8	6	6
	Max. 8-hr Concentration (ppm)	6.1	4.88	4.6
	# Days > Federal 1-hr Std. of > 9.5 ppm	0	0	0
	# Days > California 8-hr Std. of > 9.0 ppm	0	0	0
Ozone (O_3)	Max. 1-hr Concentration (ppm)	0.15	0.129	0.128
	Max. 8-hr Concentration (ppm)	0.119	0.104	0.097
	# Days > Federal 1-hr Std. > 0.12 ppm	3	2	1
	# Days > Federal 8-hr Std. of > 0.08 ppm	11	5	6
	# Days > California 1-hr Std. > 0.09 ppm	16	15	17
Nitrogen Dioxide (NO_2)	Max. 1-hr Concentration (ppm)	0.17	0.25	0.26
	# Days > California 1-hr Std. of > .25 ppm	0	0	1 (a)
Suspended Particulate Matter ($PM_{2.5}$)	Number of Samples	70	117	121
	Max. 24-hr concentration (µg/m^3)	84.4	94.7	57.8
	# Samples > Federal 24-hr Std. of > 65 µg/m^3	3	4	0
	Annual Arithmetic Mean (µg/m^3)	23.8	24.9	20.3
Sulfur Dioxide	Max. concentration in 1 hr (ppm)	0.01	0.01	0.01
	Max. concentration in 24 hours (ppm)	0.004	0.004	0.007
Suspended Particulate Matter (PM_{10})	Number of Samples	60	61	58
	Max. 24-hr Concentration (µg/m^3)	74	86	71
	# Samples > Federal 24-hr Std. of > 150 µg/m^3	0	0	0
	# Samples > California 24-hr Std. of 50 µg/m^3	14	14	7
	Annual Arithmetic Mean (µg/m^3)	39.1	40.9	37.7

Source: Air Quality data downloaded at www.aqmd.gov.

Note: Lead and sulfate are not monitored at the Burbank Station.

(a) Note: Although the NO_x CAAQS was exceeded at this location for 1 day, the overall South Coast Air Basin is in attainment with both the California and federal NO_2 standards based on their Basinwide modeling.

TABLE 1-4
Maximum Daily Construction Emissions for Phases 1 – 9 (Grouped into One Project for CEQA Significance Determination)

Construction Phases	**Maximum Daily Emissions**				
	lb/day ROG	**lb/day CO**	**lb/day NO_x**	**lb/day SO_x**	**lb/day PM_{10}**
Phase 1 - Grading and Reservoir Site Preparation (without mitigation)	59	265	696	0.7	816
Phase 2 - Inlet-Outlet and Vault Construction (without mitigation)	30	131	307	0.8	556
Phase 3 - Reservoir Tank Construction (without mitigation)	78	400	958	1.0	460
Phase 4 - Burying Reservoir Structure (without mitigation)	38	179	486	0.9	665
Phase 5 - Hydroelectric Power Plant (without mitigation)	46	188	475	0.6	270
Phase 6 - Bypass Pipeline (without mitigation)	33	138	375	0.4	336
Phase 7 - Regulating Station and Relief Stations (without mitigation)	23	92	234	0.4	283
Phase 8 - Removal of Silver Lake Reservoir from Service (without mitigation)	26	107	272	0.2	244
Phase 9 - Removal of Ivanhoe Reservoir from Service (without mitigation)	26	107	273	0.2	253
Max. Daily Total* (without mitigation)	*124*	*588*	*1,433*	*1.9*	*1,708*
Max. Daily Total (with Mitigation)	*124*	*588*	*1,242*	*1.9*	*1,671*
Significance Thresholds**	75	550	100	150	150
Remaining Significant?	Yes	Yes	Yes	No	Yes

*Max. daily total is total for worst-case construction day (i.e., sum of daily emissions for phases that overlap).

Wherever two or more phases of the Project overlap (even for days or weeks), the highest emitting days of each of individual phases were combined to estimate the most conservative, worst-case emissions. These overlapping emissions were then compared to the SCAQMD daily and quarterly significance levels. For example, Phases 1, 2, and 6 overlap; Phase 1, 6, and 8 overlap; Phases 3 and 5, 3 and 6, and 3 and 7 also overlap. Phase 4 and Phase 9 are the only Phases that do not overlap in any way with any other Phase.

Note: These totals are NOT the totals of Phases 1 – 9 above as not all phases overlap all the time.

**Emission thresholds established by the SCAQMD CEQA Handbook.

Mitigation measures are outlined in Section 11.3.

Standard dust control measures per Rule 403 are included in the pre-mitigation emissions.

TABLE 1-5
Maximum Quarterly Construction Emissions for Phases 1 – 9

Construction Phases	**Maximum Quarterly Emissions**				
	Tons/qtr ROG	**Tons/qtr CO**	**Tons/qtr NO_x**	**Tons/qtr SO_x**	**Tons/qtr PM_{10}**
Phase 1 - Grading and Reservoir Site Preparation (without mitigation)	2.3	10.3	27.1	-	31.8
Phase 2 - Inlet-Outlet and Vault Construction (without mitigation)	0.9	3.5	8.8	-	6.8
Phase 3 - Reservoir Tank Construction (without mitigation)	3.0	15.6	37.4	-	17.9
Phase 4 - Burying Reservoir Structure (without mitigation)	1.4	6.8	18.2	-	20.3
Phase 5 - Hydroelectric Power Plant (without mitigation)	1.8	7.3	18.4	-	9.6
Phase 6 - Bypass Pipeline (without mitigation)	1.3	5.3	14.3	-	10.5
Phase 7 - Regulating Station and Relief Stations (without mitigation)	0.9	3.6	9.1	-	11.0
Phase 8 - Removal of Silver Lake Reservoir from Service (without mitigation)	1.0	4.1	10.5	-	5.1
Phase 9 - Removal of Ivanhoe Reservoir from Service (without mitigation)	1.0	4.1	10.6	-	5.4
Max. Quarterly* (without mitigation)	*4.8*	*22.9*	*55.8*	-	*47.4*
Max. Quarterly Total (with Mitigation)**	*4.8*	*22.9*	*48.3*	-	*46.0*
Significance Thresholds***	2.5	24.75	2.5	6.75	6.75

TABLE 1-5
Maximum Quarterly Construction Emissions for Phases 1 – 9

Construction Phases	Maximum Quarterly Emissions				
	Tons/qtr ROG	**Tons/qtr CO**	**Tons/qtr NO_x**	**Tons/qtr SO_x**	**Tons/qtr PM_{10}**
Remaining Significant?	Yes	No	Yes	No	Yes

*Maximum quarterly emissions assume worst-case construction quarter (i.e., sum of maximum quarterly emissions for phases that overlap). Maximum quarterly emissions = worst case daily emissions x 67 workdays per quarter.

Wherever two or more phases of the project overlap (even for days or weeks), the highest emitting days of each of individual phases were combined to estimate the most conservative, worst-case emissions. These overlapping emissions were then compared to the SCAQMD daily and quarterly significance levels.

For example, Phases 1, 2, and 6 overlap; Phases 1, 6, and 8 overlap; Phases 3 and 5, 3 and 6, and 3 and 7 also overlap. Phases 4 and 9 are the only Phases that do not overlap in any way with any other Phase.

Note: These totals are NOT the totals of Phases 1 – 9 above as not all phases overlap all the time.

**Mitigation measures are outlined in Section 11.3.

Standard dust control measures per Rule 403 are included in the pre-mitigation emissions.

***Emission thresholds established by the SCAQMD CEQA Handbook.

Maximum Daily Emissions from each of the nine construction phases are included in the individual tables below.

TABLE 1-T1
Construction Emissions – Headworks Spreading Ground Phase 1 – Reservoir Excavation and Subgrade Preparation

Construction Phases	Maximum Daily Emissions				
	lb/day ROG	**lb/day CO**	**lb/day NO_x**	**lb/day SO_x**	**lb/day PM_{10}**
Construction Equipment* (without mitigation)	56.2	235.9	693.7	0.7	31.8
Commute Vehicles (without mitigation)	2.3	28.7	2.3	-	0.1
Fugitive Dust (without mitigation)	-	-	-	-	784.4
Unmitigated Total	*58.5*	*264.6*	*696.0*	*0.7*	*816.3*
Mitigated Total**	*58.5*	*264.6*	*604.1*	*0.7*	*797.0*
Significance Thresholds***	**75**	**550**	**100**	**150**	**150**
Remaining Significant?	**No**	**No**	**Yes**	**No**	**Yes**

*Types of construction equipment needed for this phase are outlined in the Technical Appendix spreadsheets.

**Mitigation: Use of emulsified diesel fuel in all construction equipment. Rule 403 measures are assumed to be included in the maximum project emissions.

***Emission thresholds established by the SCAQMD CEQA Handbook.

TABLE 1-T2
Construction Emissions – Headworks Spreading Ground Phase 2 – Inlet/Outlet Vault Construction

Construction Phases	Maximum Daily Emissions				
	lb/day ROG	**lb/day CO**	**lb/day NO_x**	**lb/day SO_x**	**lb/day PM_{10}**
Construction Equipment* (without mitigation)	29.1	124.9	306.1	0.8	15.0
Commute Vehicles (without mitigation)	0.5	6.4	0.5	-	-
Fugitive Dust (without mitigation)	-	-	-	-	540.5
Unmitigated Total	*29.6*	*131.3*	*306.6*	*0.8*	*555.5*
Mitigated Total**	*29.6*	*131.3*	*277.4*	*0.8*	*548.2*
Significance Thresholds***	**75**	**550**	**100**	**150**	**150**
Remaining Significant?	**No**	**No**	**Yes**	**No**	**Yes**

*Types of construction equipment needed for this phase are outlined in the Technical Appendix spreadsheets.

**Mitigation: Use of emulsified diesel fuel in all construction equipment. Rule 403 measures are assumed to be included in the maximum project emissions.

***Emission thresholds established by the SCAQMD CEQA Handbook.

TABLE 1-T3

Construction Emissions – Headworks Spreading Ground Phase 3 – Reservoir Tank Construction

Construction Phases	Maximum Daily Emissions				
	lb/day ROG	**lb/day CO**	**lb/day NO_x**	**lb/day SO_x**	**lb/day PM_{10}**
Construction Equipment* (without mitigation)	71.0	314.2	951.6	0.9	41.6
Commute Vehicles (without mitigation)	7.0	85.3	6.8	0.1	0.2
Fugitive Dust (without mitigation)	-	-	-	-	418.6
Unmitigated Total	*78.0*	*399.5*	*958.4*	*1.0*	*460.4*
Mitigated Total**	*78.0*	*399.5*	*830.7*	*1.0*	*435.1*
Significance Thresholds***	**75**	**550**	**100**	**150**	**150**
Remaining Significant?	**Yes**	**No**	**Yes**	**No**	**Yes**

*Types of construction equipment needed for this phase are outlined in the Technical Appendix spreadsheets.

**Mitigation: Use of emulsified diesel fuel in all construction equipment. Rule 403 measures are assumed to be included in the maximum project emissions.

***Emission thresholds established by the SCAQMD’s CEQA Handbook.

TABLE 1-T4

Construction Emissions – Headworks Spreading Ground Phase 4 – Burying Reservoir Structure

Construction Phases	Maximum Daily Emissions				
	lb/day ROG	**lb/day CO**	**lb/day NO_x**	**lb/day SO_x**	**lb/day PM_{10}**
Construction Equipment* (without mitigation)	36.1	159.9	484.4	0.9	20.8
Commute Vehicles (without mitigation)	1.6	19.2	1.5	-	-
Fugitive Dust (without mitigation)	-	-	-	-	644.1
Unmitigated Total	*37.7*	*179.1*	*485.9*	*0.9*	*664.9*
Mitigated Total**	*37.7*	*179.1*	*425.9*	*0.9*	*652.8*
Significance Thresholds***	**75**	**550**	**100**	**150**	**150**
Remaining Significant?	**No**	**No**	**Yes**	**No**	**Yes**

*Types of construction equipment needed for this phase are outlined in the Technical Appendix spreadsheets.

**Mitigation: Use of emulsified diesel fuel in all construction equipment. Rule 403 measures are assumed to be included in the maximum project emissions.

***Emission thresholds established by the SCAQMD CEQA Handbook.

TABLE 1-T5
Construction Emissions – Headworks Spreading Ground Phase 5 – Hydroelectric Powerplant

Construction Phases	Maximum Daily Emissions				
	lb/day ROG	**lb/day CO**	**lb/day NO_x**	**lb/day SO_x**	**lb/day PM_{10}**
Construction Equipment* (without mitigation)	44.2	172.6	473.7	0.2	24.4
Commute Vehicles (without mitigation)	1.5	15.6	1.7	0.4	0.4
Fugitive Dust (without mitigation)	-	-	-	-	244.8
Unmitigated Total	*45.7*	*188.2*	*475.4*	*0.6*	*269.6*
Mitigated Total**	*45.7*	*188.2*	*411.4*	*0.6*	*254.5*
Significance Thresholds***	**75**	**550**	**100**	**150**	**150**
Remaining Significant?	**No**	**No**	**Yes**	**No**	**Yes**

*Types of construction equipment needed for this phase are outlined in the Technical Appendix spreadsheets.

**Mitigation: Use of emulsified diesel fuel in all construction equipment. Rule 403 measures are assumed to be included in the maximum project emissions.

***Emission thresholds established by the SCAQMD CEQA Handbook.

TABLE 1-T6
Construction Emissions – Silver Lake Reservoir Complex – Phase 6 – Bypass Pipeline

Construction Phases	Maximum Daily Emissions				
	lb/day ROG	**lb/day CO**	**lb/day NO_x**	**lb/day SO_x**	**lb/day PM_{10}**
Construction Equipment* (without mitigation)	32.5	131.1	374.9	0.4	18.0
Commute Vehicles (without mitigation)	0.5	6.4	0.5	-	-
Fugitive Dust (without mitigation)	-	-	-	-	318.4
Unmitigated Total	*33.0*	*137.5*	*375.4*	*0.4*	*336.4*
Mitigated Total**	*33.0*	*137.5*	*328.2*	*0.4*	*325.6*
Significance Thresholds***	**75**	**550**	**100**	**150**	**150**
Remaining Significant?	**No**	**No**	**Yes**	**No**	**Yes**

*Types of construction equipment needed for this phase are outlined in the Technical Appendix spreadsheets.

**Mitigation: Use of emulsified diesel fuel in all construction equipment.

No additional mitigation credit was taken for watering site and other Rule 403 dust suppressant methods.

***Emission thresholds established by the SCAQMD CEQA Handbook.

TABLE 1-T7
Construction Emissions – Silver Lake Reservoir Complex – Phase 7 – Regulating Station and Relief Stations

Construction Phases	Maximum Daily Emissions				
	lb/day ROG	**lb/day CO**	**lb/day NO_x**	**lb/day SO_x**	**lb/day PM_{10}**
Construction Equipment* (without mitigation)	22.2	85.5	233.2	0.4	11.8
Commute Vehicles (without mitigation)	0.5	6.4	0.5	-	-
Fugitive Dust (without mitigation)	-	-	-	-	270.8
Unmitigated Total	*22.7*	*91.9*	*233.7*	*0.4*	*282.6*
Mitigated Total**	*22.7*	*91.9*	*206.1*	*0.4*	*275.7*
Significance Thresholds***	**75**	**550**	**100**	**150**	**150**
Remaining Significant?	**No**	**No**	**Yes**	**No**	**Yes**

*Types of construction equipment needed for this phase are outlined in the Technical Appendix spreadsheets.

**Mitigation: Use of emulsified diesel fuel in all construction equipment.

No additional mitigation credit was taken for watering site and other Rule 403 dust suppressant methods.

***Emission thresholds established by the SCAQMD CEQA Handbook.

TABLE 1-T8
Construction Emissions – Silver Lake Reservoir Complex – Phase 8 – Removal of Silver Lake Reservoir from Service

Construction Phases	Maximum Daily Emissions				
	lb/day ROG	**lb/day CO**	**lb/day NO_x**	**lb/day SO_x**	**lb/day PM_{10}**
Construction Equipment* (without mitigation)	25.8	100.1	271.2	0.2	13.9
Commute Vehicles (without mitigation)	0.5	6.4	0.5	-	-
Fugitive Dust (without mitigation)	-	-	-	-	229.6
Unmitigated Total	*26.3*	*106.5*	*271.7*	*0.2*	*243.5*
Mitigated Total**	*26.3*	*106.5*	*237.9*	*0.2*	*235.2*
Significance Thresholds***	**75**	**550**	**100**	**150**	**150**
Remaining Significant?	**No**	**No**	**Yes**	**No**	**Yes**

*Types of construction equipment needed for this phase are outlined in the Technical Appendix spreadsheets.

**Mitigation: Use of emulsified diesel fuel in all construction equipment.

No additional mitigation credit was taken for watering site and other Rule 403 dust suppressant methods.

***Emission thresholds established by the SCAQMD CEQA Handbook.

TABLE 1-T9
Construction Emissions – Silver Lake Reservoir Complex – Phase 9 – Removal of Ivanhoe Reservoir from Service

Construction Phases	Maximum Daily Emissions				
	lb/day ROG	**lb/day CO**	**lb/day NO_x**	**lb/day SO_x**	**lb/day PM_{10}**
Construction Equipment* (without mitigation)	25.9	100.4	272.7	0.2	13.9
Commute Vehicles (without mitigation)	0.5	6.4	0.5	-	-
Fugitive Dust (without mitigation)	-	-	-	-	239.1
Unmitigated Total	*26.4*	*106.8*	*273.2*	*0.2*	*253.0*
Mitigated Total**	*26.4*	*106.8*	*239.4*	*0.2*	*244.7*
Significance Thresholds***	**75**	**550**	**100**	**150**	**150**
Remaining Significant?	**No**	**No**	**Yes**	**No**	**Yes**

*Types of construction equipment needed for this phase are outlined in the Technical Appendix spreadsheets.

**Mitigation: Use of emulsified diesel fuel in all construction equipment.

No additional mitigation credit was taken for watering site and other Rule 403 dust suppressant methods.

***Emission thresholds established by the SCAQMD CEQA Handbook.

Air Quality Technical Appendix

SLRC Project

Prepared by: Environmental Compliance Solutions

Prepared for: CH2M HILL on behalf of LADWP

SLRC Project
Construction and Operational Emissions
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SLRC Project

Construction Emissions

Summary 1 (Tasks Grouped into One Project for CEQA Significance Determination)

Maximum Daily Construction Emissions

	Unmitigated Max. Daily Emissions (lb/day)					*Mitigated (1) Max. Daily Emissions (lb/day)*				
Construction Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Headworks Spreading Grounds & Silver Lake Reservoir Complex										
Task 1 - Grading and Reservoir Site Preparation	59	265	696	0.7	816	59	265	604	0.7	797
Task 2 - Inlet-Outlet and Vault Construction	30	131	307	0.8	556	30	131	277	0.8	548
Task 3 - Reservoir Tank Construction	78	400	958	1.0	460	78	400	831	1.0	435
Task 4 - Burying Reservoir Structure	38	179	486	0.9	665	38	179	426	0.9	653
Task 5 - Hydroelectric Powerplant	46	188	475	0.6	270	46	188	411	0.6	254
Task 6 - Bypass Pipeline	33	138	375	0.4	336	33	138	328	0.4	326
Task 7 - Regulating Station and Relief Stations	23	92	234	0.4	283	23	92	206	0.4	276
Task 8 - Removal of Silver Lake Reservoir from Service	26	107	272	0.2	244	26	107	238	0.2	235
Task 9 - Removal of Ivanhoe Reservoir from Service	26	107	273	0.2	253	26	107	239	0.2	245
Max. Daily Total (2)	*124*	*588*	*1,433*	*1.9*	*1,708*	*124*	*588*	*1,242*	*1.9*	*1,671*
SCAQMD Significance Threshold	75	550	100	150	150	75	550	100	150	150
Significant?	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*

Notes:

(1) Mitigated emissions assume PuriNOx diesel emulsion is used to fuel off-road construction equipment.

(2) Total maximum daily emissions assume worst-case construction day (ie., sum of daily maximum daily emissions for tasks that overlap)

Maximum Quarterly Construction Emissions

	Unmitigated Max. Quarterly Emissions (tons/Q)					*Mitigated (1) Max. Quarterly Emissions (tons/Q)*				
Construction Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Headworks Spreading Grounds & Silver Lake Reservoir Complex										
Task 1 - Grading and Reservoir Site Preparation	2.3	10.3	27.1	-	31.8	2.3	10.3	23.6	-	31.1
Task 2 - Inlet-Outlet and Vault Construction	0.9	3.5	8.8	-	6.8	0.9	3.5	7.6	-	6.5
Task 3 - Reservoir Tank Construction	3.0	15.6	37.4	-	17.9	3.0	15.6	32.4	-	17.0
Task 4 - Burying Reservoir Structure	1.4	6.8	18.2	-	20.3	1.4	6.8	15.9	-	19.8
Task 5 - Hydroelectric Powerplant	1.8	7.3	18.4	-	9.6	1.8	7.3	15.9	-	9.0
Task 6 - Bypass Pipeline	1.3	5.3	14.3	-	10.5	1.3	5.3	12.5	-	10.1
Task 7 - Regulating Station and Relief Stations	0.9	3.6	9.1	-	11.0	0.9	3.6	8.0	-	10.8
Task 8 - Removal of Silver Lake Reservoir from Service	1.0	4.1	10.5	-	5.1	1.0	4.1	9.2	-	4.8
Task 9 - Removal of Ivanhoe Reservoir from Service	1.0	4.1	10.6	-	5.4	1.0	4.1	9.3	-	5.1
Max. Quarterly Total (2)	*4.8*	*22.9*	*55.8*	-	*47.4*	*4.8*	*22.9*	*48.3*	-	*46.0*
SCAQMD Significance Threshold	2.5	24.75	2.5	6.75	6.75	2.5	24.75	2.5	6.75	6.75
Significant?	*Yes*	*No*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*No*	*Yes*

Notes:

(1) Mitigated emissions assume PuriNOx diesel emulsion is used to fuel off-road construction equipment.

(2) Maximum quarterly emissions assume worst-case construction quarter (sum of maximum quarterly emissions for tasks that overlap)

Quarterly emissions = worst case daily emissions x 78 workdays per quarter, except for

- concrete trucks which occur 2 days/quarter in Task 2, 4 days/quarter in Task 4, 31 days/quarter in Task 6, 1 day per quarter in Task 8, and 5 days/quarter in Task 9.
- dump trucks occur 20 days/quarter in Task 5.

"Max. Quarterly Total" calculation adjusted to account for Task 2 overlapping only 2 months with Tasks 1 and 6.

SLRC Project

Construction Emissions

Summary 2 (Tasks Grouped into Two Projects for CEQA Significance Determination)

Maximum Daily Construction Emissions

	Unmitigated Max. Daily Emissions (lb/day)					*Mitigated (1) Max. Daily Emissions (lb/day)*				
Construction Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Headworks Spreading Grounds										
Task 1 - Grading and Reservoir Site Preparation	59	265	696	0.7	816	59	265	604	0.7	797
Task 2 - Inlet-Outlet and Vault Construction	30	131	307	0.8	556	30	131	277	0.8	548
Task 3 - Reservoir Tank Construction	78	400	958	1.0	460	78	400	831	1.0	435
Task 4 - Burying Reservoir Structure	38	179	486	0.9	665	38	179	426	0.9	653
Task 5 - Hydroelectric Powerplant	46	188	475	0.6	270	46	188	411	0.6	254
Max. Daily Total (2)	*124*	*588*	*1,433*	*1.6*	*1,372*	*124*	*588*	*1,242*	*1.6*	*1,345*
SCAQMD Significance Threshold	75	550	100	150	150	75	550	100	150	150
Significant?	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*
Silver Lake Reservoir Complex										
Task 6 - Bypass Pipeline	33	138	375	0.4	336	33	138	328	0.4	326
Task 7 - Regulating Station and Relief Stations	23	92	234	0.4	283	23	92	206	0.4	276
Task 8 - Removal of Silver Lake Reservoir from Service	26	107	272	0.2	244	26	107	238	0.2	235
Task 9 - Removal of Ivanhoe Reservoir from Service	26	107	273	0.2	253	26	107	239	0.2	245
Max. Daily Total (2)	*59*	*245*	*647*	*0.6*	*580*	*59*	*245*	*566*	*0.6*	*561*
SCAQMD Significance Threshold	75	550	100	150	150	75	550	100	150	150
Significant?	*No*	*No*	*Yes*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*Yes*

Notes:

(1) Mitigated emissions assume PuriNOx diesel emulsion is used to fuel off-road construction equipment.

(2) Total maximum daily emissions assume worst-case construction day (ie., sum of daily maximum daily emissions for tasks that overlap)

Max. Overlapping Tasks: 1, 2, 6 --- 3, 5 --- 3, 6 --- 3, 7 --- 4 (assumes task 7 starts after completion of Task 6)

Maximum Quarterly Construction Emissions

	Unmitigated Max. Quarterly Emissions (tons/Q)					*Mitigated (1) Max. Quarterly Emissions (tons/Q)*				
Construction Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Headworks Spreading Grounds										
Task 1 - Grading and Reservoir Site Preparation	2.3	10.3	27.1	-	31.8	2.3	10.3	23.6	-	31.1
Task 2 - Inlet-Outlet and Vault Construction	0.9	3.5	8.8	-	6.8	0.9	3.5	7.6	-	6.5
Task 3 - Reservoir Tank Construction	3.0	15.6	37.4	-	17.9	3.0	15.6	32.4	-	17.0
Task 4 - Burying Reservoir Structure	1.4	6.8	18.2	-	20.3	1.4	6.8	15.9	-	19.8
Task 5 - Hydroelectric Powerplant	1.8	7.3	18.4	-	9.6	1.8	7.3	15.9	-	9.0
Max. Quarterly Total (2)	*4.8*	*22.9*	*55.8*	-	*38.6*	*4.8*	*22.9*	*48.3*	-	*37.6*
SCAQMD Significance Threshold	2.5	24.75	2.5	6.75	6.75	2.5	24.75	2.5	6.75	6.75
Significant?	*Yes*	*No*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*No*	*Yes*
Silver Lake Reservoir Complex										
Task 6 - Bypass Pipeline	1.3	5.3	14.3	-	10.5	1.3	5.3	12.5	-	10.1
Task 7 - Regulating Station and Relief Stations	0.9	3.6	9.1	-	11.0	0.9	3.6	8.0	-	10.8
Task 8 - Removal of Silver Lake Reservoir from Service	1.0	4.1	10.5	-	5.1	1.0	4.1	9.2	-	4.8
Task 9 - Removal of Ivanhoe Reservoir from Service	1.0	4.1	10.6	-	5.4	1.0	4.1	9.3	-	5.1
Max. Quarterly Total (2)	*1.3*	*5.3*	*14.3*	-	*11.0*	*1.3*	*5.3*	*12.5*	-	*10.8*
SCAQMD Significance Threshold	2.5	24.75	2.5	6.75	6.75	2.5	24.75	2.5	6.75	6.75
Significant?	*No*	*No*	*Yes*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*Yes*

Notes:

(1) Mitigated emissions assume PuriNOx diesel emulsion is used to fuel off-road construction equipment.

(2) Maximum quarterly emissions assume worst-case construction quarter (sum of maximum quarterly emissions for tasks that overlap)

Quarterly emissions = worst case daily emissions x 78 workdays per quarter, except for

- concrete trucks which occur 2 days/quarter in Task 2, 4 days/quarter in Task 4, 31 days/quarter in Task 6, 1 day per quarter in Task 8, and 5 days/quarter in Task 9.
- dump trucks occur 20 days/quarter in Task 5.

"Max. Quarterly Total" calculation adjusted to account for Task 2 only overlapping 2 months with Tasks 1 and 6.

SLRC Project
Operational Emissions
Summary 3

Maximum Daily Operational Emissions

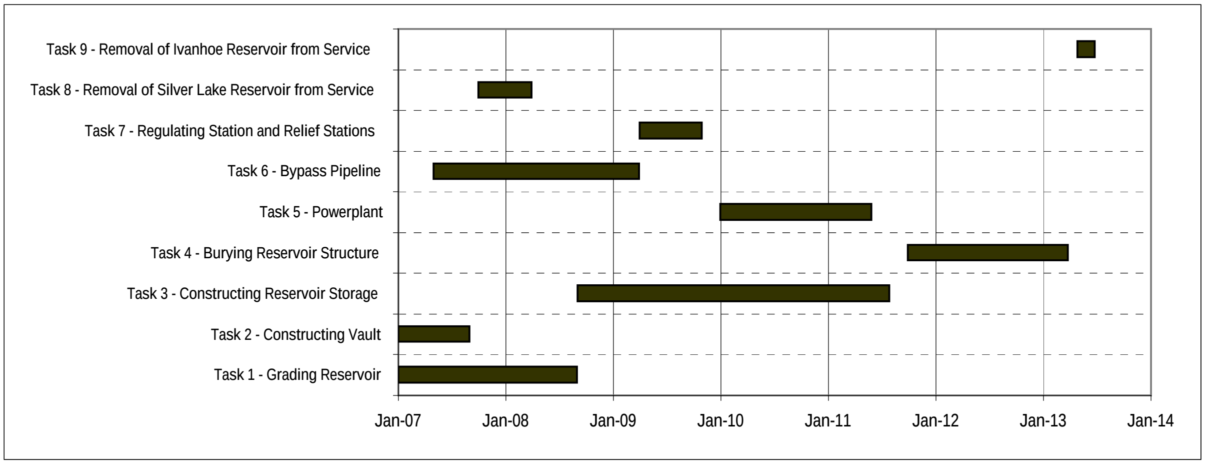
	Max. Daily Emissions (lb/day)				
Operational Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Operations	0.3	3.3	0.3	-	1.0
Max. Daily Total	*0.3*	*3.3*	*0.3*	*-*	*1.0*

Maximum Quarterly Operational Emissions

	Max. Quarterly Emissions (tons/Q)				
Operational Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Operations	0.004	0.033	0.004	-	0.009
Max. Quarterly Total:	*0.004*	*0.033*	*0.004*	*-*	*0.009*

Notes:
Quarterly emissions = worst case daily emissions x 78 workdays per quarter, except that
quarterly service vehicle operates only 1 day/quarter, and annual service trucks operate for only 2 weeks (10 days) in a one quarter.

SLRC Project
Construction Emissions
Construction Schedule



SLRC Project
Construction Emissions
Task 1 - Grading and Reservoir Site Preparation

Equipment/Activity Descriptions

Equipment/Activity	*Hp Rating*	*Load Factor*	*Number Active*	*Equip-Hrs Day*	*Miles/ Day/ Vehicle*	*Idling Min/Day/ Vehicle*	Equipment Type
Scraper (23 yd3)	400	0.66	4	10	-	-	Off-Road
Bulldozer (D8)	340	0.59	4	10	-	-	Off-Road
Excavator-Breaker	500	0.58	1	10	-	-	Off-Road
Grader	240	0.575	2	10	-	-	Off-Road
Front-End Loader (4 yd3)	230	0.465	1	10	-	-	Off-Road
Compactor	180	0.575	4	10	-	-	Off-Road
Drill Rig/Auger	50	0.500	6	10	-	-	Off-Road
Rock crusher	450	0.78	1	10	-	-	Off-Road
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	3	10	50	60	On-Road
Dump Truck, Kenworth (20 yd3) [HHDT]	-	-	8	10	120	90	On-Road
Worker commute vehicle [LDT1-ALL]	-	-	63	-	25	-	On-Road
Pickup Truck [LDT1-ALL]			-	-	-	-	On-Road

Notes:

Load factors and horsepower ratings from 1993 SCAQMD CEQA Handbook (Tables A9-8-C and A9-8-D), LADWP project team, and Caterpillar Handbook.

Work schedule: 10 hours/day plus 1 hour/day for lunch (7am - 8pm) Monday through Friday, and 8 hours/day plus 1 hour lunch (8am - 5 pm) on Saturday.

Number of workers per day: up to 63.

Grading and reservoir site preparation would take place approximately from January 2007 through September 2008.

Approximately 470,000 cubic yards of soil material would be excavated for the construction of the reservoir.

Of the 470,000 cubic yards, approximately 5% (23,000 cubic yards), would be disposed offsite due to its unsuitability as fill material.

Based on using 20 cubic yard capacity dump trucks to export the soil material needed, a total of 30 truckloads per day for a duration of 40 days would be necessary to export 23,000 cubic yards of soil for a total of 1,200 truck trips during the period from May 2008 through July 2008.

Dump trucks assumed to travel approximately 32 miles per roundtrip.

SLRC Project
Construction Emissions
Task 1 - Grading and Reservoir Site Preparation

Emission Factors for Off-Road Construction Equipment

	Emission Factors						
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Scraper (23 yd3)	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Bulldozer (D8)	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Excavator-Breaker	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Grader	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Front-End Loader (4 yd3)	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Compactor	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Drill Rig/Auger	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Rock crusher	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)

(1) Composite based on CARB OFFROAD Emissions Model (1999). SOx emission factor assumes fuel has maximum sulfur content of 15 ppmw (SCAQMD Rule 431.2 requirement effective as early as 1 January 2005).

Emission Factors for On-Road Heavy Duty Trucks

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
On-road Truck - Idle	4.41	26.30	80.70	0.34	1.84	grams/hr	(1)
On-road Truck - 5 mph	1.85	10.53	20.27	0.18	0.83	grams/mile	(1)
On-road Truck - 10 mph	1.45	7.26	16.81	0.18	0.79	grams/mile	(1)
On-road Truck - 25 mph	0.80	3.13	11.88	0.18	0.44	grams/mile	(1)
On-road Truck - 55 mph	0.44	1.98	15.47	0.18	0.24	grams/mile	(1)
On-road Trucks - Composite (Water Truck)	1.85	10.53	20.27	0.18	0.83	grams/mile	(2)
On-road Trucks - Composite (Dump Truck)	0.69	2.97	14.17	0.18	0.38	grams/mile	(3)

(1) From CARB's EMFAC2002 (v2.2). Assumes: Heavy duty diesel truck (HHDT), Location: SCAQMD, Temp.: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire wear and brake wear included with fugitive dust).
Based on EMFAC emission factors for Year 2006.

(2) Assumes water truck travel at 5 miles per hour (mph) maximum. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

(3) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

Emission Factors for On-Road Construction Worker Vehicles and Pickups

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Worker Trips - 10 mph	0.92	11.15	0.79	0.01	0.04	grams/mile	(1)
Worker Trips - 25 mph	0.50	7.25	0.59	0.01	0.02	grams/mile	(1)
Worker Trips - 55 mph	0.40	5.71	0.59	0.00	0.01	grams/mile	(1)
Worker Trips - Composite	0.49	6.87	0.61	0.00	0.02	grams/mile	(2)

(1) From CARB's EMFAC2002 (v2.2). Units in grams/mile. Assumptions: Location: SCAQMD, Temperature: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire and brake wear included with fugitive dust). Conservatively assumes light-duty trucks, composite (LDT1-ALL).
ROG emission factors includes evaporative running loss of 0.2017 grams/mile.
Based on EMFAC emission factors for Year 2006.
Starting emissions (grams/trip, after 600 minutes): ROG (1.52), CO (17.59), Nox (0.66), SOx (0.003), PM10 (0.015).
Starting emissions (grams/trip, after 60 minutes): ROG (0.862), CO (10.647), Nox (0.726), SOx (0.001), PM10 (0.008).
Hot soak emissions (grams/trip): ROG (0.326).
Partial day diurnal emissions (grams/hr): ROG (0.013).
Resting losses (grams/hr): ROG (0.077).

(2) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Composite emission factor is used for worker commute vehicles. On-site pickup trucks are assumed to average 10 mph.

SLRC Project
Construction Emissions
Task 1 - Grading and Reservoir Site Preparation

Fugitive Dust

	Emissions (lb/day) - Before Mitigation					Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Scraper (23 yd3)	-	-	-	-	106.3	-	-	-	-	106.3
Bulldozer (D8)	-	-	-	-	35.7	-	-	-	-	35.7
Excavator-Breaker	-	-	-	-	-	-	-	-	-	-
Grader	-	-	-	-	43.1	-	-	-	-	43.1
Front-End Loader (4 yd3)	-	-	-	-	0.2	-	-	-	-	0.2
Compactor	-	-	-	-	35.7	-	-	-	-	35.7
Drill Rig/Auger	-	-	-	-	-	-	-	-	-	-
Rock crusher	-	-	-	-	0.6	-	-	-	-	0.6
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	-	-	82.5	-	-	-	-	82.5
Dump Truck, Kenworth (20 yd3) [HHDT]	-	-	-	-	456.6	-	-	-	-	456.6
Worker commute vehicle [LDT1-ALL]	-	-	-	-	8.5	-	-	-	-	8.5
Pickup Truck [LDT1-ALL]	-	-	-	-	-	-	-	-	-	-
Soil transfer operations	-	-	-	-	0.2	-	-	-	-	0.2
Wind Erosion of Stockpiles	-	-	-	-	15.0	-	-	-	-	15.0
Total	-	-	-	-	784.4	-	-	-	-	784.4

Notes:
Fugitive PM10 emissions estimates assume watering is used to control emissions by: 50% (Table A11-9-A, CEQA Handbook)
Watering required per SCAQMD Rule 403, so watering and resulting reduction in fugitive dust is not considered mitigation.
No reduction assumed for off-site travel on paved roads (eg., worker commute vehicles) because watering only occurs on site.
Fugitive PM10 emissions for on-road vehicles also include break and tire wear.
Fugitive dust from equipment with "-" assumed to be negligible relative to other equipment.

Scraper:
Scraper emissions based on EPA's AP42, Section 13.2.3 (Heavy Construction Operations, 1/95),
Table 13.2.3-1 (Recommended Emission Factors for Construction Operations)

Description	Value	References/Notes
TSP Emission factor (assume = PM10):	0.058 lb/ton soil	AP42, Table 11.9-4 (Open Dust Sources at Western Surface Coal Mines)
PM10 fraction:	0.35	AP42, Section 13.2.4-3 (Aggregate Handling and Storage Piles)
Total soil scraped:	470,000 tons	Project description
Duration of scraping:	522 days	Project description
Soil scraping rate:	900 ton/day	
PM10 from scraping/excavating:	18.3 lb/day	Uncontrolled

Wind Erosion of Storage Piles:
PM10 Emissions (lb/day/acre) = 1.7 * (G / 1.5) * ((365 - H) / 235) * (I / 15) * 0.5

Description	Value	References/Notes
Silt Content (G):	15 % wt	Blended ore and dirt (Table A9-9-E-1, CEQA Handbook)
Days of Rain per Year >0.01 in (H):	34	Average year for South Coast Air Basin (Table A9-9-E-2, CEQA Handbook)
% of Time Wind Speed > 12 mph (I):	50 %	Assumption
Storage pile size:	0.75 acre	Assumption
PM10 from storage piles:	29.9 lb/day	Uncontrolled

References:
1993 CEQA Handbook, Table A9-9-E

Material Handling/Drop Operations:
PM10 Emissions (lb/ton) = k * (0.0032) * ((u / 5)^(1.3) / (M / 2)^(1.4))

Description	Value	References/Notes
Unitless particle size multiplier (k):	0.35	AP42
Mean wind speed (u):	6.2 mph	EPA Tanks v4.0 (Average wind speed for LA County = 6.2 mi/hr)
Material moisture content (M):	5 %	Table A9-9-G-1, 1993 CEQA Handbook (Dry=2.0%, Moist=15.0%, Wet=50.0%)
PM10 Emission factor:	4E-04 lb/ton	Uncontrolled
Soil handled:	900 ton/day	Assumption based on project description
PM10 emissions:	0.37 lb/day	Uncontrolled

References:
AP42, Section 13.2.4 (Aggregate Handling and Storage Piles, 1/95)
Table 9-9-G, 1993 CEQA Handbook.

SLRC Project
Construction Emissions
Task 1 - Grading and Reservoir Site Preparation

Grader:

PM10 Emissions (lbs/VMT) = 0.60 * 0.051 * (S)^(2.0)

Description	Value	References/Notes
Mean vehicle speed (S):	5 mph	Assumption
PM10 Emissions:	0.77 lb/VMT	AP42, Table 11.9-1
VMT/day:	37.5 mi/day	Assumed to travel at mean vehicle speed for 75% of work day.
PM10 Emissions:	28.7 lb/day/unit	Uncontrolled

References:
AP42, Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98), Grading Operations.

Compactor and Bulldozer:

PM10 emissions (lb/hr) = 0.75 * 1.0 * ([s]^1.5) / ([M]^1.4)

Description	Value	References/Notes
Surface material silt content (s):	8 %	Table A9-9-F-1, 1993 CEQA Handbook ("Overburden" dirt type = 7.5%)
Surface material moisture content (M):	5 %	Table A9-9-F-2, 1993 CEQA Handbook (Dry = 2.0%, Moist = 15.0%, Wet = 50.0%)
PM10 Emissions:	17.8 lb/day/unit	Uncontrolled (assumes 10-hr work day)

References:
AP42, Section 13.2.3 (Heavy Construction Operations), Table 13.2.3-1 (Recommended Emission Factors for Construction Operations, 1/95) and Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98, Bulldozing Operations).
(Note: PM10 equation from 1993 CEQA Handbook, Table A9-9-F [Estimating Emissions from Dirt Pushing or Bulldozing Operations] is incorrect)

Rock crushing:

Mobile rock crushing plant:

Description	Value	References/Notes
Crushing rate:	100 ton/day	Assumption
PM10 Emission factor:	0.0122 lb/ton	AP42, Table 11.19.2-2 (Crushed Stone Processing Operations) - Factor includes assumes tertiary crushing, screening, conveyor transfer
PM10 emissions:	1.22 lb/day	Controlled

Passenger vehicle travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Local streets	0.018 lb/mile	Table A9-9-B, CEQA Handbook
Collector streets:	0.013 lb/mile	Table A9-9-B, CEQA Handbook
Major Streets/Highways:	0.0064 lb/mile	Table A9-9-B, CEQA Handbook
Freeways:	0.00065 lb/mile	Table A9-9-B, CEQA Handbook
PM10 Emission factor (composite)	0.005345 lb/mile	Assumption (10% Local, 10% Collector, 30% Major Street, 50% Freeway)

Truck travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Construction sites w/cleaning:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Local streets:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Collector streets:	0.54 lb/mile	Table A9-9-C, CEQA Handbook
Major streets/highways:	0.43 lb/mile	Table A9-9-C, CEQA Handbook
Freeway:	0.18 lb/mile	Table A9-9-C, CEQA Handbook
Composite (dump truck):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (delivery-type trucks):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (other project trucks)	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)
Composite (pickup truck):	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)

Reference: Table A9-9-D, CEQA Handbook.

Vehicle travel on UNPAVED roads:

Description	PM10 Emissions	References/Notes
Dump truck:	1.55 lb/mile	Vehicle weighs 10 tons, has 10 wheels, travels at 10 mph on site.
Concrete truck/Water truck:	1.26 lb/mile	Vehicle weighs 20 tons, has 10 wheels, travels at 5 mph on site.
Tractor trailer-type truck:	1.38 lb/mile	Vehicle weighs 15 tons, has 18 wheels, travels at 5 mph on site.
Scraper:	1.62 lb/mile	Vehicle weighs 55 tons (CAT 631E), has 4 wheels, travels at 3 mph on site.
Grader:	0.48 lb/mile	Vehicle weighs 15 tons, has 6 wheels, travels at 3 mph on site.

Reference: Table A9-9-D, CEQA Handbook; Caterpillar Equipment Handbook. Assumes silt loading of 8% (Mining Haul Road, Table A9-9-D-1).
For other equipment traveling on unpaved roads, maximum speed on site assumed to be 5 mph.
Fugitive dust from other equipment (loader) travel on paved or unpaved roads assumed to be negligible relative to other equipment.

SLRC Project
Construction Emissions
Task 1 - Grading and Reservoir Site Preparation

Daily Emissions

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Scraper (23 yd3)	14.7	64.7	198.8	0.1	8.6	14.7	64.7	171.0	0.1	3.2
Bulldozer (D8)	11.1	49.2	151.1	0.1	6.5	11.1	49.2	129.9	0.1	2.4
Excavator-Breaker	4.0	17.8	54.6	-	2.4	4.0	17.8	47.0	-	0.9
Grader	4.4	18.7	55.1	-	2.6	4.4	18.7	47.4	-	1.0
Front-End Loader (4 yd3)	1.7	7.3	21.4	-	1.0	1.7	7.3	18.4	-	0.4
Compactor	6.6	28.1	82.7	-	3.8	6.6	28.1	71.1	-	1.4
Drill Rig/Auger	6.0	16.4	22.7	-	2.5	6.0	16.4	19.5	-	0.9
Rock crusher	5.6	23.8	70.1	-	3.3	5.6	23.8	60.3	-	1.2
Water Truck, Peterbilt (4,000 gal) [HHDT]	0.6	3.5	6.9	0.1	0.3	0.6	3.5	6.9	0.1	0.3
Dump Truck, Kenworth (20 yd3) [HHDT]	1.5	6.4	30.3	0.4	0.8	1.5	6.4	30.3	0.4	0.8
Worker commute vehicle [LDT1-ALL]	2.3	28.7	2.3	-	0.1	2.3	28.7	2.3	-	0.1
Pickup Truck [LDT1-ALL]	-	-	-	-	-	-	-	-	-	-
Fugitive Dust	-	-	-	-	784.4	-	-	-	-	784.4
Total	*58.5*	*264.6*	*696.0*	*0.7*	*816.3*	*58.5*	*264.6*	*604.1*	*0.7*	*797.0*

Notes:

Mitigation assumes use of PuriNOx fuel for off-road diesel construction equipment:

NOx reduction:	14.0%
PM10 reduction:	63.0%

Daily Emissions - Grouped by Equipment/Activity Type

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Construction Equipment	56.2	235.9	693.7	0.7	31.8	56.2	235.9	601.8	0.7	12.5
Commute Vehicles	2.3	28.7	2.3	-	0.1	2.3	28.7	2.3	-	0.1
Fugitive Dust	-	-	-	-	784.4	-	-	-	-	784.4
Total	*58.5*	*264.6*	*696.0*	*0.7*	*816.3*	*58.5*	*264.6*	*604.1*	*0.7*	*797.0*

SLRC Project
Construction Emissions
Task 2 - Inlet-Outlet and Vault Construction

Equipment/Activity Descriptions

Equipment/Activity	*Hp Rating*	*Load Factor*	*Number Active*	*Equip-Hrs Day*	*Miles/ Day/ Vehicle*	*Idling Min/Day/ Vehicle*	Equipment Type
Excavator	188	0.58	1	10	-	-	Off-Road
Loader, CAT 950G	196	0.465	1	10	-	-	Off-Road
Crane	345	0.430	2	10	-	-	Off-Road
Tractor	240	0.575	1	10	-	-	Off-Road
Ventilation Blower	50	0.500	1	10	-	-	Off-Road
Generator	36	0.740	1	10	-	-	Off-Road
Backhoe	110	0.465	1	10	-	-	Off-Road
Hydraulic Power Unit	40	0.500	1	10	-	-	Off-Road
Auger, 370-foot	50	0.500	1	10	-	-	Off-Road
Concrete Pump	50	0.740	1	10	-	-	Off-Road
Paver	112	0.590	1	10	-	-	Off-Road
Roller	180	0.575	1	10	-	-	Off-Road
Grader	140	0.575	1	10	-	-	Off-Road
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	1	10	50	60	On-Road
Dump Truck, Kenworth (20 yd3) [HHDT]	-	-	1	10	60	90	On-Road
Flat Bed Truck (HHDT)	-	-	1	10	60	90	On-Road
Utility Truck/Pipe Carrier (HHDT)	-	-	3	10	50	90	On-Road
Welding Truck (HHDT)	-	-	1	10	10	90	On-Road
Concrete Truck (HHDT)	-	-	41	10	40	90	On-Road
Worker commute vehicle [LDT1-ALL]	-	-	14	-	25	-	On-Road

Notes:

Load factors and horsepower ratings from 1993 SCAQMD CEQA Handbook (Tables A9-8-C and A9-8-D), LADWP project team, and Caterpillar Handbook.

Work schedule: 10 hours/day plus 1 hour/day for lunch (7am - 8pm) Monday through Friday, and 8 hours/day plus 1 hour lunch (8am - 5 pm) on Saturday.

Number of workers per day: 10-14 per day.

Inlet/outlet and vault construction would take place approximately from January through August 2007. Excavation for the inlet/outlet and vault construction would be done as part of the grading and reservoir site preparation (Task 1). Inlet/outlet and vault construction would require approximately 810 cubic yards of concrete. Approximately 41 trucks per day would deliver 410 cubic yards of concrete per day to the site for two days. Concrete would be obtained from the Southern California area, specifically Los Angeles and Orange counties. Valves would be delivered on a flat bed truck. Approximately one valve per day for eight days would be delivered to the site.

SLRC Project
Construction Emissions
Task 2 - Inlet-Outlet and Vault Construction

Emission Factors for Off-Road Construction Equipment

	Emission Factors						
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Excavator	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Loader, CAT 950G	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Crane	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Tractor	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Ventilation Blower	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Generator	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Backhoe	1.22	4.17	10.88	0.01	0.77	g/hp-hr	(1)
Hydraulic Power Unit	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Auger, 370-foot	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Concrete Pump	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Paver	1.22	4.17	10.88	0.01	0.77	g/hp-hr	(1)
Roller	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Grader	0.77	3.39	9.33	0.01	0.45	g/hp-hr	(1)

(1) Composite based on CARB OFFROAD Emissions Model (1999). SOx emission factor assumes fuel has maximum sulfur content
of 15 ppmw (SCAQMD Rule 431.2 requirement effective 1 January 2005).

Emission Factors for On-Road Heavy Duty Trucks

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
On-road Truck - Idle	4.41	26.30	80.70	0.34	1.84	grams/hr	(1)
On-road Truck - 5 mph	1.85	10.53	20.27	0.18	0.83	grams/mile	(1)
On-road Truck - 10 mph	1.45	7.26	16.81	0.18	0.79	grams/mile	(1)
On-road Truck - 25 mph	0.80	3.13	11.88	0.18	0.44	grams/mile	(1)
On-road Truck - 55 mph	0.44	1.98	15.47	0.18	0.24	grams/mile	(1)
On-road Trucks - Composite (Water Truck)	1.85	10.53	20.27	0.18	0.83	grams/mile	(2)
On-road Trucks - Composite (Other Trucks)	0.69	2.97	14.17	0.18	0.38	grams/mile	(3)

(1) From CARB's EMFAC2002 (v2.2). Assumes: Heavy duty diesel truck (HHDT), Location: SCAQMD, Temp.: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire wear and brake wear included with fugitive dust).
Based on EMFAC emission factors for Year 2006.
(2) Assumes water truck travel at 5 miles per hour (mph) maximum. Although not included in this
composite emission factor, daily emissions estimates (see below) include idling emissions.
(3) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Although not included in this
composite emission factor, daily emissions estimates (see below) include idling emissions.

Emission Factors for On-Road Construction Worker Vehicles

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Worker Trips - 10 mph	0.92	11.15	0.79	0.01	0.04	grams/mile	(1)
Worker Trips - 25 mph	0.50	7.25	0.59	0.01	0.02	grams/mile	(1)
Worker Trips - 55 mph	0.40	5.71	0.59	0.00	0.01	grams/mile	(1)
Worker Trips - Composite	0.49	6.87	0.61	0.00	0.02	grams/mile	(2)

(1) From CARB's EMFAC2002 (v2.2). Units in grams/mile. Assumptions: Location: SCAQMD, Temperature: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire and brake wear included with fugitive dust). Conservatively assumes light-duty trucks, composite (LDT1-ALL).
ROG emission factors includes evaporative running loss of 0.2017 grams/mile.
Based on EMFAC emission factors for Year 2006.
Starting emissions (grams/trip, after 600 minutes): ROG (1.52), CO (17.59), Nox (0.66), SOx (0.003), PM10 (0.015).
Hot soak emissions (grams/trip): ROG (0.326).
Partial day diurnal emissions (grams/hr): ROG (0.013).
Resting losses (grams/hr): ROG (0.077).
(2) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 50 mph. Composite emission factor is used for worker commute
vehicles. On-site pickup trucks are assumed to average 10 mph while on site.

SLRC Project
Construction Emissions
Task 2 - Inlet-Outlet and Vault Construction

Fugitive Dust

	Emissions (lb/day) - Before Mitigation					Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Excavator	-	-	-	-	-	-	-	-	-	-
Loader, CAT 950G	-	-	-	-	-	-	-	-	-	-
Crane	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-
Ventilation Blower	-	-	-	-	-	-	-	-	-	-
Generator	-	-	-	-	-	-	-	-	-	-
Backhoe	-	-	-	-	-	-	-	-	-	-
Hydraulic Power Unit	-	-	-	-	-	-	-	-	-	-
Auger, 370-foot	-	-	-	-	-	-	-	-	-	-
Concrete Pump	-	-	-	-	-	-	-	-	-	-
Paver	-	-	-	-	-	-	-	-	-	-
Roller	-	-	-	-	-	-	-	-	-	-
Grader	-	-	-	-	21.5	-	-	-	-	21.5
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	-	-	27.5	-	-	-	-	27.5
Dump Truck, Kenworth (20 yd3) [HHDT]	-	-	-	-	20.0	-	-	-	-	20.0
Flat Bed Truck (HHDT)	-	-	-	-	15.7	-	-	-	-	15.7
Utility Truck/Pipe Carrier (HHDT)	-	-	-	-	52.2	-	-	-	-	52.2
Welding Truck (HHDT)	-	-	-	-	3.1	-	-	-	-	3.1
Concrete Truck (HHDT)	-	-	-	-	388.4	-	-	-	-	388.4
Worker commute vehicle [LDT1-ALL]	-	-	-	-	1.9	-	-	-	-	1.9
Material transfer operations	-	-	-	-	0.2	-	-	-	-	0.2
Wind Erosion of Stockpiles	-	-	-	-	10.0	-	-	-	-	10.0
Total	-	-	-	-	540.5	-	-	-	-	540.5

Notes:

Fugitive PM10 emissions estimates assume watering is used to control emissions by: 50% (Table A11-9-A, CEQA Handbook)

Watering required per SCAQMD Rule 403, so watering and resulting reduction in fugitive dust is not considered mitigation.

No reduction assumed for off-site travel on paved roads (eg., worker commute vehicles) because watering only occurs on site.

Fugitive PM10 emissions for on-road vehicles also include break and tire wear.

Fugitive dust from equipment with "-" assumed to be negligible relative to other equipment.

Wind Erosion of Storage Piles:

PM10 Emissions (lb/day/acre) = 1.7 * (G / 1.5) * ((365 - H) / 235) * (I / 15) * 0.5

Description	Value	References/Notes
Silt Content (G):	15 % wt	Blended ore and dirt (Table A9-9-E-1, CEQA Handbook)
Days of Rain per Year >0.01 in (H):	34	Average year for South Coast Air Basin (Table A9-9-E-2, CEQA Handbook)
% of Time Wind Speed > 12 mph (I):	50 %	Assumption
Storage pile size:	0.25 acre	Assumption (separate storage pile from the one in Task 1)
PM10 from storage piles:	10.0 lb/day	Uncontrolled

References:

1993 CEQA Handbook, Table A9-9-E

Material Handling/Drop Operations:

PM10 Emissions (lb/ton) = k * (0.0032) * ((u / 5)^(1.3) / (M / 2)^(1.4))

Description	Value	References/Notes
Unitless particle size multiplier (k):	0.35	AP42
Mean wind speed (u):	6.2 mph	EPA Tanks v4.0 (Average wind speed for LA County = 6.2 mi/hr)
Material moisture content (M):	5 %	Table A9-9-G-1, 1993 CEQA Handbook (Dry=2.0%, Moist=15.0%, Wet=50.0%)
PM10 Emission factor:	4E-04 lb/ton	Uncontrolled
Soil handled:	500 ton/day	Assumption based on project description
PM10 emissions:	0.21 lb/day	Uncontrolled

References:

AP42, Section 13.2.4 (Aggregate Handling and Storage Piles, 1/95)

Table 9-9-G, 1993 CEQA Handbook.

SLRC Project
Construction Emissions
Task 2 - Inlet-Outlet and Vault Construction

Grader:

PM10 Emissions (lbs/VMT) = 0.60 * 0.051 * (S	Value	References/Notes
Description	5 mph	Assumption
Mean vehicle speed (S):	0.77 lb/VMT	AP42, Table 11.9-1
PM10 Emissions:	37.5 mi/day	Assumed to travel at mean vehicle speed for 75% of work day.
VMT/day:	28.7 lb/day/unit	Uncontrolled
PM10 Emissions:		

References:
AP42, Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98), Grading Operations.

Passenger vehicle travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Local streets	0.018 lb/mile	Table A9-9-B, CEQA Handbook
Collector streets:	0.013 lb/mile	Table A9-9-B, CEQA Handbook
Major Streets/Highways:	0.0064 lb/mile	Table A9-9-B, CEQA Handbook
Freeways:	0.00065 lb/mile	Table A9-9-B, CEQA Handbook
PM10 Emission factor (composite)	0.005345 lb/mile	Assumption (10% Local, 10% Collector, 30% Major Street, 50% Freeway)

Truck travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Construction sites w/cleaning:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Local streets:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Collector streets:	0.54 lb/mile	Table A9-9-C, CEQA Handbook
Major streets/highways:	0.43 lb/mile	Table A9-9-C, CEQA Handbook
Freeway:	0.18 lb/mile	Table A9-9-C, CEQA Handbook
Composite (dump truck):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (delivery-type trucks):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (other project trucks)	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)
Composite (pickup truck):	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)

Reference: Table A9-9-D, CEQA Handbook.

Vehicle travel on UNPAVED roads:

Description	PM10 Emissions	References/Notes
Dump truck:	1.55 lb/mile	Vehicle weighs 10 tons, has 10 wheels, travels at 10 mph on site.
Concrete truck/Water truck:	1.26 lb/mile	Vehicle weighs 20 tons, has 10 wheels, travels at 5 mph on site.
Tractor trailer-type truck:	1.38 lb/mile	Vehicle weighs 15 tons, has 18 wheels, travels at 5 mph on site.
Grader:	0.48 lb/mile	Vehicle weighs 15 tons, has 6 wheels, travels at 3 mph on site.

Reference: Table A9-9-D, CEQA Handbook; Caterpillar Performance Handbook. Assumes silt loading of 8% (Mining Haul Road, Table A9-9-D-1).
For other equipment traveling on unpaved roads, maximum speed on site assumed to be 5 mph.
Fugitive dust from other equipment (loader) travel on paved or unpaved roads assumed to be negligible relative to other equipment.

SLRC Project
Construction Emissions
Task 2 - Inlet-Outlet and Vault Construction

Daily Emissions

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Excavator	1.7	7.4	21.8	-	1.0	1.7	7.4	18.7	-	0.4
Loader, CAT 950G	1.4	6.2	18.2	-	0.8	1.4	6.2	15.7	-	0.3
Crane	4.1	18.2	55.9	-	2.4	4.1	18.2	48.1	-	0.9
Tractor	2.2	9.4	27.6	-	1.3	2.2	9.4	23.7	-	0.5
Ventilation Blower	1.0	2.7	3.8	-	0.4	1.0	2.7	3.3	-	0.1
Generator	1.1	2.9	4.0	-	0.4	1.1	2.9	3.4	-	0.1
Backhoe	1.4	4.7	12.3	-	0.9	1.4	4.7	10.6	-	0.3
Hydraulic Power Unit	0.8	2.2	3.0	-	0.3	0.8	2.2	2.6	-	0.1
Auger, 370-foot	1.0	2.7	3.8	-	0.4	1.0	2.7	3.3	-	0.1
Concrete Pump	1.5	4.1	5.6	-	0.6	1.5	4.1	4.8	-	0.2
Paver	1.8	6.1	15.8	-	1.1	1.8	6.1	13.6	-	0.4
Roller	1.6	7.0	20.7	-	1.0	1.6	7.0	17.8	-	0.4
Grader	1.4	6.0	16.6	-	0.8	1.4	6.0	14.3	-	0.3
Water Truck, Peterbilt (4,000 gal) [HHDT]	0.2	1.2	2.4	-	0.1	0.2	1.2	2.4	-	0.1
Dump Truck, Kenworth (20 yd3) [HHDT]	0.1	0.5	2.1	-	0.1	0.1	0.5	2.1	-	0.1
Flat Bed Truck (HHDT)	0.1	0.5	2.1	-	0.1	0.1	0.5	2.1	-	0.1
Utility Truck/Pipe Carrier (HHDT)	0.3	1.2	5.5	0.1	0.1	0.3	1.2	5.5	0.1	0.1
Welding Truck (HHDT)	0.1	0.3	0.7	-	-	0.1	0.3	0.7	-	-
Concrete Truck (HHDT)	7.3	41.6	84.2	0.7	3.2	7.3	41.6	84.2	0.7	3.2
Worker commute vehicle [LDT1-ALL]	0.5	6.4	0.5	-	-	0.5	6.4	0.5	-	-
Fugitive Dust	-	-	-	-	540.5	-	-	-	-	540.5
Total	*29.6*	*131.3*	*306.6*	*0.8*	*555.5*	*29.6*	*131.3*	*277.4*	*0.8*	*548.2*

Notes:

Mitigation assumes use of PuriNOx fuel for off-road diesel construction equipment:

NOx reduction:	14.0%
PM10 reduction:	63.0%

Daily Emissions - Grouped by Equipment/Activity Type

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Construction Equipment	29.1	124.9	306.1	0.8	15.0	29.1	124.9	276.9	0.8	7.7
Commute Vehicles	0.5	6.4	0.5	-	-	0.5	6.4	0.5	-	-
Fugitive Dust	-	-	-	-	540.5	-	-	-	-	540.5
Total	*29.6*	*131.3*	*306.6*	*0.8*	*555.5*	*29.6*	*131.3*	*277.4*	*0.8*	*548.2*

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Construction Emissions
Task 3 - Reservoir Tank Construction

Equipment/Activity Descriptions

Equipment/Activity	*Hp Rating*	*Load Factor*	*Number Active*	*Equip-Hrs Day*	*Miles/ Day/ Vehicle*	*Idling Min/Day/ Vehicle*	Equipment Type
Power Shovels with FE Attachment	200	0.465	4	10	-	-	Off-Road
Bulldozer (D8)	305	0.59	4	10	-	-	Off-Road
Front-End Loader	230	0.465	4	10	-	-	Off-Road
Crane, 40-ton	345	0.430	19	10	-	-	Off-Road
Grader	140	0.575	1	10	-	-	Off-Road
Tractor	240	0.575	1	10	-	-	Off-Road
Vibratory Roller	180	0.575	1	10	-	-	Off-Road
Compactor	180	0.575	1	10	-	-	Off-Road
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	3	10	50	60	On-Road
Dump Truck, 16-ton [HHDT]	-	-	3	10	60	90	On-Road
Concrete truck [HHDT]	-	-	15	10	40	90	On-Road
Gravel truck [HHDT]	-	-	2	10	40	90	On-Road
Welding truck			1	10	10	90	On-Road
pick-up truck			2	10	50	90	On-Road
Worker commute vehicle [LDT1-ALL]	-	-	187	-	25	-	On-Road

Notes:

Load factors and horsepower ratings from 1993 SCAQMD CEQA Handbook (Tables A9-8-C and A9-8-D), LADWP project team, and Caterpillar Handbook.

Work schedule: 10 hours/day plus 1 hour/day for lunch (7am - 8pm) Monday through Friday, and 8 hours/day plus 1 hour lunch (8am - 5 pm) on Saturday.

Number of workers per day: average of 80 per day, peak of 180+ per day for concrete work between September and December 2009. Additional 7 workers were added into the calculation for construction of the water distribution system line.

Reservoir tank construction would take place approximately from September 2008 through August 2011.

Materials required for reservoir tank construction include concrete and gravel. A total of approximately 98,686 cubic yards of concrete would be required. Approximately 15 trucks per day would deliver 135 cubic yards of concrete per day to the site. A total of approximately 18,336 cubic yards of gravel would be required. Approximately 2 trucks per day would deliver 36 cubic yards of gravel per day to the site. Concrete and gravel would be obtained from the Southern California area, specifically Los Angeles and Orange counties.

The average number of pieces of equipment would be 14 per day. A peak of approximately 50 pieces of equipment would occur around April 2011 through July 2011.

Construction equipment numbers specified by LADWP/CH2MHill project team.

SLRC Project
Construction Emissions
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Emission Factors for Off-Road Construction Equipment

	Emission Factors						
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Power Shovels with FE Attachment	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Bulldozer (D8)	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Front-End Loader	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Crane, 40-ton	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Grader	0.77	3.39	9.33	0.01	0.45	g/hp-hr	(1)
Tractor	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Vibratory Roller	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Compactor	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)

(1) Composite based on CARB OFFROAD Emissions Model (1999). SOx emission factor assumes fuel has maximum sulfur content of 15 ppmw (SCAQMD Rule 431.2 requirement effective 1 January 2005).

Emission Factors for On-Road Heavy Duty Trucks

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
On-road Truck - Idle	4.41	26.30	80.70	0.34	1.84	grams/hr	(1)
On-road Truck - 5 mph	1.85	10.53	20.27	0.18	0.83	grams/mile	(1)
On-road Truck - 10 mph	1.45	7.26	16.81	0.18	0.79	grams/mile	(1)
On-road Truck - 25 mph	0.80	3.13	11.88	0.18	0.44	grams/mile	(1)
On-road Truck - 55 mph	0.44	1.98	15.47	0.18	0.24	grams/mile	(1)
On-road Trucks - Composite (Water Truck)	1.85	10.53	20.27	0.18	0.83	grams/mile	(2)
On-road Trucks - Composite (Other Trucks)	0.69	2.97	14.17	0.18	0.38	grams/mile	(3)

(1) From CARB's EMFAC2002 (v2.2). Assumes: Heavy duty diesel truck (HHDT), Location: SCAQMD, Temp.: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire wear and brake wear included with fugitive dust).
Based on EMFAC emission factors for Year 2006.
(2) Assumes water truck travel at 5 miles per hour (mph) maximum. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.
(3) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

Emission Factors for On-Road Construction Worker Vehicles

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Worker Trips - 10 mph	0.92	11.15	0.79	0.01	0.04	grams/mile	(1)
Worker Trips - 25 mph	0.50	7.25	0.59	0.01	0.02	grams/mile	(1)
Worker Trips - 55 mph	0.40	5.71	0.59	0.00	0.01	grams/mile	(1)
Worker Trips - Composite	0.49	6.87	0.61	0.00	0.02	grams/mile	(2)

(1) From CARB's EMFAC2002 (v2.2). Units in grams/mile. Assumptions: Location: SCAQMD, Temperature: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire and brake wear included with fugitive dust). Conservatively assumes light-duty trucks, composite (LDT1-ALL).
ROG emission factors includes evaporative running loss of 0.2017 grams/mile.
Based on EMFAC emission factors for Year 2006.
Starting emissions (grams/trip, after 600 minutes): ROG (1.52), CO (17.59), Nox (0.66), SOx (0.003), PM10 (0.015).
Hot soak emissions (grams/trip): ROG (0.326).
Partial day diurnal emissions (grams/hr): ROG (0.013).
Resting losses (grams/hr): ROG (0.077).
(2) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Composite emission factor is used for worker commute vehicles. On-site pickup trucks are assumed to average 10 mph while on site.

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Fugitive Dust

	Emissions (lb/day) - Before Mitigation					Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Power Shovels with FE Attachment	-	-	-	-	-	-	-	-	-	-
Bulldozer (D8)	-	-	-	-	35.7	-	-	-	-	35.7
Front-End Loader	-	-	-	-	-	-	-	-	-	-
Crane, 40-ton	-	-	-	-	-	-	-	-	-	-
Grader	-	-	-	-	14.4	-	-	-	-	14.4
Tractor	-	-	-	-	-	-	-	-	-	-
Vibratory Roller	-	-	-	-	-	-	-	-	-	-
Compactor	-	-	-	-	8.91					8.9
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	-	-	89.7	-	-	-	-	89.7
Dump Truck, 16-ton [HHDT]	-	-	-	-	47.1	-	-	-	-	47.1
Concrete truck [HHDT]	-	-	-	-	142.1	-	-	-	-	142.1
Gravel truck [HHDT]	-	-	-	-	19.1	-	-	-	-	19.1
Welding truck	-	-	-	-	3.1	-	-	-	-	3.1
pick-up truck	-	-	-	-	31.0	-	-	-	-	31.0
Worker commute vehicle [LDT1-ALL]	-	-	-	-	25.0	-	-	-	-	25.0
Material transfer operations	-	-	-	-	-	-	-	-	-	-
Wind Erosion of Stockpiles	-	-	-	-	2.5	-	-	-	-	2.5
Total	-	-	-	-	418.6	-	-	-	-	418.6

Notes:

Fugitive PM10 emissions estimates assume watering is used to control emissions by: 50% (Table A11-9-A, CEQA Handbook)

Watering required per SCAQMD Rule 403, so watering and resulting reduction in fugitive dust is not considered mitigation.

No reduction assumed for off-site travel on paved roads (eg., worker commute vehicles) because watering only occurs on site.

Fugitive PM10 emissions for on-road vehicles also include break and tire wear.

Fugitive dust from power shovel, crane, tractor, vibratory roller travel on paved/unpaved roads assumed to be negligible relative to other equipment.

Wind Erosion of Storage Piles:

PM10 Emissions (lb/day/acre) = 1.7 * (G / 1.5) * ((365 - H) / 235) * (I / 15) * 0.5

Description	Value	References/Notes
Silt Content (G):	15 % wt	Blended ore and dirt (Table A9-9-E-1, CEQA Handbook)
Days of Rain per Year >0.01 in (H):	34	Average year for South Coast Air Basin (Table A9-9-E-2, CEQA Handbook)
% of Time Wind Speed > 12 mph (I):	50 %	Assumption
Storage pile size:	0.125 acre	Assumption
PM10 from storage piles:	5.0 lb/day	Uncontrolled

References:

1993 CEQA Handbook, Table A9-9-E

Material Handling/Drop Operations:

PM10 Emissions (lb/ton) = k * (0.0032) * ((u / 5)^(1.3) / (M / 2)^(1.4))

Description	Value	References/Notes
Unitless particle size multiplier (k):	0.35	AP42
Mean wind speed (u):	6.2 mph	EPA Tanks v4.0 (Average wind speed for LA County = 6.2 mi/hr)
Material moisture content (M):	5 %	Table A9-9-G-1, 1993 CEQA Handbook (Dry=2.0%, Moist=15.0%, Wet=50.0%)
PM10 Emission factor:	4E-04 lb/ton	Uncontrolled
Soil handled:	200 ton/day	Assumption based on project description
PM10 emissions:	0.08 lb/day	Uncontrolled

References:

AP42, Section 13.2.4 (Aggregate Handling and Storage Piles, 1/95)

Table 9-9-G, 1993 CEQA Handbook.

Grader:

PM10 Emissions (lbs/VMT) = 0.60 * 0.051 * (S)^(2.0)

Description	Value	References/Notes
Mean vehicle speed (S):	5 mph	Assumption
PM10 Emissions:	0.77 lb/VMT	AP42, Table 11.9-1
VMT/day:	37.5 mi/day	Assumed to travel at mean vehicle speed for 75% of work day.
PM10 Emissions:	28.7 lb/day/unit	Uncontrolled

References:

AP42, Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98), Grading Operations.

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Compactor and Dozer:

PM10 emissions (lb/hr) = 0.75 * 1.0 * ([s]^1.5) / ([M]^1.4)

Description	Value	References/Notes
Surface material silt content (s):	8 %	Table A9-9-F-1, 1993 CEQA Handbook ("Overburden" dirt type)
Surface material moisture content (M):	5 %	Table A9-9-F-2, 1993 CEQA Handbook (Dry = 2.0%, Moist = 15.0%, Wet = 50.0%)
PM10 Emissions:	17.8 lb/day/unit	Uncontrolled (assumes 10-hr work day)

References:

AP42, Section 13.2.3 (Heavy Construction Operations), Table 13.2.3-1 (Recommended Emission Factors for Construction Operations, 1/95) and
Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98, Bulldozing Operations).
(Note: PM10 equation from 1993 CEQA Handbook, Table A9-9-F [Estimating Emissions from Dirt Pushing or Bulldozing Operations] is incorrect)

Passenger vehicle travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Local streets	0.018 lb/mile	Table A9-9-B, CEQA Handbook
Collector streets:	0.013 lb/mile	Table A9-9-B, CEQA Handbook
Major Streets/Highways:	0.0064 lb/mile	Table A9-9-B, CEQA Handbook
Freeways:	0.00065 lb/mile	Table A9-9-B, CEQA Handbook
PM10 Emission factor (composite)	0.005345 lb/mile	Assumption (10% Local, 10% Collector, 30% Major Street, 50% Freeway)

Truck travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Construction sites w/cleaning:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Local streets:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Collector streets:	0.54 lb/mile	Table A9-9-C, CEQA Handbook
Major streets/highways:	0.43 lb/mile	Table A9-9-C, CEQA Handbook
Freeway:	0.18 lb/mile	Table A9-9-C, CEQA Handbook
Composite (dump truck):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (delivery-type trucks):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (other project trucks)	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)
Composite (pickup truck):	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)

Reference: Table A9-9-D, CEQA Handbook.

Vehicle travel on UNPAVED roads:

Description	PM10 Emissions	References/Notes
Dump truck:	1.55 lb/mile	Vehicle weighs 10 tons, has 10 wheels, travels at 10 mph on site.
Concrete truck/Water truck:	1.26 lb/mile	Vehicle weighs 20 tons, has 10 wheels, travels at 5 mph on site.
Tractor trailer-type truck:	1.38 lb/mile	Vehicle weighs 15 tons, has 18 wheels, travels at 5 mph on site.
Grader:	0.48 lb/mile	Vehicle weighs 15 tons, has 6 wheels, travels at 3 mph on site.

Reference: Table A9-9-D, CEQA Handbook; Caterpillar Performance Handbook. Assumes silt loading of 8% (Mining Haul Road, Table A9-9-D-1).
For other equipment traveling on unpaved roads, maximum speed on site assumed to be 5 mph.
Fugitive dust from other equipment (loader) travel on paved or unpaved roads assumed to be negligible relative to other equipment.

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Daily Emissions

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Power Shovels with FE Attachment	5.9	25.3	74.3	-	3.4	5.9	25.3	63.9	-	1.3
Bulldozer (D8)	10.0	44.1	135.5	0.1	5.9	10.0	44.1	116.5	0.1	2.2
Front-End Loader	6.8	29.0	85.4	-	4.0	6.8	29.0	73.4	-	1.5
Crane, 40-ton	39.1	172.7	530.7	0.3	23.0	39.1	172.7	456.4	0.3	8.5
Grader	1.4	6.0	16.6	-	0.8	1.4	6.0	14.3	-	0.3
Tractor	2.2	9.4	27.6	-	1.3	2.2	9.4	23.7	-	0.5
Vibratory Roller	1.6	7.0	20.7	-	1.0	1.6	7.0	17.8	-	0.4
Compactor	1.6	7.0	20.7	-	1.0	1.6	7.0	17.8	-	0.4
Water Truck, Peterbilt (4,000 gal) [HHDT]	0.6	3.7	7.2	0.1	0.3	0.6	3.7	7.2	0.1	0.3
Dump Truck, 16-ton [HHDT]	0.3	1.4	6.4	0.1	0.2	0.3	1.4	6.4	0.1	0.2
Concrete truck [HHDT]	1.1	5.2	22.7	0.3	0.6	1.1	5.2	22.7	0.3	0.6
Gravel truck [HHDT]	0.2	0.7	3.0	-	0.1	0.2	0.7	3.0	-	0.1
Welding truck	-	0.2	0.6	-	-	-	0.2	0.6	-	-
pick-up truck	0.2	2.5	0.2	-	-	0.2	2.5	0.2	-	-
Worker commute vehicle [LDT1-ALL]	7.0	85.3	6.8	0.1	0.2	7.0	85.3	6.8	0.1	0.2
Fugitive Dust	-	-	-	-	418.6	-	-	-	-	418.6
Total	*78.0*	*399.5*	*958.4*	*1.0*	*460.4*	*78.0*	*399.5*	*830.7*	*1.0*	*435.1*

Notes:

Mitigation assumes use of PuriNOx fuel for off-road diesel construction equipment:

NOx reduction: 14.0%

PM10 reduction: 63.0%

Daily Emissions - Grouped by Equipment/Activity Type

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Construction Equipment	71.0	314.2	951.6	0.9	41.6	71.0	314.2	823.9	0.9	16.3
Commute Vehicles	7.0	85.3	6.8	0.1	0.2	7.0	85.3	6.8	0.1	0.2
Fugitive Dust	-	-	-	-	418.6	-	-	-	-	418.6
Total	*78.0*	*399.5*	*958.4*	*1.0*	*460.4*	*78.0*	*399.5*	*830.7*	*1.0*	*435.1*

SLRC Project
Construction Emissions
Task 4 - Burying Reservoir Structure

Equipment/Activity Descriptions

Equipment/Activity	*Hp Rating*	*Load Factor*	*Number Active*	*Equip-Hrs Day*	*Miles/ Day/ Vehicle*	*Idling Min/Day/ Vehicle*	Equipment Type
Front-End Loader (4 yd3)	230	0.465	3	10	-	-	Off-Road
Bulldozer (D8)	340	0.59	6	10	-	-	Off-Road
Grader	240	0.575	2	10	-	-	Off-Road
Compactor	180	0.575	4	10	-	-	Off-Road
Water Truck (4,000 gal) [HHDT]	-	-	3	10	50	60	On-Road
Dump Truck [HHDT]	-	-	15	10	60	90	On-Road
Concrete Truck [HHDT]	-	-	8	10	80	90	On-Road
Worker commute vehicle [LDT1-ALL]	-	-	42	-	25	-	On-Road
Pickup Truck [LDT1-ALL]	-	-	3	10	50	-	On-Road

Notes:

Load factors and horsepower ratings from 1993 SCAQMD CEQA Handbook (Tables A9-8-C and A9-8-D), LADWP project team, and Caterpillar Handbook.

Work schedule: 10 hours/day plus 1 hour/day for lunch (7am - 8pm) Monday through Friday, and 8 hours/day plus 1 hour lunch (8am - 5 pm) on Saturday.

Number of workers per day: up to 42.

Activities related to burying the reservoir storage structure would occur from approximately August 2011 through April 2013.

Approximately 420,000 cubic yards of fill material would be required to bury the storage structure. Of this amount, 156,000 would be obtained onsite from tank excavation, and 265,000 cubic yards would be imported. A total of 80 truck loads per day for 166 days would be necessary to import all the soil material, resulting in a total of approximately 13,250 truck trips between August 2011 and March 2012. Approximately 320 cubic yards of concrete would be required to construct gutter drains around the reservoir. A total of 8 truckloads per day for 4 days would be required.

SLRC Project
Construction Emissions
Task 4 - Burying Reservoir Structure

Emission Factors for Off-Road Construction Equipment

	Emission Factors						
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Front-End Loader (4 yd3)	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Bulldozer (D8)	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Grader	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Compactor	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)

(1) Composite based on CARB OFFROAD Emissions Model (1999). SOx emission factor assumes fuel has maximum sulfur content of 15 ppmw (SCAQMD Rule 431.2 requirement effective 1 January 2005).

Emission Factors for On-Road Heavy Duty Trucks

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
On-road Truck - Idle	4.41	26.30	80.70	0.34	1.84	grams/hr	(1)
On-road Truck - 5 mph	1.85	10.53	20.27	0.18	0.83	grams/mile	(1)
On-road Truck - 10 mph	1.45	7.26	16.81	0.18	0.79	grams/mile	(1)
On-road Truck - 25 mph	0.80	3.13	11.88	0.18	0.44	grams/mile	(1)
On-road Truck - 55 mph	0.44	1.98	15.47	0.18	0.24	grams/mile	(1)
On-road Trucks - Composite (Water Truck)	1.85	10.53	20.27	0.18	0.83	grams/mile	(2)
On-road Trucks - Composite (Dump Truck)	0.69	2.97	14.17	0.18	0.38	grams/mile	(3)

(1) From CARB's EMFAC2002 (v2.2). Assumes: Heavy duty diesel truck (HHDT), Location: SCAQMD, Temp.: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire wear and brake wear included with fugitive dust).
Based on EMFAC emission factors for Year 2006.

(2) Assumes water truck travel at 5 miles per hour (mph) maximum. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

(3) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

Emission Factors for On-Road Construction Worker Vehicles and Pickups

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Worker Trips - 10 mph	0.92	11.15	0.79	0.01	0.04	grams/mile	(1)
Worker Trips - 25 mph	0.50	7.25	0.59	0.01	0.02	grams/mile	(1)
Worker Trips - 55 mph	0.40	5.71	0.59	0.00	0.01	grams/mile	(1)
Worker Trips - Composite	0.49	6.87	0.61	0.00	0.02	grams/mile	(2)

(1) From CARB's EMFAC2002 (v2.2). Units in grams/mile. Assumptions: Location: SCAQMD, Temperature: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire and brake wear included with fugitive dust). Conservatively assumes light-duty trucks, composite (LDT1-ALL).
ROG emission factors includes evaporative running loss of 0.2017 grams/mile.
Based on EMFAC emission factors for Year 2006.
Starting emissions (grams/trip, after 600 minutes): ROG (1.52), CO (17.59), NOx (0.66), SOx (0.003), PM10 (0.015).
Starting emissions (grams/trip, after 60 minutes): ROG (0.862), CO (10.647), NOx (0.726), SOx (0.001), PM10 (0.008).
Hot soak emissions (grams/trip): ROG (0.326).
Partial day diurnal emissions (grams/hr): ROG (0.013).
Resting losses (grams/hr): ROG (0.077).

(2) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 50 mph. Composite emission factor is used for worker commute vehicles. On-site pickup trucks are assumed to average 10 mph while on site.

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Task 4 - Burying Reservoir Structure

Fugitive Dust

	Emissions (lb/day) - Before Mitigation					Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Front-End Loader (4 yd3)	-	-	-	-	0.2	-	-	-	-	0.2
Bulldozer (D8)	-	-	-	-	48.6	-	-	-	-	48.6
Grader	-	-	-	-	43.1	-	-	-	-	43.1
Compactor	-	-	-	-	32.4	-	-	-	-	32.4
Water Truck (4,000 gal) [HHDT]	-	-	-	-	89.7	-	-	-	-	89.7
Dump Truck [HHDT]	-	-	-	-	216.2	-	-	-	-	216.2
Concrete Truck [HHDT]	-	-	-	-	151.6	-	-	-	-	151.6
Worker commute vehicle [LDT1-ALL]	-	-	-	-	5.6	-	-	-	-	5.6
Pickup Truck [LDT1-ALL]	-	-	-	-	46.5	-	-	-	-	46.5
Material transfer operations	-	-	-	-	0.2	-	-	-	-	0.2
Wind Erosion of Stockpiles	-	-	-	-	10.0	-	-	-	-	10.0
Total	-	-	-	-	644.1	-	-	-	-	644.1

Notes:
Fugitive PM10 emissions estimates assume watering is used to control emissions by: 50% (Table A11-9-A, CEQA Handbook)
Watering required per SCAQMD Rule 403, so watering and resulting reduction in fugitive dust is not considered mitigation.
No reduction assumed for off-site travel on paved roads (eg., worker commute vehicles) because watering only occurs on site.
Fugitive PM10 emissions for on-road vehicles also include break and tire wear.
Fugitive dust from front-end loader travel assumed to be negligible relative to other equipment.

Wind Erosion of Storage Piles:

PM10 Emissions (lb/day/acre) = 1.7 * (G / 1.5) * ((365 - H) / 235) * (I / 15) * 0.5

Description	Value	References/Notes
Silt Content (G):	15 % wt	Blended ore and dirt (Table A9-9-E-1, CEQA Handbook)
Days of Rain per Year >0.01 in (H):	34	Average year for South Coast Air Basin (Table A9-9-E-2, CEQA Handbook)
% of Time Wind Speed > 12 mph (I):	50 %	Assumption
Storage pile size:	0.5 acre	Assumption
PM10 from storage piles:	20.0 lb/day	Uncontrolled

References:
1993 CEQA Handbook, Table A9-9-E

Material Handling/Drop Operations:

PM10 Emissions (lb/ton) = k * (0.0032) * ((u / 5)^(1.3) / (M / 2)^(1.4))

Description	Value	References/Notes
Unitless particle size multiplier (k):	0.35	AP42
Mean wind speed (u):	6.2 mph	EPA Tanks v4.0 (Average wind speed for LA County = 6.2 mi/hr)
Material moisture content (M):	5 %	Table A9-9-G-1, 1993 CEQA Handbook (Dry=2.0%, Moist=15.0%, Wet=50.0%)
PM10 Emission factor:	4E-04 lb/ton	Uncontrolled
Soil handled:	894 ton/day	Assumption based on project description
PM10 emissions:	0.37 lb/day	Uncontrolled

References:
AP42, Section 13.2.4 (Aggregate Handling and Storage Piles, 1/95)
Table 9-9-G, 1993 CEQA Handbook.

Grader:

PM10 Emissions (lbs/VMT) = 0.60 * 0.051 * (S)^(2.0)

Description	Value	References/Notes
Mean vehicle speed (S):	5 mph	Assumption
PM10 Emissions:	0.77 lb/VMT	AP42, Table 11.9-1
VMT/day:	37.5 mi/day	Assumed to travel at mean vehicle speed for 75% of work day.
PM10 Emissions:	28.7 lb/day/unit	Uncontrolled

References:
AP42, Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98), Grading Operations.

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Bulldozer:

PM10 emissions (lb/hr) = 0.75 * 1.0 * ([s]^1.5) / ([M]^1.4)

Description	Value	References/Notes
Surface material silt content (s):	7.5 %	Table A9-9-F-1, 1993 CEQA Handbook ("Overburden" dirt type)
Surface material moisture content (M):	5 %	Table A9-9-F-2, 1993 CEQA Handbook (Dry = 2.0%, Moist = 15.0%, Wet = 50.0%)
PM10 Emissions:	16.2 lb/day/unit	Uncontrolled (assumes 10-hr work day)

References:

AP42, Section 13.2.3 (Heavy Construction Operations), Table 13.2.3-1 (Recommended Emission Factors for Construction Operations, 1/95) and
Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98, Bulldozing Operations).
(Note: PM10 equation from 1993 CEQA Handbook, Table A9-9-F [Estimating Emissions from Dirt Pushing or Bulldozing Operations] is incorrect)

Passenger vehicle travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Local streets	0.018 lb/mile	Table A9-9-B, CEQA Handbook
Collector streets:	0.013 lb/mile	Table A9-9-B, CEQA Handbook
Major Streets/Highways:	0.0064 lb/mile	Table A9-9-B, CEQA Handbook
Freeways:	0.00065 lb/mile	Table A9-9-B, CEQA Handbook
PM10 Emission factor (composite)	0.005345 lb/mile	Assumption (10% Local, 10% Collector, 30% Major Street, 50% Freeway)

Truck travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Construction sites w/cleaning:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Local streets:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Collector streets:	0.54 lb/mile	Table A9-9-C, CEQA Handbook
Major streets/highways:	0.43 lb/mile	Table A9-9-C, CEQA Handbook
Freeway:	0.18 lb/mile	Table A9-9-C, CEQA Handbook
Composite (dump truck):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (delivery-type trucks):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (other project trucks)	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)
Composite (pickup truck):	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)

Reference: Table A9-9-D, CEQA Handbook.

Vehicle travel on UNPAVED roads:

Description	PM10 Emissions	References/Notes
Dump truck:	1.55 lb/mile	Vehicle weighs 10 tons, has 10 wheels, travels at 10 mph on site.
Concrete truck/Water truck:	1.26 lb/mile	Vehicle weighs 20 tons, has 10 wheels, travels at 5 mph on site.
Tractor trailer-type truck:	1.38 lb/mile	Vehicle weighs 15 tons, has 18 wheels, travels at 5 mph on site.
Scraper:	0.8 lb/mile	Vehicle weighs 20 tons, has 4 wheels, travels at 3 mph on site.
Grader:	0.48 lb/mile	Vehicle weighs 15 tons, has 6 wheels, travels at 3 mph on site.

Reference: Table A9-9-D, CEQA Handbook; Caterpillar Performance Handbook. Assumes silt loading of 8% (Mining Haul Road, Table A9-9-D-1).
For other equipment traveling on unpaved roads, maximum speed on site assumed to be 5 mph.
Fugitive dust from other equipment (loader) travel on paved or unpaved roads assumed to be negligible relative to other equipment.

SLRC Project
Construction Emissions
Task 4 - Burying Reservoir Structure

Daily Emissions

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Front-End Loader (4 yd3)	5.1	21.8	64.1	-	3.0	5.1	21.8	55.1	-	1.1
Bulldozer (D8)	16.7	73.8	226.6	0.1	9.8	16.7	73.8	194.9	0.1	3.6
Grader	4.4	18.7	55.1	-	2.6	4.4	18.7	47.4	-	1.0
Compactor	6.6	28.1	82.7	-	3.8	6.6	28.1	71.1	-	1.4
Water Truck (4,000 gal) [HHDT]	0.6	3.5	6.9	0.1	0.3	0.6	3.5	6.9	0.1	0.3
Dump Truck [HHDT]	1.4	6.0	28.4	0.4	0.8	1.4	6.0	28.4	0.4	0.8
Concrete Truck [HHDT]	1.0	4.3	20.3	0.3	0.5	1.0	4.3	20.3	0.3	0.5
Worker commute vehicle [LDT1-ALL]	1.6	19.2	1.5	-	-	1.6	19.2	1.5	-	-
Pickup Truck [LDT1-ALL]	0.3	3.7	0.3	-	-	0.3	3.7	0.3	-	-
Fugitive Dust	-	-	-	-	644.1	-	-	-	-	644.1
Total	*37.7*	*179.1*	*485.9*	*0.9*	*664.9*	*37.7*	*179.1*	*425.9*	*0.9*	*652.8*

Notes:

Mitigation assumes use of PuriNOx fuel for off-road diesel construction equipment:

NOx reduction: 14.0%

PM10 reduction: 63.0%

Daily Emissions - Grouped by Equipment/Activity Type

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Construction Equipment	36.1	159.9	484.4	0.9	20.8	36.1	159.9	424.4	0.9	8.7
Commute Vehicles	1.6	19.2	1.5	-	-	1.6	19.2	1.5	-	-
Fugitive Dust	-	-	-	-	644.1	-	-	-	-	644.1
Total	*37.7*	*179.1*	*485.9*	*0.9*	*664.9*	*37.7*	*179.1*	*425.9*	*0.9*	*652.8*

SLRC Project
Construction Emissions
Task 5 - Hydroelectric Powerplant

Equipment/Activity Descriptions

Equipment/Activity	*Hp Rating*	*Load Factor*	*Number Active*	*Equip-Hrs Day*	*Miles/ Day/ Vehicle*	*Idling Min/Day/ Vehicle*	Equipment Type
Scraper (11 yd3)	265	0.66	2	10	-	-	Off-Road
Bulldozer, 75 hp	75	0.59	1	10	-	-	Off-Road
Bulldozer, 200 hp	200	0.59	2	10	-	-	Off-Road
Bulldozer, 300 hp	300	0.59	1	10	-	-	Off-Road
Grader	240	0.575	4	10	-	-	Off-Road
Excavator, 0.75 yd3	150	0.50	1	10	-	-	Off-Road
Front-End Loader	230	0.465	1	10	-	-	Off-Road
Towed Sheep Foots Roller	50	0.500	1	10	-	-	Off-Road
Crane	345	0.430	3	10	-	-	Off-Road
Concrete Pumper, Schwing	100	0.500	3	10	-	-	Off-Road
Fork Loader	50	0.500	8	10	-	-	Off-Road
Water Truck (4,000 gal) [HHDT]	-	-	1	10	50	60	On-Road
Dump Truck [HHDT]	-	-	2	10	60	90	On-Road
Flat Bed Truck (HHDT)	-	-	3	10	60	90	On-Road
Tractor Trailer Truck (HHDT)	-	-	1	10	60	90	On-Road
Concrete Truck [HHDT]	-	-	1	10	40	90	On-Road
Worker commute vehicle [LDT1-ALL]	-	-	40	-	25	-	On-Road

Notes:

Load factors and horsepower ratings from 1993 SCAQMD CEQA Handbook (Tables A9-8-C and A9-8-D), LADWP project team, and Caterpillar Handbook.

Work schedule: 10 hours/day plus 1 hour/day for lunch (7am - 8pm) Monday through Friday, and 8 hours/day plus 1 hour lunch (8am - 5 pm) on Saturday.

Number of workers per day: 40 (average).

Construction of the hydroelectric power generating facility would last approximately 18 months, from January 2010 to June 2011.

The hydroelectric plant would be constructed at the west end of the HWSG site. Approximately 2 acres would be disturbed during construction.

Approximately 6,000 cubic yards of soil material would be excavated for the construction of the hydroelectric plant. 2,600 cubic yards would be exported and 3,400 cubic yards would be retained onsite for burial of the hydroelectric plant. Based on using 16 cubic yard capacity dump trucks to export the soil material, a total of 8 truckloads per day for a duration of 20 days would be necessary for a total of 160 truck trips between July and November 2007. 960 cubic yards of concrete would be required during construction, which would require 80 trips by a 12 cubic yard concrete mixer between December 2007 and June 2008. Other equipment required for the facility would be delivered by tractor trailer and flat bed truck. Approximately 312 tractor trailer trips and 900 flat bed trucks would be required over the duration of construction.

SLRC Project
Construction Emissions
Task 5 - Hydroelectric Powerplant

Emission Factors for Off-Road Construction Equipment

	Emission Factors						
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Scraper (11 yd3)	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Bulldozer, 75 hp	1.22	4.17	10.88	0.01	0.77	g/hp-hr	(1)
Bulldozer, 200 hp	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Bulldozer, 300 hp	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Grader	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Excavator, 0.75 yd3	0.77	3.39	9.33	0.01	0.45	g/hp-hr	(1)
Front-End Loader	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Towed Sheep Foots Roller	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Crane	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Concrete Pumper, Schwing	1.22	4.17	10.88	0.01	0.77	g/hp-hr	(1)
Fork Loader	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)

(1) Composite based on CARB OFFROAD Emissions Model (1999). SOx emission factor assumes fuel has maximum sulfur content of 15 ppmw (SCAQMD Rule 431.2 requirement effective 1 January 2005).

Emission Factors for On-Road Heavy Duty Trucks

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
On-road Truck - Idle	4.41	26.30	80.70	0.34	1.84	grams/hr	(1)
On-road Truck - 5 mph	1.85	10.53	20.27	0.18	0.83	grams/mile	(1)
On-road Truck - 10 mph	1.45	7.26	16.81	0.18	0.79	grams/mile	(1)
On-road Truck - 25 mph	0.80	3.13	11.88	0.18	0.44	grams/mile	(1)
On-road Truck - 55 mph	0.44	1.98	15.47	0.18	0.24	grams/mile	(1)
On-road Trucks - Composite (Water Truck)	1.85	10.53	20.27	0.18	0.83	grams/mile	(2)
On-road Trucks - Composite (Other Trucks)	0.69	2.97	14.17	0.18	0.38	grams/mile	(3)

(1) From CARB's EMFAC2002 (v2.2). Assumes: Heavy duty diesel truck (HHDT), Location: SCAQMD, Temp.: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire wear and brake wear included with fugitive dust).
Based on EMFAC emission factors for Year 2006.

(2) Assumes water truck travel at 5 miles per hour (mph) maximum. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

(3) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

Emission Factors for On-Road Construction Worker Vehicles

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Worker Trips - 10 mph	0.92	11.15	0.79	0.01	0.04	grams/mile	(1)
Worker Trips - 25 mph	0.50	7.25	0.59	0.01	0.02	grams/mile	(1)
Worker Trips - 55 mph	0.40	5.71	0.59	0.00	0.01	grams/mile	(1)
Worker Trips - Composite	0.49	6.87	0.61	0.00	0.02	grams/mile	(2)

(1) From CARB's EMFAC2002 (v2.2). Units in grams/mile. Assumptions: Location: SCAQMD, Temperature: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire and brake wear included with fugitive dust). Conservatively assumes light-duty trucks, composite (LDT1-ALL).
ROG emission factors includes evaporative running loss of 0.2017 grams/mile.
Based on EMFAC emission factors for Year 2006.
Starting emissions (grams/trip, after 600 minutes): ROG (1.52), CO (17.59), Nox (0.66), SOx (0.003), PM10 (0.015).
Starting emissions (grams/trip, after 60 minutes): ROG (0.862), CO (10.647), Nox (0.726), SOx (0.001), PM10 (0.008).
Hot soak emissions (grams/trip): ROG (0.326).
Partial day diurnal emissions (grams/hr): ROG (0.013).
Resting losses (grams/hr): ROG (0.077).

(2) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 50 mph. Composite emission factor is used for worker commute vehicles. On-site pickup trucks are assumed to average 10 mph while on site.

SLRC Project
Construction Emissions
Task 5 - Hydroelectric Powerplant

Fugitive Dust

	Emissions (lb/day) - Before Mitigation					Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Scraper (11 yd3)	-	-	-	-	32.3	-	-	-	-	32.3
Bulldozer, 75 hp	-	-	-	-	8.1	-	-	-	-	8.1
Bulldozer, 200 hp	-	-	-	-	16.2	-	-	-	-	16.2
Bulldozer, 300 hp	-	-	-	-	8.1	-	-	-	-	8.1
Grader	-	-	-	-	43.1	-	-	-	-	43.1
Excavator, 0.75 yd3	-	-	-	-	0.5	-	-	-	-	0.5
Front-End Loader	-	-	-	-	0.5	-	-	-	-	0.5
Towed Sheep Foots Roller	-	-	-	-	-	-	-	-	-	-
Crane	-	-	-	-	-	-	-	-	-	-
Concrete Pumper, Schwing	-	-	-	-	-	-	-	-	-	-
Fork Loader	-	-	-	-	-	-	-	-	-	-
Water Truck (4,000 gal) [HHDT]	-	-	-	-	29.9	-	-	-	-	29.9
Dump Truck [HHDT]	-	-	-	-	31.4	-	-	-	-	31.4
Flat Bed Truck (HHDT)	-	-	-	-	43.1	-	-	-	-	43.1
Tractor Trailer Truck (HHDT)	-	-	-	-	14.4	-	-	-	-	14.4
Concrete Truck [HHDT]	-	-	-	-	9.5	-	-	-	-	9.5
Worker commute vehicle [LDT1-ALL]	-	-	-	-	5.3	-	-	-	-	5.3
Soil transfer operations	-	-	-	-	0.0	-	-	-	-	0.0
Wind Erosion of Stockpiles	-	-	-	-	2.5	-	-	-	-	2.5
Total	-	-	-	-	244.8	-	-	-	-	244.8

Notes:
Fugitive PM10 emissions estimates assume watering is used to control emissions by: 50% (Table A11-9-A, CEQA Handbook)
Watering required per SCAQMD Rule 403, so watering and resulting reduction in fugitive dust is not considered mitigation.
No reduction assumed for off-site travel on paved roads (eg., worker commute vehicles) because watering only occurs on site.
Fugitive PM10 emissions for on-road vehicles also include break and tire wear.
Fugitive dust from equipment with "-" assumed to be negligible relative to other equipment.

Scraper:

Scraper emissions based on EPA's AP42, Section 13.2.3 (Heavy Construction Operations, 1/95),
Table 13.2.3-1 (Recommended Emission Factors for Construction Operations)

Description	Value	References/Notes
TSP Emission factor (assume = PM10):	0.058 lb/ton soil	AP42, Table 11.9-4 (Open Dust Sources at Western Surface Coal Mines)
PM10 fraction:	0.35	AP42, Section 13.2.4-3 (Aggregate Handling and Storage Piles)
Total soil scraped:	6,000 yd3	Project description
Duration of scraping:	200 days	Estimate
Soil scraping rate:	45 ton/day	Assumes soil density of 1.5 ton/yd3
PM10 from scraping/excavating:	0.9 lb/day	Controlled

Wind Erosion of Storage Piles:

PM10 Emissions (lb/day/acre) = 1.7 * (G / 1.5) * ((365 - H) / 235) * (I / 15) * 0.5

Description	Value	References/Notes
Silt Content (G):	15 % wt	Blended ore and dirt (Table A9-9-E-1, CEQA Handbook)
Days of Rain per Year >0.01 in (H):	34	Average year for South Coast Air Basin (Table A9-9-E-2, CEQA Handbook)
% of Time Wind Speed > 12 mph (I):	50 %	Assumption
Storage pile size:	0.125 acre	Assumption
PM10 from storage piles:	5.0 lb/day	Controlled

References:
1993 CEQA Handbook, Table A9-9-E

SLRC Project
Construction Emissions
Task 5 - Hydroelectric Powerplant

Material Handling/Drop Operations:

PM10 Emissions (lb/ton) = k * (0.0032) * ((u / 5)^(1.3) / (M / 2)^(1.4))

Description	Value		References/Notes
Unitless particle size multiplier (k):	0.35		AP42
Mean wind speed (u):	6.2	mph	EPA Tanks v4.0 (Average wind speed for LA County = 6.2 mi/hr)
Material moisture content (M):	5	%	Table A9-9-G-1, 1993 CEQA Handbook (Dry=2.0%, Moist=15.0%, Wet=50.0%)
PM10 Emission factor:	4E-04	lb/ton	Uncontrolled
Soil handled:	45	ton/day	Assumption based on project description
PM10 emissions:	0.02	lb/day	Uncontrolled

References:

AP42, Section 13.2.4 (Aggregate Handling and Storage Piles, 1/95)

Table 9-9-G, 1993 CEQA Handbook.

Grader:

PM10 Emissions (lbs/VMT) = 0.60 * 0.051 * (S)^(2.0)

Description	Value		References/Notes
Mean vehicle speed (S):	5	mph	Assumption
PM10 Emissions:	0.77	lb/VMT	AP42, Table 11.9-1
VMT/day:	37.5	mi/day	Assumed to travel at mean vehicle speed for 75% of work day.
PM10 Emissions:	28.7	lb/day/unit	Uncontrolled

References:

AP42, Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98), Grading Operations.

Bulldozer:

PM10 emissions (lb/hr) = 0.75 * 1.0 * ([s]^1.5) / ([M]^1.4)

Description	Value		References/Notes
Surface material silt content (s):	7.5	%	Table A9-9-F-1, 1993 CEQA Handbook ("Overburden" dirt type)
Surface material moisture content (M):	5	%	Table A9-9-F-2, 1993 CEQA Handbook (Dry = 2.0%, Moist = 15.0%, Wet = 50.0%)
PM10 Emissions:	16.2	lb/day/unit	Uncontrolled (assumes 10-hr work day)

References:

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AP42, Section 13.2.3 (Heavy Construction Operations), Table 13.2.3-1 (Recommended Emission Factors for Construction Operations, 1/95) and Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98, Bulldozing Operations).
(Note: PM10 equation from 1993 CEQA Handbook, Table A9-9-F [Estimating Emissions from Dirt Pushing or Bulldozing Operations] is incorrect)
(Note: PM10 equation from 1993 CEQA Handbook, Table A9-9-F [Estimating Emissions from Dirt Pushing or Bulldozing Operations] is incorrect)

Passenger vehicle travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Local streets	0.018 lb/mile	Table A9-9-B, CEQA Handbook
Collector streets:	0.013 lb/mile	Table A9-9-B, CEQA Handbook
Major Streets/Highways:	0.0064 lb/mile	Table A9-9-B, CEQA Handbook
Freeways:	0.00065 lb/mile	Table A9-9-B, CEQA Handbook
PM10 Emission factor (composite)	0.005345 lb/mile	Assumption (10% Local, 10% Collector, 30% Major Street, 50% Freeway)

Truck travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Construction sites w/cleaning:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Local streets:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Collector streets:	0.54 lb/mile	Table A9-9-C, CEQA Handbook
Major streets/highways:	0.43 lb/mile	Table A9-9-C, CEQA Handbook
Freeway:	0.18 lb/mile	Table A9-9-C, CEQA Handbook
Composite (dump truck):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (delivery-type trucks):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (other project trucks)	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)
Composite (pickup truck):	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)

Reference: Table A9-9-D, CEQA Handbook.

Vehicle travel on UNPAVED roads:

Description	PM10 Emissions	References/Notes
Dump truck:	1.55 lb/mile	Vehicle weighs 10 tons, has 10 wheels, travels at 10 mph on site.
Concrete truck/Water truck:	1.26 lb/mile	Vehicle weighs 20 tons, has 10 wheels, travels at 5 mph on site.
Tractor trailer truck:	1.38 lb/mile	Vehicle weighs 15 tons, has 18 wheels, travels at 5 mph on site.
Scraper:	1.06 lb/mile	Vehicle weighs 30 tons (CAT 611), has 4 wheels, travels at 3 mph on site.
Grader:	0.48 lb/mile	Vehicle weighs 15 tons, has 6 wheels, travels at 3 mph on site.

Reference: Table A9-9-D, CEQA Handbook; Caterpillar Performance Handbook. Assumes silt loading of 8% (Mining Haul Road, Table A9-9-D-1).
For other equipment traveling on unpaved roads, maximum speed on site assumed to be 5 mph.
Fugitive dust from other equipment (loader) travel on paved or unpaved roads assumed to be negligible relative to other equipment.

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Daily Emissions

	Daily Emissions (lb/day) - Before Mitigation					*Daily Emissions (lb/day) - After Mitigation*				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Scraper (11 yd3)	4.9	21.4	65.9	-	2.9	4.9	21.4	56.7	-	1.1
Bulldozer, 75 hp	1.2	4.1	10.6	-	0.8	1.2	4.1	9.1	-	0.3
Bulldozer, 200 hp	3.7	16.0	47.1	-	2.2	3.7	16.0	40.5	-	0.8
Bulldozer, 300 hp	2.5	10.8	33.3	-	1.4	2.5	10.8	28.6	-	0.5
Grader	8.8	37.5	110.3	0.1	5.1	8.8	37.5	94.9	0.1	1.9
Excavator, 0.75 yd3	1.3	5.6	15.4	-	0.7	1.3	5.6	13.2	-	0.3
Front-End Loader	1.7	7.3	21.4	-	1.0	1.7	7.3	18.4	-	0.4
Towed Sheep Foots Roller	1.0	2.7	3.8	-	0.4	1.0	2.7	3.3	-	0.1
Crane	6.2	27.3	83.8	-	3.6	6.2	27.3	72.1	-	1.3
Concrete Pumper, Schwing	4.0	13.8	36.0	-	2.5	4.0	13.8	31.0	-	0.9
Fork Loader	8.0	21.9	30.2	-	3.3	8.0	21.9	26.0	-	1.2
Water Truck (4,000 gal) [HHDT]	0.2	1.2	2.4	-	0.1	0.2	1.2	2.4	-	0.1
Dump Truck [HHDT]	0.2	0.9	4.0	-	0.1	0.2	0.9	4.0	-	0.1
Flat Bed Truck (HHDT)	0.3	1.3	5.9	0.1	0.2	0.3	1.3	5.9	0.1	0.2
Tractor Trailer Truck (HHDT)	0.1	0.5	2.1	-	0.1	0.1	0.5	2.1	-	0.1
Concrete Truck [HHDT]	0.1	0.3	1.5	-	-	0.1	0.3	1.5	-	-
Worker commute vehicle [LDT1-ALL]	1.5	15.6	1.7	0.4	0.4	1.5	15.6	1.7	0.4	0.4
Fugitive Dust	-	-	-	-	244.8	-	-	-	-	244.8
Total	*45.7*	*188.2*	*475.4*	*0.6*	*269.6*	*45.7*	*188.2*	*411.4*	*0.6*	*254.5*

Notes:

Mitigation assumes use of PuriNOx fuel for off-road diesel construction equipment:

NOx reduction: 14.0%
PM10 reduction: 63.0%

Daily Emissions - Grouped by Equipment/Activity Type

	Daily Emissions (lb/day) - Before Mitigation					*Daily Emissions (lb/day) - After Mitigation*				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Construction Equipment	44.2	172.6	473.7	0.2	24.4	44.2	172.6	409.7	0.2	9.3
Commute Vehicles	1.5	15.6	1.7	0.4	0.4	1.5	15.6	1.7	0.4	0.4
Fugitive Dust	-	-	-	-	244.8	-	-	-	-	244.8
Total	*45.7*	*188.2*	*475.4*	*0.6*	*269.6*	*45.7*	*188.2*	*411.4*	*0.6*	*254.5*

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Equipment/Activity Descriptions

Equipment/Activity	*Hp Rating*	*Load Factor*	*Number Active*	*Equip-Hrs Day*	*Miles/ Day/ Vehicle*	*Idling Min/Day/ Vehicle*	Equipment Type
Excavator	188	0.58	1	10	-	-	Off-Road
Loader, CAT 950G	196	0.465	1	10	-	-	Off-Road
Crane	345	0.430	2	10	-	-	Off-Road
Tractor	240	0.575	1	10	-	-	Off-Road
Ventilation Blower	50	0.500	1	10	-	-	Off-Road
Generator	36	0.740	1	10	-	-	Off-Road
Backhoe	110	0.465	1	10	-	-	Off-Road
Hydraulic Power Unit	40	0.500	1	10	-	-	Off-Road
Auger, 370-foot	50	0.500	1	10	-	-	Off-Road
Concrete Pump	50	0.740	1	10	-	-	Off-Road
Paver	112	0.590	1	10	-	-	Off-Road
Roller	180	0.575	1	10	-	-	Off-Road
Grader	140	0.575	1	10	-	-	Off-Road
Drill Rig	200	0.750	1	10	-	-	Off-Road
Tunnel Boring Machine	350	0.750	1	10	-	-	Off-Road
Hydraulic Boring Machine	350	0.750	1	10	-	-	Off-Road
Water Truck (4,000 gal) [HHDT]	-	-	1	10	50	60	On-Road
Dump Truck [HHDT]	-	-	1	10	60	90	On-Road
Flat Bed Truck (HHDT)	-	-	6	10	60	90	On-Road
Utility/Pipe Carrier Truck (HHDT)	-	-	3	10	50	90	On-Road
Welding Truck (HHDT)	-	-	1	10	10	90	On-Road
Concrete Truck (HHDT)	-	-	9	10	40	90	On-Road
Worker commute vehicle [LDT1-ALL]	-	-	14	-	25	-	On-Road

Notes:

Load factors and horsepower ratings from 1993 SCAQMD CEQA Handbook (Tables A9-8-C and A9-8-D), LADWP project team, and Caterpillar Handbook.

Work schedule: 10 hours/day plus 1 hour/day for lunch (7am - 8pm) Monday through Friday, and 8 hours/day plus 1 hour lunch (8am - 5 pm) on Saturday.

Number of workers per day: 10-14 per day for open trench construction, 5-7 per day for tunneling

Construction of the bypass pipeline would take place approximately from May 2007 through April 2009.

Approximately 6,625 cubic yards of soil would be removed during bypass pipeline construction. This soil would be exported to the HWSG site. Based on an estimate of 20 feet of tunneling per day and 10 cubic yard capacity dump trucks, 2 to 3 truckloads of soil would be exported from the site each day for 278 days between June 2007 through February 2008 and October 2008 through February 2009.

Steel pipe would be delivered to the site on flat bed trucks. Approximately 6 trucks per day would deliver 240 feet of pipe per day for approximately 21 days, staggered throughout the construction period. Approximately 9 trucks per day would deliver 90 cubic yards of concrete per day to the site for approximately 31 days, for a total of roughly 2,542 cubic yards of concrete.

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Emission Factors for Off-Road Construction Equipment

	Emission Factors						
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Excavator	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Loader, CAT 950G	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Crane	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Tractor	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Ventilation Blower	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Generator	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Backhoe	1.22	4.17	10.88	0.01	0.77	g/hp-hr	(1)
Hydraulic Power Unit	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Auger, 370-foot	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Concrete Pump	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Paver	1.22	4.17	10.88	0.01	0.77	g/hp-hr	(1)
Roller	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Grader	0.77	3.39	9.33	0.01	0.45	g/hp-hr	(1)
Drill Rig	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Tunnel Boring Machine	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Hydraulic Boring Machine	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)

(1) Composite based on CARB OFFROAD Emissions Model (1999). SOx emission factor assumes fuel has maximum sulfur content of 15 ppmw (SCAQMD Rule 431.2 requirement effective 1 January 2005).

Emission Factors for On-Road Heavy Duty Trucks

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
On-road Truck - Idle	4.41	26.30	80.70	0.34	1.84	grams/hr	(1)
On-road Truck - 5 mph	1.85	10.53	20.27	0.18	0.83	grams/mile	(1)
On-road Truck - 10 mph	1.45	7.26	16.81	0.18	0.79	grams/mile	(1)
On-road Truck - 25 mph	0.80	3.13	11.88	0.18	0.44	grams/mile	(1)
On-road Truck - 55 mph	0.44	1.98	15.47	0.18	0.24	grams/mile	(1)
On-road Trucks - Composite (Water Truck)	1.85	10.53	20.27	0.18	0.83	grams/mile	(2)
On-road Trucks - Composite (Other Trucks)	0.69	2.97	14.17	0.18	0.38	grams/mile	(3)

(1) From CARB's EMFAC2002 (v2.2). Assumes: Heavy duty diesel truck (HHDT), Location: SCAQMD, Temp.: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire wear and brake wear included with fugitive dust).
Based on EMFAC emission factors for Year 2006.

(2) Assumes water truck travel at 5 miles per hour (mph) maximum. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

(3) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

Emission Factors for On-Road Construction Worker Vehicles

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Worker Trips - 10 mph	0.92	11.15	0.79	0.01	0.04	grams/mile	(1)
Worker Trips - 25 mph	0.50	7.25	0.59	0.01	0.02	grams/mile	(1)
Worker Trips - 55 mph	0.40	5.71	0.59	0.00	0.01	grams/mile	(1)
Worker Trips - Composite	0.49	6.87	0.61	0.00	0.02	grams/mile	(2)

(1) From CARB's EMFAC2002 (v2.2). Units in grams/mile. Assumptions: Location: SCAQMD, Temperature: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire and brake wear included with fugitive dust). Conservatively assumes light-duty trucks, composite (LDT1-ALL).
ROG emission factors includes evaporative running loss of 0.2017 grams/mile.
Based on EMFAC emission factors for Year 2006.
Starting emissions (grams/trip, after 600 minutes): ROG (1.52), CO (17.59), Nox (0.66), SOx (0.003), PM10 (0.015).
Hot soak emissions (grams/trip): ROG (0.326).
Partial day diurnal emissions (grams/hr): ROG (0.013).
Resting losses (grams/hr): ROG (0.077).

(2) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 50 mph. Composite emission factor is used for worker commute vehicles. On-site pickup trucks are assumed to average 10 mph while on site.

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Fugitive Dust

	Emissions (lb/day) - Before Mitigation					Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Excavator	-	-	-	-	0.1	-	-	-	-	0.1
Loader, CAT 950G	-	-	-	-	0.1	-	-	-	-	0.1
Crane	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-
Ventilation Blower	-	-	-	-	-	-	-	-	-	-
Generator	-	-	-	-	-	-	-	-	-	-
Backhoe	-	-	-	-	-	-	-	-	-	-
Hydraulic Power Unit	-	-	-	-	-	-	-	-	-	-
Auger, 370-foot	-	-	-	-	-	-	-	-	-	-
Concrete Pump	-	-	-	-	-	-	-	-	-	-
Paver	-	-	-	-	-	-	-	-	-	-
Roller	-	-	-	-	-	-	-	-	-	-
Grader	-	-	-	-	21.5	-	-	-	-	21.5
Drill Rig	-	-	-	-	-	-	-	-	-	-
Tunnel Boring Machine	-	-	-	-	-	-	-	-	-	-
Hydraulic Boring Machine	-	-	-	-	-	-	-	-	-	-
Water Truck (4,000 gal) [HHDT]	-	-	-	-	29.9	-	-	-	-	29.9
Dump Truck [HHDT]	-	-	-	-	15.7	-	-	-	-	15.7
Flat Bed Truck (HHDT)	-	-	-	-	92.7	-	-	-	-	92.7
Utility/Pipe Carrier Truck (HHDT)	-	-	-	-	38.6	-	-	-	-	38.6
Welding Truck (HHDT)	-	-	-	-	3.1	-	-	-	-	3.1
Concrete Truck (HHDT)	-	-	-	-	112.2	-	-	-	-	112.2
Worker commute vehicle [LDT1-ALL]	-	-	-	-	1.9	-	-	-	-	1.9
Material transfer operations	-	-	-	-	0.1	-	-	-	-	0.1
Wind Erosion of Stockpiles	-	-	-	-	2.5	-	-	-	-	2.5
Total	-	-	-	-	318.4	-	-	-	-	318.4

Notes:
Fugitive PM10 emissions estimates assume watering is used to control emissions by: 50% (Table A11-9-A, CEQA Handbook)
Watering required per SCAQMD Rule 403, so watering and resulting reduction in fugitive dust is not considered mitigation.
No reduction assumed for off-site travel on paved roads (eg., worker commute vehicles) because watering only occurs on site.
Fugitive PM10 emissions for on-road vehicles also include break and tire wear.
Fugitive dust from equipment with "-" assumed to be negligible relative to other equipment. Negligible fugitive dust from tunnel and hydraulic boring machines because operations occur underground.

Wind Erosion of Storage Piles:

PM10 Emissions (lb/day/acre) = 1.7 * (G / 1.5) * ((365 - H) / 235) * (I / 15) * 0.5

Description	Value	References/Notes
Silt Content (G):	15 % wt	Blended ore and dirt (Table A9-9-E-1, CEQA Handbook)
Days of Rain per Year >0.01 in (H):	34	Average year for South Coast Air Basin (Table A9-9-E-2, CEQA Handbook)
% of Time Wind Speed > 12 mph (I):	50 %	Assumption
Storage pile size:	0.125 acre	Assumption
PM10 from storage piles:	5.0 lb/day	Uncontrolled

References:
1993 CEQA Handbook, Table A9-9-E

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Material Handling/Drop Operations:

PM10 Emissions (lb/ton) = k * (0.0032) * ((u / 5)^(1.3) / (M / 2)^(1.4))

Description	Value	References/Notes
Unitless particle size multiplier (k):	0.35	AP42
Mean wind speed (u):	6.2 mph	EPA Tanks v4.0 (Average wind speed for LA County = 6.2 mi/hr)
Material moisture content (M):	5 %	Table A9-9-G-1, 1993 CEQA Handbook (Dry=2.0%, Moist=15.0%, Wet=50.0%)
PM10 Emission factor:	4E-04 lb/ton	Uncontrolled
Soil handled:	500 ton/day	Assumption based on project description
PM10 emissions:	0.21 lb/day	Uncontrolled

References:
AP42, Section 13.2.4 (Aggregate Handling and Storage Piles, 1/95)
Table 9-9-G, 1993 CEQA Handbook.

Grader:

PM10 Emissions (lbs/VMT) = 0.60 * 0.051 * (S)^(2.0)

Description	Value	References/Notes
Mean vehicle speed (S):	5 mph	Assumption
PM10 Emissions:	0.77 lb/VMT	AP42, Table 11.9-1
VMT/day:	37.5 mi/day	Assumed to travel at mean vehicle speed for 75% of work day.
PM10 Emissions:	28.7 lb/day/unit	Uncontrolled

References:
AP42, Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98), Grading Operations.

Passenger vehicle travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Local streets	0.018 lb/mile	Table A9-9-B, CEQA Handbook
Collector streets:	0.013 lb/mile	Table A9-9-B, CEQA Handbook
Major Streets/Highways:	0.0064 lb/mile	Table A9-9-B, CEQA Handbook
Freeways:	0.00065 lb/mile	Table A9-9-B, CEQA Handbook
PM10 Emission factor (composite)	0.005345 lb/mile	Assumption (10% Local, 10% Collector, 30% Major Street, 50% Freeway)

Truck travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Construction sites w/cleaning:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Local streets:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Collector streets:	0.54 lb/mile	Table A9-9-C, CEQA Handbook
Major streets/highways:	0.43 lb/mile	Table A9-9-C, CEQA Handbook
Freeway:	0.18 lb/mile	Table A9-9-C, CEQA Handbook
Composite (dump truck):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (delivery-type trucks):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (other project trucks)	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)
Composite (pickup truck):	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)

Reference: Table A9-9-D, CEQA Handbook.

Vehicle travel on UNPAVED roads:

Description	PM10 Emissions	References/Notes
Dump truck:	1.55 lb/mile	Vehicle weighs 10 tons, has 10 wheels, travels at 10 mph on site.
Concrete truck/Water truck:	1.26 lb/mile	Vehicle weighs 20 tons, has 10 wheels, travels at 5 mph on site.
Tractor trailer truck:	1.38 lb/mile	Vehicle weighs 15 tons, has 18 wheels, travels at 5 mph on site.
Scraper:	0.80 lb/mile	Vehicle weighs 20 tons, has 4 wheels, travels at 3 mph on site.
Grader:	0.48 lb/mile	Vehicle weighs 15 tons, has 6 wheels, travels at 3 mph on site.

Reference: Table A9-9-D, CEQA Handbook; Caterpillar Performance Handbook. Assumes silt loading of 8% (Mining Haul Road, Table A9-9-D-1).
For other equipment traveling on unpaved roads, maximum speed on site assumed to be 5 mph.
Fugitive dust from other equipment (loader) travel on paved or unpaved roads assumed to be negligible relative to other equipment.

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Daily Emissions

	Daily Emissions (lb/day) - Before Mitigation					*Daily Emissions (lb/day) - After Mitigation*				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Excavator	1.7	7.4	21.8	-	1.0	1.7	7.4	18.7	-	0.4
Loader, CAT 950G	1.4	6.2	18.2	-	0.8	1.4	6.2	15.7	-	0.3
Crane	4.1	18.2	55.9	-	2.4	4.1	18.2	48.1	-	0.9
Tractor	2.2	9.4	27.6	-	1.3	2.2	9.4	23.7	-	0.5
Ventilation Blower	1.0	2.7	3.8	-	0.4	1.0	2.7	3.3	-	0.1
Generator	1.1	2.9	4.0	-	0.4	1.1	2.9	3.4	-	0.1
Backhoe	1.4	4.7	12.3	-	0.9	1.4	4.7	10.6	-	0.3
Hydraulic Power Unit	0.8	2.2	3.0	-	0.3	0.8	2.2	2.6	-	0.1
Auger, 370-foot	1.0	2.7	3.8	-	0.4	1.0	2.7	3.3	-	0.1
Concrete Pump	1.5	4.1	5.6	-	0.6	1.5	4.1	4.8	-	0.2
Paver	1.8	6.1	15.8	-	1.1	1.8	6.1	13.6	-	0.4
Roller	1.6	7.0	20.7	-	1.0	1.6	7.0	17.8	-	0.4
Grader	1.4	6.0	16.6	-	0.8	1.4	6.0	14.3	-	0.3
Drill Rig	2.4	10.2	30.0	-	1.4	2.4	10.2	25.8	-	0.5
Tunnel Boring Machine	3.6	16.1	49.4	-	2.1	3.6	16.1	42.5	-	0.8
Hydraulic Boring Machine	3.6	16.1	49.4	-	2.1	3.6	16.1	42.5	-	0.8
Water Truck (4,000 gal) [HHDT]	0.2	1.2	2.4	-	0.1	0.2	1.2	2.4	-	0.1
Dump Truck [HHDT]	0.1	0.5	2.1	-	0.1	0.1	0.5	2.1	-	0.1
Flat Bed Truck (HHDT)	0.6	2.9	12.8	0.1	0.3	0.6	2.9	12.8	0.1	0.3
Utility/Pipe Carrier Truck (HHDT)	0.3	1.2	5.5	0.1	0.1	0.3	1.2	5.5	0.1	0.1
Welding Truck (HHDT)	-	0.2	0.6	-	-	-	0.2	0.6	-	-
Concrete Truck (HHDT)	0.7	3.1	13.6	0.2	0.4	0.7	3.1	13.6	0.2	0.4
Worker commute vehicle [LDT1-ALL]	0.5	6.4	0.5	-	-	0.5	6.4	0.5	-	-
Fugitive Dust	-	-	-	-	318.4	-	-	-	-	318.4
Total	*33.0*	*137.5*	*375.4*	*0.4*	*336.4*	*33.0*	*137.5*	*328.2*	*0.4*	*325.6*

Notes:

Mitigation assumes use of PuriNOx fuel for off-road diesel construction equipment:

NOx reduction: 14.0%
PM10 reduction: 63.0%

Daily Emissions - Grouped by Equipment/Activity Type

	Daily Emissions (lb/day) - Before Mitigation					*Daily Emissions (lb/day) - After Mitigation*				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Construction Equipment	32.5	131.1	374.9	0.4	18.0	32.5	131.1	327.7	0.4	7.2
Commute Vehicles	0.5	6.4	0.5	-	-	0.5	6.4	0.5	-	-
Fugitive Dust	-	-	-	-	318.4	-	-	-	-	318.4
Total	*33.0*	*137.5*	*375.4*	*0.4*	*336.4*	*33.0*	*137.5*	*328.2*	*0.4*	*325.6*

SLRC Project
Construction Emissions
Task 7 - Regulating Station and Relief Stations

Equipment/Activity Descriptions

Equipment/Activity	*Hp Rating*	*Load Factor*	*Number Active*	*Equip-Hrs Day*	*Miles/ Day/ Vehicle*	*Idling Min/Day/ Vehicle*	Equipment Type
Excavator	188	0.58	1	10	-	-	Off-Road
Loader, CAT 950G	196	0.465	1	10	-	-	Off-Road
Crane	345	0.430	2	10	-	-	Off-Road
Tractor	240	0.575	1	10	-	-	Off-Road
Ventilation Blower	50	0.500	1	10	-	-	Off-Road
Generator	36	0.740	1	10	-	-	Off-Road
Backhoe	110	0.465	1	10	-	-	Off-Road
Hydraulic Power Unit	40	0.500	1	10	-	-	Off-Road
Auger, 370-foot	50	0.500	1	10	-	-	Off-Road
Concrete Pump	50	0.740	1	10	-	-	Off-Road
Paver	50	0.590	1	10	-	-	Off-Road
Roller	180	0.575	1	10	-	-	Off-Road
Grader	140	0.575	1	10	-	-	Off-Road
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	1	10	50	60	On-Road
Dump Truck, Kenworth (20 yd3) [HHDT]	-	-	1	10	60	90	On-Road
Flat Bed Truck (HHDT)	-	-	1	10	60	90	On-Road
Utility Truck/Pipe Carrier (HHDT)	-	-	3	10	50	90	On-Road
Welding Truck (HHDT)	-	-	1	10	10	90	On-Road
Concrete Truck (HHDT)	-	-	15	10	40	90	On-Road
Worker commute vehicle [LDT1-ALL]	-	-	14	-	25	-	On-Road

Notes:

Load factors and horsepower ratings from 1993 SCAQMD CEQA Handbook (Tables A9-8-C and A9-8-D), LADWP project team, and Caterpillar Handbook.

Work schedule: 10 hours/day plus 1 hour/day for lunch (7am - 8pm) Monday through Friday, and 8 hours/day plus 1 hour lunch (8am - 5 pm) on Saturday.

Number of workers per day: 10-14 per day.

Construction of the regulating station would take place approximately from April through October 2009.

Approximately 330 cubic yards of concrete would be required for construction of the regulating station. Approximately 5 to 15 trucks per day would deliver up to 130 cubic yards of concrete per day to the site for approximately 5 days. Concrete would be obtained from the Southern California area, specifically Los Angeles and Orange counties.

SLRC Project
Construction Emissions
Task 7 - Regulating Station and Relief Stations

Emission Factors for Off-Road Construction Equipment

	Emission Factors						
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Excavator	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Loader, CAT 950G	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Crane	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Tractor	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Ventilation Blower	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Generator	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Backhoe	1.22	4.17	10.88	0.01	0.77	g/hp-hr	(1)
Hydraulic Power Unit	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Auger, 370-foot	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Concrete Pump	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Paver	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Roller	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Grader	0.77	3.39	9.33	0.01	0.45	g/hp-hr	(1)

(1) Composite based on CARB OFFROAD Emissions Model (1999). SOx emission factor assumes fuel has maximum sulfur content of 15 ppmw (SCAQMD Rule 431.2 requirement effective 1 January 2005).

Emission Factors for On-Road Heavy Duty Trucks

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
On-road Truck - Idle	4.41	26.30	80.70	0.34	1.84	grams/hr	(1)
On-road Truck - 5 mph	1.85	10.53	20.27	0.18	0.83	grams/mile	(1)
On-road Truck - 10 mph	1.45	7.26	16.81	0.18	0.79	grams/mile	(1)
On-road Truck - 25 mph	0.80	3.13	11.88	0.18	0.44	grams/mile	(1)
On-road Truck - 55 mph	0.44	1.98	15.47	0.18	0.24	grams/mile	(1)
On-road Trucks - Composite (Water Truck)	1.85	10.53	20.27	0.18	0.83	grams/mile	(2)
On-road Trucks - Composite (Other Trucks)	0.69	2.97	14.17	0.18	0.38	grams/mile	(3)

(1) From CARB's EMFAC2002 (v2.2). Assumes: Heavy duty diesel truck (HHDT), Location: SCAQMD, Temp.: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire wear and brake wear included with fugitive dust).
Based on EMFAC emission factors for Year 2006.

(2) Assumes water truck travel at 5 miles per hour (mph) maximum. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

(3) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

Emission Factors for On-Road Construction Worker Vehicles

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Worker Trips - 10 mph	0.92	11.15	0.79	0.01	0.04	grams/mile	(1)
Worker Trips - 25 mph	0.50	7.25	0.59	0.01	0.02	grams/mile	(1)
Worker Trips - 55 mph	0.40	5.71	0.59	0.00	0.01	grams/mile	(1)
Worker Trips - Composite	0.49	6.87	0.61	0.00	0.02	grams/mile	(2)

(1) From CARB's EMFAC2002 (v2.2). Units in grams/mile. Assumptions: Location: SCAQMD, Temperature: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire and brake wear included with fugitive dust). Conservatively assumes light-duty trucks, composite (LDT1-ALL).
ROG emission factors includes evaporative running loss of 0.2017 grams/mile.
Based on EMFAC emission factors for Year 2006.
Starting emissions (grams/trip, after 600 minutes): ROG (1.52), CO (17.59), Nox (0.66), SOx (0.003), PM10 (0.015).
Hot soak emissions (grams/trip): ROG (0.326).
Partial day diurnal emissions (grams/hr): ROG (0.013).
Resting losses (grams/hr): ROG (0.077).

(2) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Composite emission factor is used for worker commute vehicles. On-site pickup trucks are assumed to average 10 mph while on site.

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Fugitive Dust

	Emissions (lb/day) - Before Mitigation					Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Excavator	-	-	-	-	-	-	-	-	-	-
Loader, CAT 950G	-	-	-	-	-	-	-	-	-	-
Crane	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-
Ventilation Blower	-	-	-	-	-	-	-	-	-	-
Generator	-	-	-	-	-	-	-	-	-	-
Backhoe	-	-	-	-	-	-	-	-	-	-
Hydraulic Power Unit	-	-	-	-	-	-	-	-	-	-
Auger, 370-foot	-	-	-	-	-	-	-	-	-	-
Concrete Pump	-	-	-	-	-	-	-	-	-	-
Paver	-	-	-	-	-	-	-	-	-	-
Roller	-	-	-	-	-	-	-	-	-	-
Grader	-	-	-	-	21.5	-	-	-	-	21.5
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	-	-	29.9	-	-	-	-	29.9
Dump Truck, Kenworth (20 yd3) [HHDT]	-	-	-	-	15.7	-	-	-	-	15.7
Flat Bed Truck (HHDT)	-	-	-	-	15.5	-	-	-	-	15.5
Utility Truck/Pipe Carrier (HHDT)	-	-	-	-	38.6	-	-	-	-	38.6
Welding Truck (HHDT)	-	-	-	-	3.1	-	-	-	-	3.1
Concrete Truck (HHDT)	-	-	-	-	142.1	-	-	-	-	142.1
Worker commute vehicle [LDT1-ALL]	-	-	-	-	1.9	-	-	-	-	1.9
Material transfer operations	-	-	-	-	-	-	-	-	-	-
Wind Erosion of Stockpiles	-	-	-	-	2.5	-	-	-	-	2.5
Total	-	-	-	-	270.8	-	-	-	-	270.8

Notes:
Fugitive PM10 emissions estimates assume watering is used to control emissions by: 50% (Table A11-9-A, CEQA Handbook)
Watering required per SCAQMD Rule 403, so watering and resulting reduction in fugitive dust is not considered mitigation.
No reduction assumed for off-site travel on paved roads (eg., worker commute vehicles) because watering only occurs on site.
Fugitive PM10 emissions for on-road vehicles also include break and tire wear.
Fugitive dust from equipment with "-" assumed to be negligible relative to other equipment.

Wind Erosion of Storage Piles:
PM10 Emissions (lb/day/acre) = 1.7 * (G / 1.5) * ((365 - H) / 235) * (I / 15) * 0.5

Description	Value		References/Notes
Silt Content (G):	15	% wt	Blended ore and dirt (Table A9-9-E-1, CEQA Handbook)
Days of Rain per Year >0.01 in (H):	34		Average year for South Coast Air Basin (Table A9-9-E-2, CEQA Handbook)
% of Time Wind Speed > 12 mph (I):	50	%	Assumption
Storage pile size:	0.125	acre	Assumption
PM10 from storage piles:	5.0	lb/day	Uncontrolled

References:
1993 CEQA Handbook, Table A9-9-E

Material Handling/Drop Operations:
PM10 Emissions (lb/ton) = k * (0.0032) * ((u / 5)^(1.3) / (M / 2)^(1.4))

Description	Value		References/Notes
Unitless particle size multiplier (k):	0.35		AP42
Mean wind speed (u):	6.2	mph	EPA Tanks v4.0 (Average wind speed for LA County = 6.2 mi/hr)
Material moisture content (M):	5	%	Table A9-9-G-1, 1993 CEQA Handbook (Dry=2.0%, Moist=15.0%, Wet=50.0%)
PM10 Emission factor:	4E-04	lb/ton	Uncontrolled
Soil handled:	25	ton/day	Assumption based on project description
PM10 emissions:	0.0	lb/day	Uncontrolled

References:
AP42, Section 13.2.4 (Aggregate Handling and Storage Piles, 1/95)
Table 9-9-G, 1993 CEQA Handbook.

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Grader:

PM10 Emissions (lbs/VMT) = 0.60 * 0.051 * (S)^(2.0)

Description	Value	References/Notes
Mean vehicle speed (S):	5 mph	Assumption
PM10 Emissions:	0.77 lb/VMT	AP42, Table 11.9-1
VMT/day:	37.5 mi/day	Assumed to travel at mean vehicle speed for 75% of work day.
PM10 Emissions:	28.7 lb/day/unit	Uncontrolled

References:

AP42, Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98), Grading Operations.

Passenger vehicle travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Local streets	0.018 lb/mile	Table A9-9-B, CEQA Handbook
Collector streets:	0.013 lb/mile	Table A9-9-B, CEQA Handbook
Major Streets/Highways:	0.0064 lb/mile	Table A9-9-B, CEQA Handbook
Freeways:	0.00065 lb/mile	Table A9-9-B, CEQA Handbook
PM10 Emission factor (composite)	0.005345 lb/mile	Assumption (10% Local, 10% Collector, 30% Major Street, 50% Freeway)

Truck travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Construction sites w/cleaning:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Local streets:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Collector streets:	0.54 lb/mile	Table A9-9-C, CEQA Handbook
Major streets/highways:	0.43 lb/mile	Table A9-9-C, CEQA Handbook
Freeway:	0.18 lb/mile	Table A9-9-C, CEQA Handbook
Composite (dump truck):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (delivery-type trucks):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (other project trucks)	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)
Composite (pickup truck):	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)

Reference: Table A9-9-D, CEQA Handbook.

Vehicle travel on UNPAVED roads:

Description	PM10 Emissions	References/Notes
Dump truck:	1.55 lb/mile	Vehicle weighs 10 tons, has 10 wheels, travels at 10 mph on site.
Concrete truck/Water truck:	1.26 lb/mile	Vehicle weighs 20 tons, has 10 wheels, travels at 5 mph on site.
Tractor trailer truck:	1.38 lb/mile	Vehicle weighs 15 tons, has 18 wheels, travels at 5 mph on site.
Grader:	0.48 lb/mile	Vehicle weighs 15 tons, has 6 wheels, travels at 3 mph on site.

Reference: Table A9-9-D, CEQA Handbook; Caterpillar Performance Handbook. Assumes silt loading of 8% (Mining Haul Road, Table A9-9-D-1).

For other equipment traveling on unpaved roads, maximum speed on site assumed to be 5 mph.

Fugitive dust from other equipment (loader) travel on paved or unpaved roads assumed to be negligible relative to other equipment.

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Task 7 - Regulating Station and Relief Stations

Daily Emissions

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Excavator	1.7	7.4	21.8	-	1.0	1.7	7.4	18.7	-	0.4
Loader, CAT 950G	1.4	6.2	18.2	-	0.8	1.4	6.2	15.7	-	0.3
Crane	4.1	18.2	55.9	-	2.4	4.1	18.2	48.1	-	0.9
Tractor	2.2	9.4	27.6	-	1.3	2.2	9.4	23.7	-	0.5
Ventilation Blower	1.0	2.7	3.8	-	0.4	1.0	2.7	3.3	-	0.1
Generator	1.1	2.9	4.0	-	0.4	1.1	2.9	3.4	-	0.1
Backhoe	1.4	4.7	12.3	-	0.9	1.4	4.7	10.6	-	0.3
Hydraulic Power Unit	0.8	2.2	3.0	-	0.3	0.8	2.2	2.6	-	0.1
Auger, 370-foot	1.0	2.7	3.8	-	0.4	1.0	2.7	3.3	-	0.1
Concrete Pump	1.5	4.1	5.6	-	0.6	1.5	4.1	4.8	-	0.2
Paver	1.2	3.2	4.5	-	0.5	1.2	3.2	3.9	-	0.2
Roller	1.6	7.0	20.7	-	1.0	1.6	7.0	17.8	-	0.4
Grader	1.4	6.0	16.6	-	0.8	1.4	6.0	14.3	-	0.3
Water Truck, Peterbilt (4,000 gal) [HHDT]	0.2	1.2	2.4	-	0.1	0.2	1.2	2.4	-	0.1
Dump Truck, Kenworth (20 yd3) [HHDT]	0.1	0.5	2.1	-	0.1	0.1	0.5	2.1	-	0.1
Flat Bed Truck (HHDT)	0.1	0.5	2.1	-	0.1	0.1	0.5	2.1	-	0.1
Utility Truck/Pipe Carrier (HHDT)	0.3	1.2	5.5	0.1	0.1	0.3	1.2	5.5	0.1	0.1
Welding Truck (HHDT)	-	0.2	0.6	-	-	-	0.2	0.6	-	-
Concrete Truck (HHDT)	1.1	5.2	22.7	0.3	0.6	1.1	5.2	22.7	0.3	0.6
Worker commute vehicle [LDT1-ALL]	0.5	6.4	0.5	-	-	0.5	6.4	0.5	-	-
Fugitive Dust	-	-	-	-	270.8	-	-	-	-	270.8
Total	*22.7*	*91.9*	*233.7*	*0.4*	*282.6*	*22.7*	*91.9*	*206.1*	*0.4*	*275.7*

Notes:

Mitigation assumes use of PuriNOx fuel for off-road diesel construction equipment:

NOx reduction:	14.0%
PM10 reduction:	63.0%

Daily Emissions - Grouped by Equipment/Activity Type

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Construction Equipment	22.2	85.5	233.2	0.4	11.8	22.2	85.5	205.6	0.4	4.9
Commute Vehicles	0.5	6.4	0.5	-	-	0.5	6.4	0.5	-	-
Fugitive Dust	-	-	-	-	270.8	-	-	-	-	270.8
Total	*22.7*	*91.9*	*233.7*	*0.4*	*282.6*	*22.7*	*91.9*	*206.1*	*0.4*	*275.7*

SLRC Project
Construction Emissions
Task 8 - Removal of Silver Lake Reservoir from Service

Equipment/Activity Descriptions

Equipment/Activity	*Hp Rating*	*Load Factor*	*Number Active*	*Equip-Hrs Day*	*Miles/ Day/ Vehicle*	*Idling Min/Day/ Vehicle*	Equipment Type
Excavator	188	0.58	1	10	-	-	Off-Road
Loader, CAT 950G	196	0.465	1	10	-	-	Off-Road
Crane	345	0.430	2	10	-	-	Off-Road
Tractor	600	0.575	1	10	-	-	Off-Road
Ventilation Blower	50	0.500	1	10	-	-	Off-Road
Generator	36	0.740	1	10	-	-	Off-Road
Backhoe	110	0.465	1	10	-	-	Off-Road
Drill Dig	50	0.500	1	10	-	-	Off-Road
Concrete Pump	50	0.740	1	10	-	-	Off-Road
Paver	112	0.590	1	10	-	-	Off-Road
Roller	180	0.575	1	10	-	-	Off-Road
Grader	145	0.575	1	10	-	-	Off-Road
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	1	10	50	60	On-Road
Dump Truck, Kenworth (20 yd3) [HHDT]	-	-	1	10	60	90	On-Road
Flat Bed Truck (HHDT)	-	-	1	10	60	90	On-Road
Utility Truck/Pipe Carrier (HHDT)	-	-	2	10	50	90	On-Road
Welding Truck (HHDT)	-	-	1	10	10	90	On-Road
Concrete Truck (HHDT)	-	-	12	10	40	90	On-Road
Worker commute vehicle [LDT1-ALL]	-	-	14	-	25	-	On-Road

Notes:

Load factors and horsepower ratings from 1993 SCAQMD CEQA Handbook (Tables A9-8-C and A9-8-D), LADWP project team, and Caterpillar Handbook.

Work schedule: 10 hours/day plus 1 hour/day for lunch (7am - 8pm) Monday through Friday, and 8 hours/day plus 1 hour lunch (8am - 5 pm) on Saturday.

Number of workers per day: 10-14 per day.

Removal of the Silver Lake Reservoir from Service would take place approximately from October 2007 through August 2008.

Twelve concrete trucks per day would be needed during the construction of the vault lid and base. Number of concrete trucks during other period of the construction would be less than 12. The emissions were based on 12 concrete trucks working for one day to estimate the maximum emissions. T

Concrete would be obtained from the Southern California area, specifically Los Angeles and Orange counties.

SLRC Project
Construction Emissions
Task 8 - Removal of Silver Lake Reservoir from Service

Emission Factors for Off-Road Construction Equipment

	Emission Factors						
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Excavator	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Loader, CAT 950G	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Crane	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Tractor	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Ventilation Blower	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Generator	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Backhoe	1.22	4.17	10.88	0.01	0.77	g/hp-hr	(1)
Drill Dig	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Concrete Pump	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Paver	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Roller	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Grader	0.77	3.39	9.33	0.01	0.45	g/hp-hr	(1)

(1) Composite based on CARB OFFROAD Emissions Model (1999). SOx emission factor assumes fuel has maximum sulfur content of 15 ppmw (SCAQMD Rule 431.2 requirement effective 1 January 2005).

Emission Factors for On-Road Heavy Duty Trucks

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
On-road Truck - Idle	4.41	26.30	80.70	0.34	1.84	grams/hr	(1)
On-road Truck - 5 mph	1.85	10.53	20.27	0.18	0.83	grams/mile	(1)
On-road Truck - 10 mph	1.45	7.26	16.81	0.18	0.79	grams/mile	(1)
On-road Truck - 25 mph	0.80	3.13	11.88	0.18	0.44	grams/mile	(1)
On-road Truck - 55 mph	0.44	1.98	15.47	0.18	0.24	grams/mile	(1)
On-road Trucks - Composite (Water Truck)	1.85	10.53	20.27	0.18	0.83	grams/mile	(2)
On-road Trucks - Composite (Other Trucks)	0.69	2.97	14.17	0.18	0.38	grams/mile	(3)

(1) From CARB's EMFAC2002 (v2.2). Assumes: Heavy duty diesel truck (HHDT), Location: SCAQMD, Temp.: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire wear and brake wear included with fugitive dust).
Based on EMFAC emission factors for Year 2006.
(2) Assumes water truck travel at 5 miles per hour (mph) maximum. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.
(3) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

Emission Factors for On-Road Construction Worker Vehicles

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Worker Trips - 10 mph	0.92	11.15	0.79	0.01	0.04	grams/mile	(1)
Worker Trips - 25 mph	0.50	7.25	0.59	0.01	0.02	grams/mile	(1)
Worker Trips - 55 mph	0.40	5.71	0.59	0.00	0.01	grams/mile	(1)
Worker Trips - Composite	0.49	6.87	0.61	0.00	0.02	grams/mile	(2)

(1) From CARB's EMFAC2002 (v2.2). Units in grams/mile. Assumptions: Location: SCAQMD, Temperature: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire and brake wear included with fugitive dust). Conservatively assumes light-duty trucks, composite (LDT1-ALL).
ROG emission factors includes evaporative running loss of 0.2017 grams/mile.
Based on EMFAC emission factors for Year 2006.
Starting emissions (grams/trip, after 600 minutes): ROG (1.52), CO (17.59), Nox (0.66), SOx (0.003), PM10 (0.015).
Hot soak emissions (grams/trip): ROG (0.326).
Partial day diurnal emissions (grams/hr): ROG (0.013).
Resting losses (grams/hr): ROG (0.077).
(2) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Composite emission factor is used for worker commute vehicles. On-site pickup trucks are assumed to average 10 mph while on site.

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Fugitive Dust

	Emissions (lb/day) - Before Mitigation					Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Excavator	-	-	-	-	-	-	-	-	-	-
Loader, CAT 950G	-	-	-	-	-	-	-	-	-	-
Crane	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-
Ventilation Blower	-	-	-	-	-	-	-	-	-	-
Generator	-	-	-	-	-	-	-	-	-	-
Backhoe	-	-	-	-	-	-	-	-	-	-
Drill Dig	-	-	-	-	-	-	-	-	-	-
Concrete Pump	-	-	-	-	-	-	-	-	-	-
Paver	-	-	-	-	-	-	-	-	-	-
Roller	-	-	-	-	-	-	-	-	-	-
Grader	-	-	-	-	21.5	-	-	-	-	21.5
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	-	-	29.9	-	-	-	-	29.9
Dump Truck, Kenworth (20 yd3) [HHDT]	-	-	-	-	15.7	-	-	-	-	15.7
Flat Bed Truck (HHDT)	-	-	-	-	15.5	-	-	-	-	15.5
Utility Truck/Pipe Carrier (HHDT)	-	-	-	-	25.8	-	-	-	-	25.8
Welding Truck (HHDT)	-	-	-	-	3.1	-	-	-	-	3.1
Concrete Truck (HHDT)	-	-	-	-	113.7	-	-	-	-	113.7
Worker commute vehicle [LDT1-ALL]	-	-	-	-	1.9	-	-	-	-	1.9
Material transfer operations	-	-	-	-	-	-	-	-	-	-
Wind Erosion of Stockpiles	-	-	-	-	2.5	-	-	-	-	2.5
Total	-	-	-	-	229.6	-	-	-	-	229.6

Notes:
Fugitive PM10 emissions estimates assume watering is used to control emissions by: 50% (Table A11-9-A, CEQA Handbook)
Watering required per SCAQMD Rule 403, so watering and resulting reduction in fugitive dust is not considered mitigation.
No reduction assumed for off-site travel on paved roads (eg., worker commute vehicles) because watering only occurs on site.
Fugitive PM10 emissions for on-road vehicles also include break and tire wear.
Fugitive dust from equipment with "-" assumed to be negligible relative to other equipment.

Wind Erosion of Storage Piles:
PM10 Emissions (lb/day/acre) = 1.7 * (G / 1.5) * ((365 - H) / 235) * (I / 15) * 0.5

Description	Value		References/Notes
Silt Content (G):	15	% wt	Blended ore and dirt (Table A9-9-E-1, CEQA Handbook)
Days of Rain per Year >0.01 in (H):	34		Average year for South Coast Air Basin (Table A9-9-E-2, CEQA Handbook)
% of Time Wind Speed > 12 mph (I):	50	%	Assumption
Storage pile size:	0.125	acre	Assumption
PM10 from storage piles:	5.0	lb/day	Uncontrolled

References:
1993 CEQA Handbook, Table A9-9-E

Material Handling/Drop Operations:
PM10 Emissions (lb/ton) = k * (0.0032) * ((u / 5)^(1.3) / (M / 2)^(1.4))

Description	Value		References/Notes
Unitless particle size multiplier (k):	0.35		AP42
Mean wind speed (u):	6.2	mph	EPA Tanks v4.0 (Average wind speed for LA County = 6.2 mi/hr)
Material moisture content (M):	5	%	Table A9-9-G-1, 1993 CEQA Handbook (Dry=2.0%, Moist=15.0%, Wet=50.0%)
PM10 Emission factor:	4E-04	lb/ton	Uncontrolled
Soil handled:	25	ton/day	Assumption based on project description
PM10 emissions:	0.0	lb/day	Uncontrolled

References:
AP42, Section 13.2.4 (Aggregate Handling and Storage Piles, 1/95)
Table 9-9-G, 1993 CEQA Handbook.

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Grader:

PM10 Emissions (lbs/VMT) = 0.60 * 0.051 * (S)^(2.0)

Description	Value	References/Notes
Mean vehicle speed (S):	5 mph	Assumption
PM10 Emissions:	0.77 lb/VMT	AP42, Table 11.9-1
VMT/day:	37.5 mi/day	Assumed to travel at mean vehicle speed for 75% of work day.
PM10 Emissions:	28.7 lb/day/unit	Uncontrolled

References:

AP42, Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98), Grading Operations.

Passenger vehicle travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Local streets	0.018 lb/mile	Table A9-9-B, CEQA Handbook
Collector streets:	0.013 lb/mile	Table A9-9-B, CEQA Handbook
Major Streets/Highways:	0.0064 lb/mile	Table A9-9-B, CEQA Handbook
Freeways:	0.00065 lb/mile	Table A9-9-B, CEQA Handbook
PM10 Emission factor (composite)	0.005345 lb/mile	Assumption (10% Local, 10% Collector, 30% Major Street, 50% Freeway)

Truck travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Construction sites w/cleaning:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Local streets:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Collector streets:	0.54 lb/mile	Table A9-9-C, CEQA Handbook
Major streets/highways:	0.43 lb/mile	Table A9-9-C, CEQA Handbook
Freeway:	0.18 lb/mile	Table A9-9-C, CEQA Handbook
Composite (dump truck):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (delivery-type trucks):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (other project trucks)	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)
Composite (pickup truck):	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)

Reference: Table A9-9-D, CEQA Handbook.

Vehicle travel on UNPAVED roads:

Description	PM10 Emissions	References/Notes
Dump truck:	1.55 lb/mile	Vehicle weighs 10 tons, has 10 wheels, travels at 10 mph on site.
Concrete truck/Water truck:	1.26 lb/mile	Vehicle weighs 20 tons, has 10 wheels, travels at 5 mph on site.
Tractor trailer truck:	1.38 lb/mile	Vehicle weighs 15 tons, has 18 wheels, travels at 5 mph on site.
Grader:	0.48 lb/mile	Vehicle weighs 15 tons, has 6 wheels, travels at 3 mph on site.

Reference: Table A9-9-D, CEQA Handbook; Caterpillar Performance Handbook. Assumes silt loading of 8% (Mining Haul Road, Table A9-9-D-1).

For other equipment traveling on unpaved roads, maximum speed on site assumed to be 5 mph.

Fugitive dust from other equipment (loader) travel on paved or unpaved roads assumed to be negligible relative to other equipment.

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Daily Emissions

	Daily Emissions (lb/day) - Before Mitigation					*Daily Emissions (lb/day) - After Mitigation*				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Excavator	1.7	7.4	21.8	-	1.0	1.7	7.4	18.7	-	0.4
Loader, CAT 950G	1.4	6.2	18.2	-	0.8	1.4	6.2	15.7	-	0.3
Crane	4.1	18.2	55.9	-	2.4	4.1	18.2	48.1	-	0.9
Tractor	5.5	23.4	68.9	-	3.2	5.5	23.4	59.3	-	1.2
Ventilation Blower	1.0	2.7	3.8	-	0.4	1.0	2.7	3.3	-	0.1
Generator	1.1	2.9	4.0	-	0.4	1.1	2.9	3.4	-	0.1
Backhoe	1.4	4.7	12.3	-	0.9	1.4	4.7	10.6	-	0.3
Drill Dig	1.0	2.7	3.8	-	0.4	1.0	2.7	3.3	-	0.1
Concrete Pump	1.5	4.1	5.6	-	0.6	1.5	4.1	4.8	-	0.2
Paver	2.6	7.2	10.0	-	1.1	2.6	7.2	8.6	-	0.4
Roller	1.6	7.0	20.7	-	1.0	1.6	7.0	17.8	-	0.4
Grader	1.4	6.2	17.1	-	0.8	1.4	6.2	14.7	-	0.3
Water Truck, Peterbilt (4,000 gal) [HHDT]	0.2	1.2	2.4	-	0.1	0.2	1.2	2.4	-	0.1
Dump Truck, Kenworth (20 yd3) [HHDT]	0.1	0.5	2.1	-	0.1	0.1	0.5	2.1	-	0.1
Flat Bed Truck (HHDT)	0.1	0.5	2.1	-	0.1	0.1	0.5	2.1	-	0.1
Utility Truck/Pipe Carrier (HHDT)	0.2	0.8	3.7	-	0.1	0.2	0.8	3.7	-	0.1
Welding Truck (HHDT)	-	0.2	0.6	-	-	-	0.2	0.6	-	-
Concrete Truck (HHDT)	0.9	4.2	18.2	0.2	0.5	0.9	4.2	18.2	0.2	0.5
Worker commute vehicle [LDT1-ALL]	0.5	6.4	0.5	-	-	0.5	6.4	0.5	-	-
Fugitive Dust	-	-	-	-	229.6	-	-	-	-	229.6
Total	*26.3*	*106.5*	*271.7*	*0.2*	*243.5*	*26.3*	*106.5*	*237.9*	*0.2*	*235.2*

Notes:

Mitigation assumes use of PuriNOx fuel for off-road diesel construction equipment:

NOx reduction:	14.0%
PM10 reduction:	63.0%

Daily Emissions - Grouped by Equipment/Activity Type

	Daily Emissions (lb/day) - Before Mitigation					*Daily Emissions (lb/day) - After Mitigation*				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Construction Equipment	25.8	100.1	271.2	0.2	13.9	25.8	100.1	237.4	0.2	5.6
Commute Vehicles	0.5	6.4	0.5	-	-	0.5	6.4	0.5	-	-
Fugitive Dust	-	-	-	-	229.6	-	-	-	-	229.6
Total	*26.3*	*106.5*	*271.7*	*0.2*	*243.5*	*26.3*	*106.5*	*237.9*	*0.2*	*235.2*

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Construction Emissions
Task 9 - Removal of Ivanhoe Reservoir from Service

Equipment/Activity Descriptions

Equipment/Activity	*Hp Rating*	*Load Factor*	*Number Active*	*Equip-Hrs Day*	*Miles/ Day/ Vehicle*	*Idling Min/Day/ Vehicle*	Equipment Type
Excavator	188	0.58	1	10	-	-	Off-Road
Loader, CAT 950G	196	0.465	1	10	-	-	Off-Road
Crane	345	0.430	2	10	-	-	Off-Road
Tractor	600	0.575	1	10	-	-	Off-Road
Ventilation Blower	50	0.500	1	10	-	-	Off-Road
Generator	36	0.740	1	10	-	-	Off-Road
Backhoe	110	0.465	1	10	-	-	Off-Road
Drill Dig	50	0.500	1	10	-	-	Off-Road
Concrete Pump	50	0.740	1	10	-	-	Off-Road
Paver	112	0.590	1	10	-	-	Off-Road
Roller	180	0.575	1	10	-	-	Off-Road
Grader	145	0.575	1	10	-	-	Off-Road
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	1	10	50	60	On-Road
Dump Truck, Kenworth (20 yd3) [HHDT]	-	-	1	10	60	90	On-Road
Flat Bed Truck (HHDT)	-	-	1	10	60	90	On-Road
Utility Truck/Pipe Carrier (HHDT)	-	-	2	10	50	90	On-Road
Welding Truck (HHDT)	-	-	1	10	10	90	On-Road
Concrete Truck (HHDT)	-	-	13	10	40	90	On-Road
Worker commute vehicle [LDT1-ALL]	-	-	14	-	25	-	On-Road

Notes:

Load factors and horsepower ratings from 1993 SCAQMD CEQA Handbook (Tables A9-8-C and A9-8-D), LADWP project team, and Caterpillar Handbook.

Work schedule: 10 hours/day plus 1 hour/day for lunch (7am - 8pm) Monday through Friday, and 8 hours/day plus 1 hour lunch (8am - 5 pm) on Saturday.

Number of workers per day: 10-14 per day.

Removal of the Silver Lake Reservoir from Service would take place approximately from October 2007 through August 2008.

Approximately 17,000 cubic yards of concrete would be required during the construction. Approximately 13 truck loads per day for 5 days would be needed.

Concrete would be obtained from the Southern California area, specifically Los Angeles and Orange counties.

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Construction Emissions
Task 9 - Removal of Ivanhoe Reservoir from Service

Emission Factors for Off-Road Construction Equipment

	Emission Factors						
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Excavator	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Loader, CAT 950G	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Crane	0.63	2.78	8.54	0.01	0.37	g/hp-hr	(1)
Tractor	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Ventilation Blower	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Generator	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Backhoe	1.22	4.17	10.88	0.01	0.77	g/hp-hr	(1)
Drill Dig	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Concrete Pump	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Paver	1.81	4.97	6.85	0.01	0.75	g/hp-hr	(1)
Roller	0.72	3.08	9.06	0.01	0.42	g/hp-hr	(1)
Grader	0.77	3.39	9.33	0.01	0.45	g/hp-hr	(1)

(1) Composite based on CARB OFFROAD Emissions Model (1999). SOx emission factor assumes fuel has maximum sulfur content of 15 ppmw (SCAQMD Rule 431.2 requirement effective 1 January 2005).

Emission Factors for On-Road Heavy Duty Trucks

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
On-road Truck - Idle	4.41	26.30	80.70	0.34	1.84	grams/hr	(1)
On-road Truck - 5 mph	1.85	10.53	20.27	0.18	0.83	grams/mile	(1)
On-road Truck - 10 mph	1.45	7.26	16.81	0.18	0.79	grams/mile	(1)
On-road Truck - 25 mph	0.80	3.13	11.88	0.18	0.44	grams/mile	(1)
On-road Truck - 55 mph	0.44	1.98	15.47	0.18	0.24	grams/mile	(1)
On-road Trucks - Composite (Water Truck)	1.85	10.53	20.27	0.18	0.83	grams/mile	(2)
On-road Trucks - Composite (Other Trucks)	0.69	2.97	14.17	0.18	0.38	grams/mile	(3)

(1) From CARB's EMFAC2002 (v2.2). Assumes: Heavy duty diesel truck (HHDT), Location: SCAQMD, Temp.: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire wear and brake wear included with fugitive dust).
Based on EMFAC emission factors for Year 2006.

(2) Assumes water truck travel at 5 miles per hour (mph) maximum. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

(3) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Although not included in this composite emission factor, daily emissions estimates (see below) include idling emissions.

Emission Factors for On-Road Construction Worker Vehicles

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
Worker Trips - 10 mph	0.92	11.15	0.79	0.01	0.04	grams/mile	(1)
Worker Trips - 25 mph	0.50	7.25	0.59	0.01	0.02	grams/mile	(1)
Worker Trips - 55 mph	0.40	5.71	0.59	0.00	0.01	grams/mile	(1)
Worker Trips - Composite	0.49	6.87	0.61	0.00	0.02	grams/mile	(2)

(1) From CARB's EMFAC2002 (v2.2). Units in grams/mile. Assumptions: Location: SCAQMD, Temperature: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire and brake wear included with fugitive dust). Conservatively assumes light-duty trucks, composite (LDT1-ALL).
ROG emission factors includes evaporative running loss of 0.2017 grams/mile.
Based on EMFAC emission factors for Year 2006.
Starting emissions (grams/trip, after 600 minutes): ROG (1.52), CO (17.59), Nox (0.66), SOx (0.003), PM10 (0.015).
Hot soak emissions (grams/trip): ROG (0.326).
Partial day diurnal emissions (grams/hr): ROG (0.013).
Resting losses (grams/hr): ROG (0.077).

(2) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Composite emission factor is used for worker commute vehicles. On-site pickup trucks are assumed to average 10 mph while on site.

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Fugitive Dust

	Emissions (lb/day) - Before Mitigation					*Emissions (lb/day) - After Mitigation*				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Excavator	-	-	-	-	-	-	-	-	-	-
Loader, CAT 950G	-	-	-	-	-	-	-	-	-	-
Crane	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-
Ventilation Blower	-	-	-	-	-	-	-	-	-	-
Generator	-	-	-	-	-	-	-	-	-	-
Backhoe	-	-	-	-	-	-	-	-	-	-
Drill Dig	-	-	-	-	-	-	-	-	-	-
Concrete Pump	-	-	-	-	-	-	-	-	-	-
Paver	-	-	-	-	-	-	-	-	-	-
Roller	-	-	-	-	-	-	-	-	-	-
Grader	-	-	-	-	21.5	-	-	-	-	21.5
Water Truck, Peterbilt (4,000 gal) [HHDT]	-	-	-	-	29.9	-	-	-	-	29.9
Dump Truck, Kenworth (20 yd3) [HHDT]	-	-	-	-	15.7	-	-	-	-	15.7
Flat Bed Truck (HHDT)	-	-	-	-	15.5	-	-	-	-	15.5
Utility Truck/Pipe Carrier (HHDT)	-	-	-	-	25.8	-	-	-	-	25.8
Welding Truck (HHDT)	-	-	-	-	3.1	-	-	-	-	3.1
Concrete Truck (HHDT)	-	-	-	-	123.2	-	-	-	-	123.2
Worker commute vehicle [LDT1-ALL]	-	-	-	-	1.9	-	-	-	-	1.9
Material transfer operations	-	-	-	-	-	-	-	-	-	-
Wind Erosion of Stockpiles	-	-	-	-	2.5	-	-	-	-	2.5
Total	-	-	-	-	239.1	-	-	-	-	239.1

Notes:
Fugitive PM10 emissions estimates assume watering is used to control emissions by: 50% (Table A11-9-A, CEQA Handbook)
Watering required per SCAQMD Rule 403, so watering and resulting reduction in fugitive dust is not considered mitigation.
No reduction assumed for off-site travel on paved roads (eg., worker commute vehicles) because watering only occurs on site.
Fugitive PM10 emissions for on-road vehicles also include break and tire wear.
Fugitive dust from equipment with "-" assumed to be negligible relative to other equipment.

Wind Erosion of Storage Piles:
PM10 Emissions (lb/day/acre) = 1.7 * (G / 1.5) * ((365 - H) / 235) * (I / 15) * 0.5

Description	Value		References/Notes
Silt Content (G):	15	% wt	Blended ore and dirt (Table A9-9-E-1, CEQA Handbook)
Days of Rain per Year >0.01 in (H):	34		Average year for South Coast Air Basin (Table A9-9-E-2, CEQA Handbook)
% of Time Wind Speed > 12 mph (I):	50	%	Assumption
Storage pile size:	0.125	acre	Assumption
PM10 from storage piles:	5.0	lb/day	Uncontrolled

References:
1993 CEQA Handbook, Table A9-9-E

Material Handling/Drop Operations:
PM10 Emissions (lb/ton) = k * (0.0032) * ((u / 5)^(1.3) / (M / 2)^(1.4))

Description	Value		References/Notes
Unitless particle size multiplier (k):	0.35		AP42
Mean wind speed (u):	6.2	mph	EPA Tanks v4.0 (Average wind speed for LA County = 6.2 mi/hr)
Material moisture content (M):	5	%	Table A9-9-G-1, 1993 CEQA Handbook (Dry=2.0%, Moist=15.0%, Wet=50.0%)
PM10 Emission factor:	4E-04	lb/ton	Uncontrolled
Soil handled:	25	ton/day	Assumption based on project description
PM10 emissions:	0.0	lb/day	Uncontrolled

References:
AP42, Section 13.2.4 (Aggregate Handling and Storage Piles, 1/95)
Table 9-9-G, 1993 CEQA Handbook.

SLRC Project
Construction Emissions
Task 9 - Removal of Ivanhoe Reservoir from Service

Grader:

PM10 Emissions (lbs/VMT) = 0.60 * 0.051 * (S)^(2.0)

Description	Value	References/Notes
Mean vehicle speed (S):	5 mph	Assumption
PM10 Emissions:	0.77 lb/VMT	AP42, Table 11.9-1
VMT/day:	37.5 mi/day	Assumed to travel at mean vehicle speed for 75% of work day.
PM10 Emissions:	28.7 lb/day/unit	Uncontrolled

References:

AP42, Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98), Grading Operations.

Passenger vehicle travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Local streets	0.018 lb/mile	Table A9-9-B, CEQA Handbook
Collector streets:	0.013 lb/mile	Table A9-9-B, CEQA Handbook
Major Streets/Highways:	0.0064 lb/mile	Table A9-9-B, CEQA Handbook
Freeways:	0.00065 lb/mile	Table A9-9-B, CEQA Handbook
PM10 Emission factor (composite)	0.005345 lb/mile	Assumption (10% Local, 10% Collector, 30% Major Street, 50% Freeway)

Truck travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Construction sites w/cleaning:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Local streets:	0.62 lb/mile	Table A9-9-C, CEQA Handbook
Collector streets:	0.54 lb/mile	Table A9-9-C, CEQA Handbook
Major streets/highways:	0.43 lb/mile	Table A9-9-C, CEQA Handbook
Freeway:	0.18 lb/mile	Table A9-9-C, CEQA Handbook
Composite (dump truck):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (delivery-type trucks):	0.47 lb/mile	Assumption (5% Construction Site, 10% Local, 10% Collector, 75% Major Street/highway)
Composite (other project trucks)	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)
Composite (pickup truck):	0.62 lb/mile	Assumption (50% Construction Site, 50% Local)

Reference: Table A9-9-D, CEQA Handbook.

Vehicle travel on UNPAVED roads:

Description	PM10 Emissions	References/Notes
Dump truck:	1.55 lb/mile	Vehicle weighs 10 tons, has 10 wheels, travels at 10 mph on site.
Concrete truck/Water truck:	1.26 lb/mile	Vehicle weighs 20 tons, has 10 wheels, travels at 5 mph on site.
Tractor trailer truck:	1.38 lb/mile	Vehicle weighs 15 tons, has 18 wheels, travels at 5 mph on site.
Grader:	0.48 lb/mile	Vehicle weighs 15 tons, has 6 wheels, travels at 3 mph on site.

Reference: Table A9-9-D, CEQA Handbook; Caterpillar Performance Handbook. Assumes silt loading of 8% (Mining Haul Road, Table A9-9-D-1).

For other equipment traveling on unpaved roads, maximum speed on site assumed to be 5 mph.

Fugitive dust from other equipment (loader) travel on paved or unpaved roads assumed to be negligible relative to other equipment.

SLRC Project
Construction Emissions
Task 9 - Removal of Ivanhoe Reservoir from Service

Daily Emissions

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Excavator	1.7	7.4	21.8	-	1.0	1.7	7.4	18.7	-	0.4
Loader, CAT 950G	1.4	6.2	18.2	-	0.8	1.4	6.2	15.7	-	0.3
Crane	4.1	18.2	55.9	-	2.4	4.1	18.2	48.1	-	0.9
Tractor	5.5	23.4	68.9	-	3.2	5.5	23.4	59.3	-	1.2
Ventilation Blower	1.0	2.7	3.8	-	0.4	1.0	2.7	3.3	-	0.1
Generator	1.1	2.9	4.0	-	0.4	1.1	2.9	3.4	-	0.1
Backhoe	1.4	4.7	12.3	-	0.9	1.4	4.7	10.6	-	0.3
Drill Dig	1.0	2.7	3.8	-	0.4	1.0	2.7	3.3	-	0.1
Concrete Pump	1.5	4.1	5.6	-	0.6	1.5	4.1	4.8	-	0.2
Paver	2.6	7.2	10.0	-	1.1	2.6	7.2	8.6	-	0.4
Roller	1.6	7.0	20.7	-	1.0	1.6	7.0	17.8	-	0.4
Grader	1.4	6.2	17.1	-	0.8	1.4	6.2	14.7	-	0.3
Water Truck, Peterbilt (4,000 gal) [HHDT]	0.2	1.2	2.4	-	0.1	0.2	1.2	2.4	-	0.1
Dump Truck, Kenworth (20 yd3) [HHDT]	0.1	0.5	2.1	-	0.1	0.1	0.5	2.1	-	0.1
Flat Bed Truck (HHDT)	0.1	0.5	2.1	-	0.1	0.1	0.5	2.1	-	0.1
Utility Truck/Pipe Carrier (HHDT)	0.2	0.8	3.7	-	0.1	0.2	0.8	3.7	-	0.1
Welding Truck (HHDT)	-	0.2	0.6	-	-	-	0.2	0.6	-	-
Concrete Truck (HHDT)	1.0	4.5	19.7	0.2	0.5	1.0	4.5	19.7	0.2	0.5
Worker commute vehicle [LDT1-ALL]	0.5	6.4	0.5	-	-	0.5	6.4	0.5	-	-
Fugitive Dust	-	-	-	-	239.1	-	-	-	-	239.1
Total	*26.4*	*106.8*	*273.2*	*0.2*	*253.0*	*26.4*	*106.8*	*239.4*	*0.2*	*244.7*

Notes:

Mitigation assumes use of PuriNOx fuel for off-road diesel construction equipment:

NOx reduction: 14.0%

PM10 reduction: 63.0%

Daily Emissions - Grouped by Equipment/Activity Type

	Daily Emissions (lb/day) - Before Mitigation					Daily Emissions (lb/day) - After Mitigation				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Construction Equipment	25.9	100.4	272.7	0.2	13.9	25.9	100.4	238.9	0.2	5.6
Commute Vehicles	0.5	6.4	0.5	-	-	0.5	6.4	0.5	-	-
Fugitive Dust	-	-	-	-	239.1	-	-	-	-	239.1
Total	*26.4*	*106.8*	*273.2*	*0.2*	*253.0*	*26.4*	*106.8*	*239.4*	*0.2*	*244.7*

SLRC Project
Operational Emissions

Equipment/Activity Descriptions

Equipment/Activity	*Hp Rating*	*Load Factor*	*Number Active*	*Equip-Hrs Day*	*Miles/ Day/ Vehicle*	*Idling Min/Day/ Vehicle*	Equipment Type
Annual service vehicles	-	-	3	-	40	-	On-Road
Quarterly Service Vehicle	-	-	1	-	40	-	On-Road
Daily On-Road Vehicle	-	-	1	-	30	-	On-Road

Notes:
The hydroelectric facility would not require staff onsite; rather, the facility would be operated remotely, from the Department area control center. The station will be visited during the week and depending on the situation may be visited as often as daily or only once per week. Security would check the facility daily. The facility would have video surveillance cameras as well as other security features.

Quarterly preventative maintenance would be performed on the plant ancillary equipment *(* cooling water system, air compressor, electric motor actuators), requiring one service truck for 1 day. Once a year, the facility would be shut down for internal and external inspection. This maintenance activity would require three service trucks per day for 2 weeks. Operational emissions do not include potential emissions associated with overhaul operations, which may occur once every 5 years.

Emission Factors for On-Road Vehicles

	Emission Factors						
Project Year/Mode	*ROG*	*CO*	*NOx*	*SOx*	*PM10*	*Units*	*Reference*
On-Road Vehicles - 10 mph	0.92	11.15	0.79	0.01	0.04	grams/mile	(1)
On-Road Vehicles - 25 mph	0.50	7.25	0.59	0.01	0.02	grams/mile	(1)
On-Road Vehicles - 55 mph	0.40	5.71	0.59	0.00	0.01	grams/mile	(1)
On-Road Vehicles - Composite	0.49	6.87	0.61	0.00	0.02	grams/mile	(2)

(1) From CARB's EMFAC2002 (v2.2). Units in grams/mile. Assumptions: Location: SCAQMD, Temperature: 70 F, Relative Humidity: 60%.
PM10 factors include PM10 from combustion only (tire and brake wear included with fugitive dust). Conservatively assumes light-duty trucks, composite (LDT1-ALL).
ROG emission factors includes evaporative running loss of 0.2017 grams/mile.
Based on EMFAC emission factors for Year 2006.
Starting emissions (grams/trip, after 600 minutes): ROG (1.52), CO (17.59), Nox (0.66), SOx (0.003), PM10 (0.015).
Hot soak emissions (grams/trip): ROG (0.326).
Partial day diurnal emissions (grams/hr): ROG (0.013).
Resting losses (grams/hr): ROG (0.077).
(2) Based on 10% at 10 miles per hour (mph), 40% at 25 mph, and 50% at 55 mph. Composite emission factor is used for emissions calculations.

Fugitive Dust

	Emissions (lb/day)				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Annual service vehicles	-	-	-	-	0.64
Quarterly Service Vehicle	-	-	-	-	0.21
Daily On-Road Vehicle	-	-	-	-	0.16
Total	-	-	-	-	1.01

Notes:
Fugitive PM10 emissions for on-road vehicles also include break and tire wear.

Passenger vehicle travel on PAVED roads:

Description	PM10 Emissions	References/Notes
Local streets	0.018 lb/mile	Table A9-9-B, CEQA Handbook
Collector streets:	0.013 lb/mile	Table A9-9-B, CEQA Handbook
Major Streets/Highways:	0.0064 lb/mile	Table A9-9-B, CEQA Handbook
Freeways:	0.00065 lb/mile	Table A9-9-B, CEQA Handbook
PM10 Emission factor (composite)	0.005345 lb/mile	Assumption (10% Local, 10% Collector, 30% Major Street, 50% Freeway)

SLRC Project
Operational Emissions

Max. Daily Emissions

	Max. Daily Emissions (lb/day)				
Equipment/Activity	*ROG*	*CO*	*NOx*	*SOx*	*PM10*
Annual service vehicles	0.16	2.05	0.17	-	-
Quarterly Service Vehicle	0.05	0.68	0.06	-	-
Daily On-Road Vehicle	0.04	0.53	0.04	-	-
Fugitive Dust	-	-	-	-	1.01
Total	*0.25*	*3.26*	*0.27*	-	*1.01*

Notes:

Total max. daily emissions conservatively assume that all service vehicles could operate on the same day, though this is unlikely (e.g., quarterly service vehicle will likely not operate when annual service vehicles are operating).

Appendix I
Environmental Database Reports

HWSG Environmental Database Report

The EDR Radius Map
with GeoCheck®

HWSG Site
Forest Lawn Drive/Zoo Drive
Los Angeles, CA 90068

Inquiry Number: 01222616.1r

June 30, 2004

EDR™ Environmental
Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06460

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

FORM-NIC

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

FOREST LAWN DRIVE/ZOO DRIVE
LOS ANGELES, CA 90068

COORDINATES

Latitude (North):	34.153500 - 34˚ 9' 12.6"
Longitude (West):	118.317100 - 118˚ 19' 1.6"
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	378581.2
UTM Y (Meters):	3779764.5
Elevation:	490 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property:	34118-B3 BURBANK, CA
Source:	USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTM STANDARD

Proposed NPL............... Proposed National Priority List Sites
CERC-NFRAP............... CERCLIS No Further Remedial Action Planned
CORRACTS............... Corrective Action Report
RCRIS-TSD............... Resource Conservation and Recovery Information System
ERNS............... Emergency Response Notification System

STATE ASTM STANDARD

CHMIRS............... California Hazardous Material Incident Report System
Toxic Pits............... Toxic Pits Cleanup Act Sites

WMUDS/SWAT ---------- Waste Management Unit Database
CA BOND EXP. PLAN ------ Bond Expenditure Plan
VCP ---------- Voluntary Cleanup Program Properties
INDIAN UST ---------- Underground Storage Tanks on Indian Land
INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

FEDERAL ASTM SUPPLEMENTAL

CONSENT ---------- Superfund (CERCLA) Consent Decrees
Delisted NPL ---------- National Priority List Deletions
HMIRS ---------- Hazardous Materials Information Reporting System
MLTS ---------- Material Licensing Tracking System
MINES ---------- Mines Master Index File
NPL Liens ---------- Federal Superfund Liens
PADS ---------- PCB Activity Database System
FUDS ---------- Formerly Used Defense Sites
UMTRA ---------- Uranium Mill Tailings Sites
INDIAN RESERV ---------- Indian Reservations
DOD ---------- Department of Defense Sites
US BROWNFIELDS ---------- A Listing of Brownfields Sites
RAATS ---------- RCRA Administrative Action Tracking System
TRIS ---------- Toxic Chemical Release Inventory System
TSCA ---------- Toxic Substances Control Act
SSTS ---------- Section 7 Tracking Systems
FTTS INSP ---------- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

AST ---------- Aboveground Petroleum Storage Tank Facilities
DEED ---------- List of Deed Restrictions
SCH ---------- School Property Evaluation Program
NFA ---------- No Further Action Determination
REF ---------- Unconfirmed Properties Referred to Another Agency
NFE ---------- Properties Needing Further Evaluation
CA SLIC ---------- Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
LA Co. Site Mitigation ------ Site Mitigation List
AOCONCERN ---------- San Gabriel Valley Areas of Concern

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas ---------- Former Manufactured Gas (Coal Gas) Sites

BROWNFIELDS DATABASES

US BROWNFIELDS ---------- A Listing of Brownfields Sites
VCP ---------- Voluntary Cleanup Program Properties

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL ASTM STANDARD

NPL: Also known as Superfund, the National Priority List database is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund program. The source of this database is the U.S. EPA.

A review of the NPL list, as provided by EDR, and dated 04/27/2004 has revealed that there is 1 NPL site within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SAN FERNANDO VALLEY (AREA 2)	***CRYSTAL SPRINGS WELLFIE***	***0 - 1/8***	***0***	***6***

CERCLIS: The Comprehensive Environmental Response, Compensation and Liability Information System contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).
CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the CERCLIS list, as provided by EDR, and dated 02/26/2004 has revealed that there is 1 CERCLIS site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SAN FERNANDO VALLEY (AREA 2)	***CRYSTAL SPRINGS WELLFIE***	***0 - 1/8***	***0***	***6***

RCRIS: Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs): generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRIS-LQG list, as provided by EDR, and dated 04/13/2004 has revealed that there are

2 RCRIS-LQG sites within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
ST JOSEPH MEDICAL CENTER	*501 S BUENA VISTA ST*	*1/2 - 1 WNW*	*E23*	*29*
WALT DISNEY PICTURES AND TELEV	*500 S BUENA VISTA ST*	*1/2 - 1 WNW*	*E24*	*30*

RCRIS: Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs): generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRIS-SQG list, as provided by EDR, and dated 04/13/2004 has revealed that there are 5 RCRIS-SQG sites within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
FOREST LAWN	*6300 FOREST LAWN DR*	*1/4 - 1/2W*	*C11*	*17*
LOS ANGELES ZOO	*5333 ZOO DR*	*1/4 - 1/2E*	*14*	*21*
GENERAL MOTORS TRAINING CENTER	*1105 RIVERSIDE DR*	*1/2 - 1 NE*	*15*	*23*
CLASSIC CLEANERS THE	*1011 W ALAMEDA SUITE E*	*1/2 - 1 NNE*	*F25*	*31*
VON S 2214	*1110 ALAMEDA*	*1/2 - 1 NNE*	*F26*	*32*

STATE ASTM STANDARD

AWP: California DTSC's Annual Workplan, formerly known as BEP, identifies known hazardous substance sites targeted for cleanup. The source is the California Environmental Protection Agency.

A review of the AWP list, as provided by EDR, and dated 06/01/2004 has revealed that there is 1 AWP site within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SAN FERNANDO VALLEY (AREA 2)	*CRYSTAL SPRINGS WELLFIE*	*0 - 1/8*	*0*	*6*

CAL-SITES: Formerly known as ASPIS, this database contains both known and potential hazardous substance sites. The source is the California Department of Toxic Substance Control.

A review of the Cal-Sites list, as provided by EDR, has revealed that there is 1 Cal-Sites site within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SAN FERNANDO VALLEY (AREA 2)	*CRYSTAL SPRINGS WELLFIE*	*0 - 1/8*	*0*	*6*

EXECUTIVE SUMMARY

CORTESE: This database identifies public drinking water wells with detectable levels of contamination, hazardous substance sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, sites with USTs having a reportable release and all solid waste disposal facilities from which there is known migration. The source is the California Environmental Protection Agency/Office of Emergency Information.

A review of the Cortese list, as provided by EDR, has revealed that there are 7 Cortese sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
BURBANK UNIFIED SCHOOL DIST	***501 S SHELTON ST***	***1/2 - 1 N***	***G28***	***33***
U.S. POSTAL SERVICE TERMI	900 ALAMEDA	1/2 - 1 NNE	H29	36
MOBIL SERVICE STATION	***765 N SEPULVEDA BLVD***	***1/2 - 1 NNE***	***H30***	***36***
MOBIL GAS STATION	***2501 OLIVE AVE W***	***1/2 - 1 NW***	***J34***	***42***
NBC-FIELD SHOP	***3000 ALAMEDA AVE W***	***1/2 - 1 WNW***	***K35***	***45***
OLIVE ARCO	***1820 W OLIVE AVE***	***1/2 - 1 NNW***	***36***	***48***

Lower Elevation	Address	Dist / Dir	Map ID	Page
GRIFFITH PARK	5201 ZOO	1/2 - 1 E	I31	39

NOTIFY 65: Notify 65 records contain facility notifications about any release that could impact drinking water and thereby expose the public to a potential health risk. The data come from the State Water Resources Control Board's Proposition 65 database.

A review of the Notify 65 list, as provided by EDR, has revealed that there is 1 Notify 65 site within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
ABIDANK MNFG. COMP.	210 S. VICTORY BLVD.	1 - 2 N	38	52

SWF/LF: The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data come from the Integrated Waste Management Board's Solid Waste Information System (SWIS) database.

A review of the SWF/LF list, as provided by EDR, has revealed that there is 1 SWF/LF site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
FOREST LAWN LANDFILL	6300 FOREST LAWN DRIVE	1/4 - 1/2W	C9	15

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 04/13/2004 has revealed that there are 8 LUST sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
BURBANK UNIFIED SCHOOL DIST	***501 S SHELTON ST***	***1/2 - 1 N***	***G28***	***33***
MOBIL SERVICE STATION	***765 N SEPULVEDA BLVD***	***1/2 - 1 NNE***	***H30***	***36***
SARQUIZ CHEVRON (FORMER MEPCO	2501 OLIVE AVE	1/2 - 1 NW	J33	41

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
MOBIL GAS STATION	***2501 OLIVE AVE W***	***1/2 - 1 NW***	***J34***	***42***
NBC-FIELD SHOP	***3000 ALAMEDA AVE W***	***1/2 - 1 WNW***	***K35***	***45***
OLIVE ARCO	***1820 W OLIVE AVE***	***1/2 - 1 NNW***	***36***	***48***
STUDIO STAR MOBIL	3020 OLIVE AVE W	1/2 - 1 WNW	K37	50

Lower Elevation	Address	Dist / Dir	Map ID	Page
GRIFFITH PARK	5201 ZOO DR	1/2 - 1 E	I32	39

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, and dated 04/13/2004 has revealed that there are 5 UST sites within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
FOREST LAWN	***6300 FOREST LAWN DR***	***1/4 - 1/2 W***	***C11***	***17***
LOS ANGELES ZOO	***5333 ZOO DR***	***1/4 - 1/2 E***	***14***	***21***
SHELL	1919 W ALAMEDA AVE	1/2 - 1 NNW	D16	25
WALT DISNEY	***500 S BUENA VISTA ST***	***1/2 - 1 WNW***	***E22***	***28***
ST JOSEPH MEDICAL CENTER	***501 S BUENA VISTA ST***	***1/2 - 1 WNW***	***E23***	***29***

CA FID: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, has revealed that there are 6 CA FID UST sites within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
MT SINAI MEMORIAL PARK & MORT.	5950 FOREST LAWN DR	1/4 - 1/2 ESE	A4	12
FOREST LAWN MEMORIAL-PARK-HOLL	6300 FOREST LAWN DR	1/4 - 1/2 W	C10	16
GENERAL MOTORS TRAINING CENTER	***1105 RIVERSIDE DR***	***1/2 - 1 NE***	***15***	***23***
CORNE O SHELL SERVICE INC	***1919 W ALAMEDA AVE***	***1/2 - 1 NNW***	***D18***	***26***
WALT DISNEY COMPANY	500 S BUENA VISTA ST	1/2 - 1 WNW	E19	27
SAINT OSEPH MEDICAL CENTER	501 S BUENA VISTA	1/2 - 1 WNW	E21	28

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there are 6 HIST UST sites within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SINAI TEMPLE	5950 FOREST LAWN DR	1/4 - 1/2 ESE	A2	11
FOREST LAWN MEMORIAL-PARK-HOLL	6300 FOREST LAWN DR	1/4 - 1/2 W	C12	19
CORNE O SHELL SERVICE	1919 W ALAMEDA AVE	1/2 - 1 NNW	D17	25
LEE GANOWEN SERVICE STATION	500 S BUENA VISTA ST	1/2 - 1 WNW	E20	27
WALT DISNEY	***500 S BUENA VISTA ST***	***1/2 - 1 WNW***	***E22***	***28***
MAINTENANCE DEPARTMENT	510 S SHELTON ST	1/2 - 1 N	G27	33

FEDERAL ASTM SUPPLEMENTAL

RODS: Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid the cleanup.

A review of the ROD list, as provided by EDR, has revealed that there is 1 ROD site within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SAN FERNANDO VALLEY (AREA 2)	*CRYSTAL SPRINGS WELLFIE*	*0 - 1/8*	*0*	*6*

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 04/08/2004 has revealed that there are 4 FINDS sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SAN FERNANDO VALLEY (AREA 2)	*CRYSTAL SPRINGS WELLFIE*	*0 - 1/8*	*0*	*6*
PHOTO SONICS INCORPORATED	820 S. MARIPOSA ST.	1/4 - 1/2NNE	B6	13
FOREST LAWN	*6300 FOREST LAWN DR*	*1/4 - 1/2W*	*C11*	*17*
LOS ANGELES ZOO	*5333 ZOO DR*	*1/4 - 1/2E*	*14*	*21*

STATE OR LOCAL ASTM SUPPLEMENTAL

DRYCLEANERS:A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; drycleaning plants except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

A review of the CLEANERS list, as provided by EDR, and dated 04/21/2004 has revealed that there is 1 CLEANERS site within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
CLASSIC CLEANERS THE	*1011 W ALAMEDA SUITE E*	*1/2 - 1 NNE*	*F25*	*31*

WDS: California Water Resources Control Board - Waste Discharge System.

A review of the CA WDS list, as provided by EDR, and dated 04/05/2004 has revealed that there are 2 CA WDS sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
PHOTO SONICS INC	*820 S MARIPOSA ST*	*1/4 - 1/2NNE*	*B8*	*14*

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
FOREST LAWN	*6300 FOREST LAWN DR*	*1/4 - 1/2W*	*C11*	*17*

Emissions Inventory Data: Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies

A review of the EMI list, as provided by EDR, and dated 12/31/2002 has revealed that there are 2 EMI sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
PHOTO-SONICS, INC	*820 S MARIPOSA ST*	*1/4 - 1/2NNE*	*B7*	*13*
LOS ANGELES ZOO	*5333 ZOO DR*	*1/4 - 1/2E*	*14*	*21*

HAZNET: The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000-1,000,000 annually, representing approximately 350,000-500,000 shipments. Data from non-California manifests & continuation sheets are not included at the present time. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, & disposal method. The source is the Department of Toxic Substance Control is the agency

A review of the HAZNET list, as provided by EDR, and dated 12/31/2002 has revealed that there are 7 HAZNET sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
MT. SINAI MEMORIAL	5950 FOREST LAWN DR	1/4 - 1/2ESE	A1	10
MT SINAI MEMORIAL PARK	5950 FOREST LAWN DR	1/4 - 1/2ESE	A3	11
WALT DISNEY CO	2021 RIVERSIDE DR	1/4 - 1/2NW	5	12
PHOTO-SONICS, INC	***820 S MARIPOSA ST***	***1/4 - 1/2NNE***	***B7***	***13***
FOREST LAWN	***6300 FOREST LAWN DR***	***1/4 - 1/2W***	***C11***	***17***
WALT DISNEY PICTURES & TELEVIS	518 KEYSTONE ST	1/4 - 1/2NW	13	20
LOS ANGELES ZOO	*5333 ZOO DR*	*1/4 - 1/2E*	*14*	*21*

HMS: Los Angeles County Industrial Waste and Underground Storage Tank Sites.

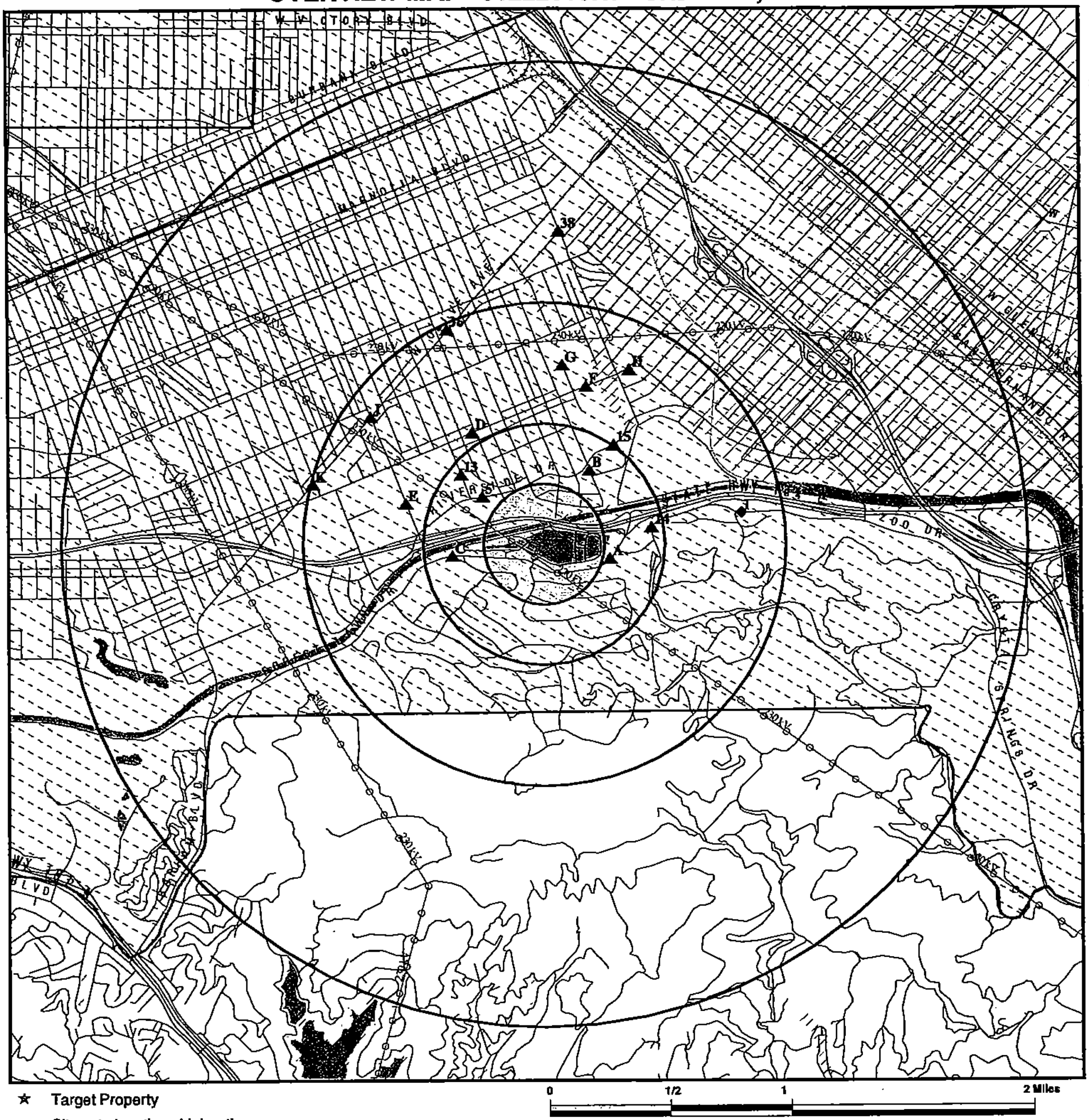
A review of the LOS ANGELES CO. HMS list, as provided by EDR, has revealed that there is 1 LOS ANGELES CO. HMS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
PHOTO SONICS INC	*820 S MARIPOSA ST*	*1/4 - 1/2NNE*	*B8*	*14*

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
IPPOLITO ESTATE	Cal-Sites
ALAMEDA & MAIN CHEVRON	UST
ABC-7 TELEVISION BROADCAST FACILIT	UST
AT&T	UST
WALT DISNEY	UST
MT SINAI MEMORIAL PARK & MORT.	UST
TEXACO SS #61-106-0133	UST
CHEVRON STATION #9-0659	UST
TOSCO CORPORATION #30550	UST
3 POINTS DISPOSAL SITE	WMUDS/SWAT
SHELDON-ARLETA SITE, LA	WMUDS/SWAT, CA WDS
CITY OF BURBANK/PUBLIC WKS	HAZNET
1X MOBIL OIL CORP STA#11- 4F	HAZNET
ALAA E ABDEL-MAQSOUD DDS	HAZNET
CARLOS ZINNIA DDS	HAZNET
WALT DISNEY PICTURES & TV	HAZNET
WALT DISNEY PICTURES & TELEVISION	HAZNET
WALT DISNEY PICTURES & TV	HAZNET
WALT DISNEY PICTURES & TELEVISION	HAZNET
POSITIVE PRESS	HAZNET
ALERT PLATING	HAZNET
CITY OF LOS ANGELES	HAZNET
CITY OF LOS ANGELES DEPT REC & PAR	HAZNET
UNOCAL SO CAL. DIV. PIPE LINE	HAZNET
DRP - CITY OF LOS ANGELES	HAZNET
SHELL	HAZNET
CITY OF LOS ANGELS - GRIFFITH PARK	HAZNET
LA VENTILATOR STATION #3	RCRIS-SQG, FINDS
LA PARSHALL FLUME GAUGE BLDG	RCRIS-SQG, FINDS
CHEVRON STATION NO 90659	RCRIS-SQG
BEVERLY PARK HOTEL SITE	ERNS
SOUTH SIDE BANDINI FIELD, SOUTHERN	ERNS
BURBANK AIR MONITORING SITE 060371	FINDS
DAMSON OIL SITE	FINDS
FORMER CROWN COACH SITE	FINDS
CASSARA DISPOSAL SITE	FINDS
WILMINGTON INDUSTRIAL PARK	US BROWNFIELDS
DAMSON OIL SITE	US BROWNFIELDS
FORMER CROWN COACH SITE	US BROWNFIELDS
EASTSIDE LIGHT RAIL TRANS PROJ	CA WDS
RIVER SUPPLY CONDUIT	CA WDS
THE WALT DISNEY COMPANY	EMI

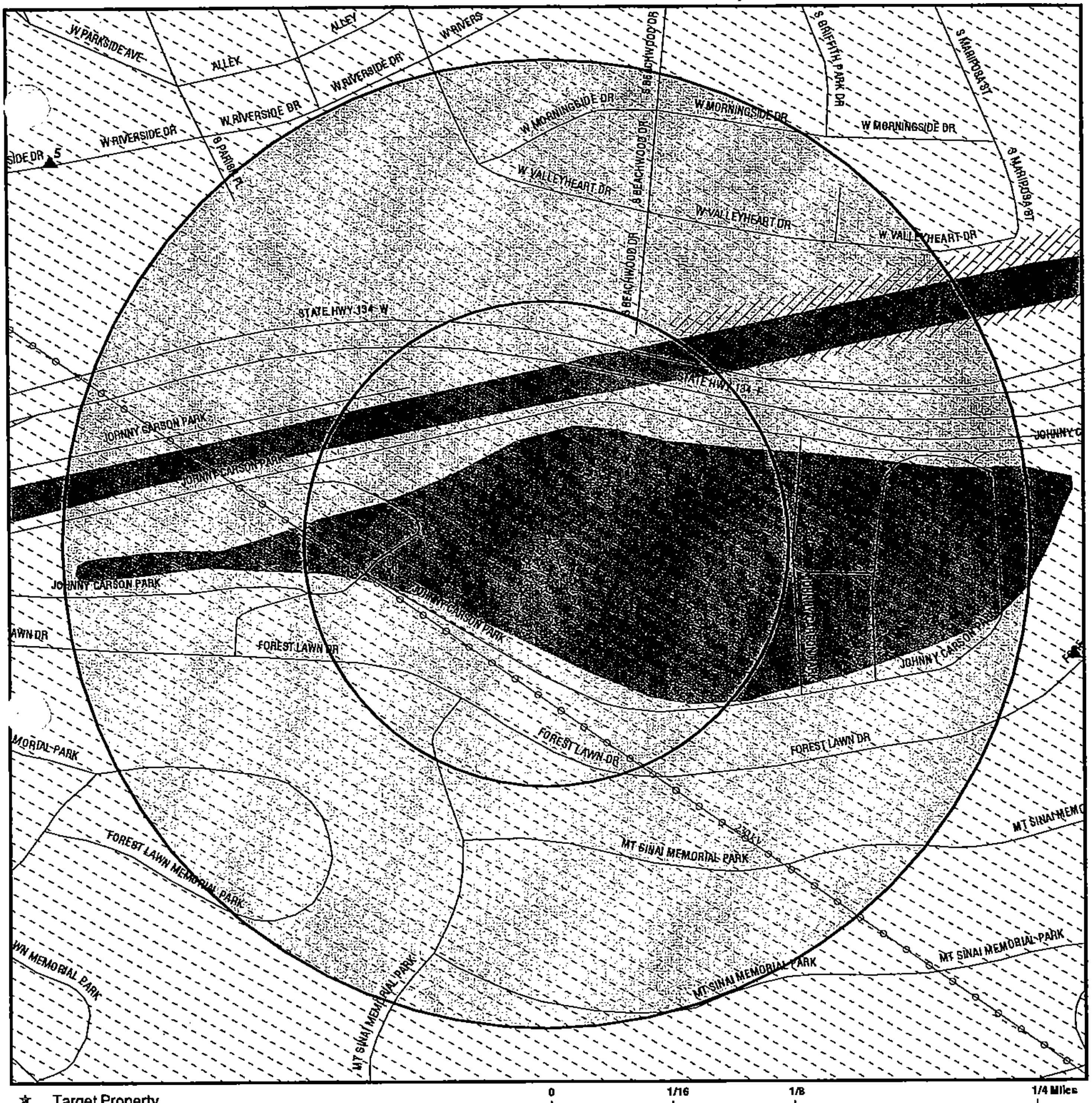
OVERVIEW MAP - 01222616.1r - CH2M Hill, Inc.



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- Coal Gasification Sites
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Federal Wetlands
- Areas of Concern

TARGET PROPERTY:	HWSG Site	CUSTOMER:	CH2M Hill, Inc.
ADDRESS:	Forest Lawn Drive/Zoo Drive	CONTACT:	David Golles
CITY/STATE/ZIP:	Los Angeles CA 90068	INQUIRY #:	01222616.1r
LAT/LONG:	34.1535 / 118.3171	DATE:	June 30, 2004 5:59 pm

DETAIL MAP - 01222616.1r - CH2M Hill, Inc.



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- Coal Gasification Sites
- Sensitive Receptors
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Federal Wetlands
- Areas of Concern

TARGET PROPERTY:	HWSG Site	CUSTOMER:	CH2M Hill, Inc.
ADDRESS:	Forest Lawn Drive/Zoo Drive	CONTACT:	David Golles
CITY/STATE/ZIP:	Los Angeles CA 90068	INQUIRY #:	01222616.1r
LAT/LONG:	34.1535 / 118.3171	DATE:	June 30, 2004 6:00 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL ASTM STANDARD								
NPL		1.500	1	0	0	0	0	1
Proposed NPL		1.500	0	0	0	0	0	0
CERCLIS		1.000	1	0	0	0	NR	1
CERC-NFRAP		0.750	0	0	0	0	NR	0
CORRACTS		1.500	0	0	0	0	0	0
RCRIS-TSD		1.000	0	0	0	0	NR	0
RCRIS Lg. Quan. Gen.		0.750	0	0	0	2	NR	2
RCRIS Sm. Quan. Gen.		0.750	0	0	2	3	NR	5
ERNS		0.500	0	0	0	NR	NR	0
STATE ASTM STANDARD								
AWP		1.500	1	0	0	0	0	1
Cal-Sites		1.500	1	0	0	0	0	1
CHMIRS		0.500	0	0	0	NR	NR	0
Cortese		1.000	0	0	0	7	NR	7
Notify 65		1.500	0	0	0	0	1	1
Toxic Pits		1.500	0	0	0	0	0	0
State Landfill		1.000	0	0	1	0	NR	1
WMUDS/SWAT		1.000	0	0	0	0	NR	0
LUST		1.000	0	0	0	8	NR	8
CA Bond Exp. Plan		1.500	0	0	0	0	0	0
UST		0.750	0	0	2	3	NR	5
VCP		1.000	0	0	0	0	NR	0
INDIAN UST		0.750	0	0	0	0	NR	0
INDIAN LUST		1.000	0	0	0	0	NR	0
CA FID UST		0.750	0	0	2	4	NR	6
HIST UST		0.750	0	0	2	4	NR	6
FEDERAL ASTM SUPPLEMENTAL								
CONSENT		1.500	0	0	0	0	0	0
ROD		1.500	1	0	0	0	0	1
Delisted NPL		1.500	0	0	0	0	0	0
FINDS		0.500	1	0	3	NR	NR	4
HMIRS		0.500	0	0	0	NR	NR	0
MLTS		0.500	0	0	0	NR	NR	0
MINES		0.750	0	0	0	0	NR	0
NPL Liens		0.500	0	0	0	NR	NR	0
PADS		0.500	0	0	0	NR	NR	0
FUDS		1.500	0	0	0	0	0	0
UMTRA		1.000	0	0	0	0	NR	0
INDIAN RESERV		1.500	0	0	0	0	0	0
DOD		1.500	0	0	0	0	0	0
US BROWNFIELDS		1.000	0	0	0	0	NR	0
RAATS		0.500	0	0	0	NR	NR	0
TRIS		0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
TSCA		0.500	0	0	0	NR	NR	0
SSTS		0.500	0	0	0	NR	NR	0
FTTS		0.500	0	0	0	NR	NR	0
STATE OR LOCAL ASTM SUPPLEMENTAL								
AST		0.500	0	0	0	NR	NR	0
CLEANERS		0.750	0	0	0	1	NR	1
CA WDS		0.500	0	0	2	NR	NR	2
DEED		0.500	0	0	0	NR	NR	0
SCH		0.750	0	0	0	0	NR	0
NFA		0.750	0	0	0	0	NR	0
EMI		0.500	0	0	2	NR	NR	2
REF		0.750	0	0	0	0	NR	0
NFE		0.750	0	0	0	0	NR	0
CA SLIC		1.000	0	0	0	0	NR	0
HAZNET		0.500	0	0	7	NR	NR	7
Los Angeles Co. HMS		0.500	0	0	1	NR	NR	1
LA Co. Site Mitigation		0.500	0	0	0	NR	NR	0
AOCONCERN		1.500	0	0	0	0	0	0
EDR PROPRIETARY HISTORICAL DATABASES								
Coal Gas		1.500	0	0	0	0	0	0
BROWNFIELDS DATABASES								
US BROWNFIELDS		1.000	0	0	0	0	NR	0
VCP		1.000	0	0	0	0	NR	0

NOTES:

AQUIFLOW - see EDR Physical Setting Source Addendum

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

SLRC Environmental Database Report

The EDR Radius Map
with GeoCheck®

SLRC Site
Silver Lake Dr/Armstrong Ave
Los Angeles, CA 90039

Inquiry Number: 01222635.1r

June 30, 2004

EDR™ Environmental Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06460

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

FORM-NIC

TABLE OF CONTENTS

GEOCHECK ADDENDUM

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

SILVER LAKE DR/ARMSTRONG AVE
LOS ANGELES, CA 90039

COORDINATES

Latitude (North):	34.097700 - 34° 5' 51.7"
Longitude (West):	118.264300 - 118° 15' 51.5"
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	383372.3
UTM Y (Meters):	3773515.5
Elevation:	452 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property:	34118-A3 HOLLYWOOD, CA
Source:	USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTM STANDARD

Proposed NPL............... Proposed National Priority List Sites
CERC-NFRAP............... CERCLIS No Further Remedial Action Planned
RCRIS-LQG............... Resource Conservation and Recovery Information System

STATE ASTM STANDARD

CHMIRS............... California Hazardous Material Incident Report System
VCP............... Voluntary Cleanup Program Properties
INDIAN UST............... Underground Storage Tanks on Indian Land
INDIAN LUST............... Leaking Underground Storage Tanks on Indian Land

EXECUTIVE SUMMARY

FEDERAL ASTM SUPPLEMENTAL

CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
Delisted NPL	National Priority List Deletions
HMIRS	Hazardous Materials Information Reporting System
MLTS	Material Licensing Tracking System
MINES	Mines Master Index File
NPL Liens	Federal Superfund Liens
PADS	PCB Activity Database System
FUDS	Formerly Used Defense Sites
UMTRA	Uranium Mill Tailings Sites
INDIAN RESERV	Indian Reservations
DOD	Department of Defense Sites
US BROWNFIELDS	A Listing of Brownfields Sites
RAATS	RCRA Administrative Action Tracking System
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
SSTS	Section 7 Tracking Systems
FTTS INSP	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

AST	Aboveground Petroleum Storage Tank Facilities
CA WDS	Waste Discharge System
DEED	List of Deed Restrictions
SCH	School Property Evaluation Program
NFA	No Further Action Determination
EMI	Emissions Inventory Data
REF	Unconfirmed Properties Referred to Another Agency
NFE	Properties Needing Further Evaluation
CA SLIC	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
LOS ANGELES CO. HMS	HMS: Street Number List
LA Co. Site Mitigation	Site Mitigation List
AOCONCERN	San Gabriel Valley Areas of Concern

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas	Former Manufactured Gas (Coal Gas) Sites

BROWNFIELDS DATABASES

US BROWNFIELDS	A Listing of Brownfields Sites
VCP	Voluntary Cleanup Program Properties

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL ASTM STANDARD

NPL: Also known as Superfund, the National Priority List database is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund program. The source of this database is the U.S. EPA.

A review of the NPL list, as provided by EDR, and dated 04/27/2004 has revealed that there is 1 NPL site within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SAN FERNANDO VALLEY (AREA 4)	*POLLOCK WELLFIELD*	*1/2 - 1 NE*	*0*	*6*

CERCLIS: The Comprehensive Environmental Response, Compensation and Liability Information System contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).
CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the CERCLIS list, as provided by EDR, and dated 02/26/2004 has revealed that there is 1 CERCLIS site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SAN FERNANDO VALLEY (AREA 4)	*POLLOCK WELLFIELD*	*1/2 - 1 NE*	*0*	*6*

CORRACTS: CORRACTS is a list of handlers with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every handler that has had corrective action activity.

A review of the CORRACTS list, as provided by EDR, and dated 03/15/2004 has revealed that there are 2 CORRACTS sites within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
SAFETY- KLEEN CORP 7-088-02	*2918 WORTHEN AVE*	*1/2 - 1 NE*	*113*	*112*
NELSON NAME PLATE CO	*3191 CASITAS AVE*	*1 - 2 NE*	*119*	*122*

RCRIS: Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs): generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRIS-TSD list, as provided by EDR, and dated 04/13/2004 has revealed that there is 1

RCRIS-TSD site within approximately 1 mile of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
SAFETY- KLEEN CORP 7-088-02	*2918 WORTHEN AVE*	*1/2 - 1 NE*	*113*	*112*

RCRIS: Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs): generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRIS-SQG list, as provided by EDR, and dated 04/13/2004 has revealed that there are 18 RCRIS-SQG sites within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SILVER GLEN CLEANERS	*2590 GLENDALE BLVD UNIT*	*1/4 - 1/2NE*	*E23*	*26*
BEST AUTOMOTIVE DETAIL CO THE	1855 GLENDALE BLVD	1/2 - 1 SSE	L49	49
SUN CHEMICAL CORP GPI DIV LA	*1855 GLENDALE BLVD*	*1/2 - 1 SSE*	*L50*	*50*
RECYCLER	*2898 ROWENA*	*1/2 - 1 NNW*	*Q90*	*82*

Lower Elevation	Address	Dist / Dir	Map ID	Page
PALACE DRY	*2453 GLENDALE BLVD*	*1/4 - 1/2ENE*	*A9*	*18*
EUROPEAN MOTORS	*2511 1/2 GLENDALE BLVD*	*1/4 - 1/2NE*	*C16*	*22*
LA WEEKLY, INC	*2140 HYPERION AVE*	*1/2 - 1 WNW*	*H40*	*44*
JR AUTO BODY SHOP	*1932 HYPERION AVE*	*1/2 - 1 W*	*K46*	*48*
EXPERT AUTO BODY	*1841 HYPERION AVE*	*1/2 - 1 W*	*55*	*53*
PAT SUAZO BODY & FRAME SHOP	*2808-A ROWENA AVE*	*1/2 - 1 N*	*N59*	*55*
SUAZOS AUTO BODY	*2808 ROWENA AVE*	*1/2 - 1 N*	*N60*	*56*
LA FIRE STATION 56	*2838 ROWENA AVE*	*1/2 - 1 N*	*N62*	*56*
CHEVRON STATION 90552	*2427 FLETCHER DR*	*1/2 - 1 NE*	*O65*	*58*
BLUESILVER IND	*2849 ROWENA AVE*	*1/2 - 1 N*	*N68*	*62*
RICKS AUTO BODY & PAINT	*1804 HYPERION AVENUE*	*1/2 - 1 W*	*70*	*63*
CREATIVE IMAGE 1 HOUR	*2662 GRIFFITH PARK BLVD*	*1/2 - 1 NW*	*P89*	*81*
GRIFFITH PARK CLEANERS	*2623 HYPERION AVE*	*1/2 - 1 NW*	*P91*	*83*
CLEAN N SAVE CLEANERS	*2630 HYPERION AVE*	*1/2 - 1 NW*	*P93*	*85*

ERNS: The Emergency Response Notification System records and stores information on reported releases of oil and hazardous substances. The source of this database is the U.S. EPA.

A review of the ERNS list, as provided by EDR, and dated 12/31/2003 has revealed that there is 1 ERNS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
STATION AT 2580 GLENDALE BLVD	STATION AT 2580 GLENDAL	1/4 - 1/2NE	E22	26

EXECUTIVE SUMMARY

STATE ASTM STANDARD

AWP: California DTSC's Annual Workplan, formerly known as BEP, identifies known hazardous substance sites targeted for cleanup. The source is the California Environmental Protection Agency.

A review of the AWP list, as provided by EDR, and dated 06/01/2004 has revealed that there are 2 AWP sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SAN FERNANDO VALLEY (AREA 4)	*POLLOCK WELLFIELD*	*1/2 - 1 NE*	*0*	*6*

Lower Elevation	Address	Dist / Dir	Map ID	Page
SOUTHERN PACIFIC - TAYLOR	*2800 KERR*	*1 - 2 NE*	*T117*	*121*

CAL-SITES: Formerly known as ASPIS, this database contains both known and potential hazardous substance sites. The source is the California Department of Toxic Substance Control.

A review of the Cal-Sites list, as provided by EDR, has revealed that there are 2 Cal-Sites sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SAN FERNANDO VALLEY (AREA 4)	*POLLOCK WELLFIELD*	*1/2 - 1 NE*	*0*	*6*

Lower Elevation	Address	Dist / Dir	Map ID	Page
SOUTHERN PACIFIC TRANSPORTATIO	*2800 KERR STREET*	*1 - 2 NE*	*T118*	*121*

CORTESE: This database identifies public drinking water wells with detectable levels of contamination, hazardous substance sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, sites with USTs having a reportable release and all solid waste disposal facilities from which there is known migration. The source is the California Environmental Protection Agency/Office of Emergency Information.

A review of the Cortese list, as provided by EDR, has revealed that there are 23 Cortese sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SAN FERNANDO VALLEY (AREA 4)	*POLLOCK WELLFIELD*	*1/2 - 1 NE*	*0*	*6*
MISSION LINEN SUPPLY	1855 GLENDALE	1/2 - 1 SSE	L48	49
POZZO CONSTRUCTION	2894 ROWENA	1/2 - 1 NNW	Q87	80

Lower Elevation	Address	Dist / Dir	Map ID	Page
HEIKO MUELLER	*2400 GLENDALE BLVD*	*1/4 - 1/2 ENE*	*A3*	*10*
CHEVRON #9-6284 (FORMER)	*2411 GLENDALE BLVD*	*1/4 - 1/2 ENE*	*A8*	*15*
ST. ALBANS LAKE PLACE TRA	2393 SILVER LAKE	1/4 - 1/2 NE	A11	19
GULF #1464 (FORMER)	*2560 GLENDALE BLVD*	*1/4 - 1/2 NE*	*E25*	*28*
UNOCAL #0882	*2580 GLENDALE*	*1/2 - 1 NE*	*G31*	*33*
LA VIGNE FAMILY TRUST PRO	*2346 HYPERION*	*1/2 - 1 WNW*	*I43*	*45*
LA CITY FIRE STATION #56	2759 ROWENA	1/2 - 1 N	M58	54
CHEVRON #9-0552	*2427 FLETCHER DR*	*1/2 - 1 NE*	*O67*	*59*

Lower Elevation	Address	Dist / Dir		Map ID	Page
ARCO #0045	***2466 RIVERSIDE***	***1/2 - 1***	***NE***	***O77***	***71***
CHEVRON #9-5194	2651 GRIFFITH PARK	1/2 - 1	NW	P80	74
BRAVURA DEVELOPMENT INC	2656 GRIFFITH PARK	1/2 - 1	NW	P84	78
UNOCAL #0514	***2635 HYPERION AVE***	***1/2 - 1***	***NW***	***P98***	***92***
MOBIL	2656 HYPERION	1/2 - 1	NW	P100	94
ACK BURK SHELL STATION	2701 HYPERION BLVD	1/2 - 1	NW	P102	97
LA UNIFIED SCHOOL DISTRIC	***2210 RIVERSIDE***	***1/2 - 1***	***ENE***	***R105***	***101***
ELECTRO CONSTRUCTION CORP	***3021 ROWENA***	***1/2 - 1***	***NNW***	***106***	***102***
DOUGLAS BERGLUND/FORMER T	2900 RIVERSIDE	1/2 - 1	N	S108	106
TRIANGLE GAS STATION	2918 RIVERSIDE	1/2 - 1	N	S110	108
SAFETY- KLEEN CORP 7-088-02	***2918 WORTHEN AVE***	***1/2 - 1***	***NE***	***113***	***112***
AUTO SERVICE	***3827 SUNSET BLVD W***	***1/2 - 1***	***WSW***	***114***	***117***

NOTIFY 65: Notify 65 records contain facility notifications about any release that could impact drinking water and thereby expose the public to a potential health risk. The data come from the State Water Resources Control Board's Proposition 65 database.

A review of the Notify 65 list, as provided by EDR, has revealed that there is 1 Notify 65 site within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir		Map ID	Page
IM SCOTT	2635 HYPERION STREET	1/2 - 1	NW	P99	94

TOXIC PITS: The Toxic Pits Cleanup Act Sites database identifies sites suspected of containing hazardous substances where cleanup has not yet been completed. The data come from the State Water Resources Control Board.

A review of the Toxic Pits list, as provided by EDR, has revealed that there is 1 Toxic Pits site within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir		Map ID	Page
SP, TAYLOR YARD	2800 KERR STREET	1 - 2	NE	T116	120

SWF/LF: The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data come from the Integrated Waste Management Board's Solid Waste Information System (SWIS) database.

A review of the SWF/LF list, as provided by EDR, has revealed that there are 2 SWF/LF sites within approximately 1 mile of the target property.

Lower Elevation	Address	Dist / Dir		Map ID	Page
SILVERLAKE MAINTENANCE STATION	2187 RIVERSIDE DRIVE	1/2 - 1	ENE	103	97
GRIFFITH PARK COMPOSTING FACIL	1555 GRIFFITH PARK DR.	1/2 - 1	WSW	111	109

EXECUTIVE SUMMARY

WMUDS/SWAT: The Waste Management Unit Database System is used for program tracking and inventory of waste management units. The source is the State Water Resources Control Board.

A review of the WMUDS/SWAT list, as provided by EDR, has revealed that there is 1 WMUDS/SWAT site within approximately 1 mile of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
LOS ANGELES DWP-FLETCHER & RIV	FLETCHER / RIVERSIDE	1/2 - 1 NE	O69	62

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 04/13/2004 has revealed that there are 26 LUST sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
POZZO CONSTRUCTION	2894 ROWENA AVE	1/2 - 1 NNW	Q85	78
POZZO CONSTRUCTION COMPANY	***2894 ROWENA AVE***	***1/2 - 1 NNW***	***Q86***	***79***

Lower Elevation	Address	Dist / Dir	Map ID	Page
HEIKO MUELLER	***2400 GLENDALE BLVD***	***1/4 - 1/2 ENE***	***A3***	***10***
CHEVRON #9-6284 (FORMER)	***2411 GLENDALE BLVD***	***1/4 - 1/2 ENE***	***A8***	***15***
ST. ALBANS LAKE PLACE TRACT	2393 SILVER LAKE BLVD	1/4 - 1/2 NE	A12	19
GULF #1464 (FORMER)	***2560 GLENDALE BLVD***	***1/4 - 1/2 NE***	***E25***	***28***
TOSCO - 76 STATION #0882	2580 GLENDALE BLVD	1/2 - 1 NE	G32	35
UNOCAL #0882	2580 GLENDALE BLVD	1/2 - 1 NE	G33	36
TOSCO - 76 STATION #0882	2580 GLENDALE BLVD	1/2 - 1 NE	G34	38
LA VIGNE FAMILY TRUST PRO	***2346 HYPERION***	***1/2 - 1 WNW***	***I43***	***45***
LA CITY FIRE STATION #56	2759 ROWENA AVE	1/2 - 1 N	M54	51
CHEVRON #9-0552	***2427 FLETCHER DR***	***1/2 - 1 NE***	***O67***	***59***
ARCO #0045	2466 RIVERSIDE DR.	1/2 - 1 NE	O71	63
CHEVRON #9-5194	2651 GRIFFITH PARK BLVD	1/2 - 1 NW	P72	64
BP WEST COAST PRODUCTS LLC 000	***2466 RIVERSIDE DR.***	***1/2 - 1 NE***	***O73***	***66***
BRAVURA DEVELOPMENT INC	2656 GRIFFITH PARK BLVD	1/2 - 1 NW	P83	75
TOSCO - 76 STATION #0514	2635 HYPERION AVE	1/2 - 1 NW	P96	89
UNOCAL #0514	***2635 HYPERION AVE***	***1/2 - 1 NW***	***P98***	***92***
ACK BURK SHELL STATION	2701 HYPERION BLVD	1/2 - 1 NW	P101	95
LA UNIFIED SCHOOL DISTRICT	2210 RIVERSIDE DR	1/2 - 1 ENE	R104	98
ELECTRO CONSTRUCTION CORP	***3021 ROWENA***	***1/2 - 1 NNW***	***106***	***102***
DOUGLAS BERGLUND/FORMER TEXACO	2900 RIVERSIDE DR	1/2 - 1 N	S107	104
TRIANGLE GAS STATION	2918 RIVERSIDE DR	1/2 - 1 N	S109	106
O. . PLUMBING	1661 ALLESANDRO ST	1/2 - 1 SSE	112	110
SAFETY- KLEEN CORP 7-088-02	***2918 WORTHEN AVE***	***1/2 - 1 NE***	***113***	***112***
AUTO SERVICE	***3827 SUNSET BLVD W***	***1/2 - 1 WSW***	***114***	***117***

BEP: Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

A review of the CA BOND EXP. PLAN list, as provided by EDR, has revealed that there are 2 CA BOND

EXP. PLAN sites within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir		Map ID	Page
SAN FERNANDO VALLEY GROUND WAT	POLLACK AREA	1 - 2	N	115	120
SOUTHERN PACIFIC TRANSPORTATIO	***2800 KERR STREET***	***1 - 2***	***NE***	***T118***	***121***

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, and dated 04/13/2004 has revealed that there are 3 UST sites within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
WILLARDSON MECHANICAL	2880 ROWENA AVE	1/2 - 1	NNW	Q82	75

Lower Elevation	Address	Dist / Dir		Map ID	Page
LOS ANGELES FIRE STATION 56	2759 ROWENA AVE	1/2 - 1	N	M57	54
ARCO FACILITY NO. 0045	2466 RIVERSIDE DR	1/2 - 1	NE	O75	70

CA FID: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, has revealed that there are 22 CA FID UST sites within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
SERVICE STATION 0779	2340 GLENDALE BLVD	1/4 - 1/2	E	1	10
POZZO CONSTRUCTION COMPANY	***2894 ROWENA AVE***	***1/2 - 1***	***NNW***	***Q86***	***79***

Lower Elevation	Address	Dist / Dir		Map ID	Page
HEIKO MUELLER	2400 GLENDALE BLVD	1/4 - 1/2	ENE	A4	13
TOMMY W LEE/BOUALONG LUANGRA	2411 GLENDALE BLVD	1/4 - 1/2	ENE	A5	13
VACANT	2393 SILVER LAKE BLVD	1/4 - 1/2	NE	A13	21
A'S GAS & AUTO SERVICE	2560 GLENDALE BLVD	1/4 - 1/2	NE	E27	30
NORDONIS UNION	2580 GLENDALE BLVD	1/2 - 1	NE	G36	39
SERVICE STATION 0514	***2135 HYPERION AVE***	***1/2 - 1***	***WNW***	***H39***	***43***
UNK	2300 HYPERION	1/2 - 1	WNW	I41	45
UNK	2346 HYPERION	1/2 - 1	WNW	I42	45
GREGORY KLASS	2012 HYPERION AVE	1/2 - 1	W	J44	48
GREGORY KLASS	2000 HYPERION AVE	1/2 - 1	W	J45	48
AUTO SHOP	2800 N GLENDALE BLVD	1/2 - 1	N	47	49
CHEVRON STATION 90140	1869 HYPERION AVE	1/2 - 1	W	K51	50
EXCELLENT AUTO REPAIR	2436 HYPERION AVE	1/2 - 1	NW	52	51
AL VILLAREAL	1650 SILVER LAKE BLVD	1/2 - 1	SSW	53	51
FIRE STATION 56	2759 ROWENA AVE	1/2 - 1	N	M56	54
FIRE STATION 56	2838 ROWENA AVE	1/2 - 1	N	N61	56
FRED LE BRUN R	2427 FLETCHER DR	1/2 - 1	NE	O64	58
SARKEES NAHAS	2466 RIVERSIDE DR	1/2 - 1	NE	O74	70
95194-CHEVRON STATION	2651 GRIFFITH PARK BLVD	1/2 - 1	NW	P79	74
UNION OIL SERVICE STATION	2635 HYPERION AVE	1/2 - 1	NW	P97	91

EXECUTIVE SUMMARY

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there are 14 HIST UST sites within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
POZZO CONSTRUCTION CO.	2894 ROWENA AVE	1/2 - 1 NNW	Q88	80

Lower Elevation	Address	Dist / Dir	Map ID	Page
96284	2411 GLENDALE BLVD	1/4 - 1/2 ENE	A6	13
A'S GAS & AUTO SERVICE	2560 GLENDALE BLVD	1/4 - 1/2 NE	E24	27
A'S GASOLINE	2560 GLENDALE BLVD	1/4 - 1/2 NE	E28	31
UNOCAL #0882	***2580 GLENDALE***	***1/2 - 1 NE***	***G31***	***33***
UNION OIL SERVICE STATION #088	2580 GLENDALE BLVD	1/2 - 1 NE	G35	39
NORDONIS UNION	2580 GLENDALE BLVD	1/2 - 1 NE	G37	40
SERVICE STATION 0514	***2135 HYPERION AVE***	***1/2 - 1 WNW***	***H39***	***43***
FIRE STATION 56	2838 ROWENA AVE	1/2 - 1 N	N63	57
90552	2427 FLETCHER DR	1/2 - 1 NE	O66	58
NAHAS ARCO	2466 RIVERSIDE DR	1/2 - 1 NE	O76	70
SARKEES NAHAS	2466 RIVERSIDE DR	1/2 - 1 NE	O78	73
95194	2651 GRIFFITH PARK BLVD	1/2 - 1 NW	P81	74
UNION OIL SERVICE STATION LEAS	2635 HYPERION AVE	1/2 - 1 NW	P95	89

FEDERAL ASTM SUPPLEMENTAL

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 04/08/2004 has revealed that there are 3 FINDS sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SILVER GLEN CLEANERS	***2590 GLENDALE BLVD UNIT***	***1/4 - 1/2 NE***	***E23***	***26***

Lower Elevation	Address	Dist / Dir	Map ID	Page
PALACE DRY	***2453 GLENDALE BLVD***	***1/4 - 1/2 ENE***	***A9***	***18***
EUROPEAN MOTORS	***2511 1/2 GLENDALE BLVD***	***1/4 - 1/2 NE***	***C16***	***22***

STATE OR LOCAL ASTM SUPPLEMENTAL

DRYCLEANERS: A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; drycleaning plants except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

A review of the CLEANERS list, as provided by EDR, and dated 04/21/2004 has revealed that there are 5 CLEANERS sites within approximately 0.75 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
PALACE CLEANERS	2453 GLENDALE BLVD	1/4 - 1/2 ENE	A10	18
SILVER-GLEN CLEANERS	***2590 GLENDALE BLVD UNIT***	***1/2 - 1 NNE***	***G38***	***41***
GRIFFITH PARK CLEANERS	***2623 HYPERION AVE***	***1/2 - 1 NW***	***P91***	***83***
CLEAN & SAVE CLEANERS	2630 HYPERION AVE #102	1/2 - 1 NW	P92	84
CLEAN & SAVE	***2630 HYPERION AVE***	***1/2 - 1 NW***	***P94***	***86***

HAZNET: The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000-1,000,000 annually, representing approximately 350,000-500,000 shipments. Data from non-California manifests & continuation sheets are not included at the present time. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, & disposal method. The source is the Department of Toxic Substance Control is the agency

A review of the HAZNET list, as provided by EDR, and dated 12/31/2002 has revealed that there are 14 HAZNET sites within approximately 0.5 miles of the target property.

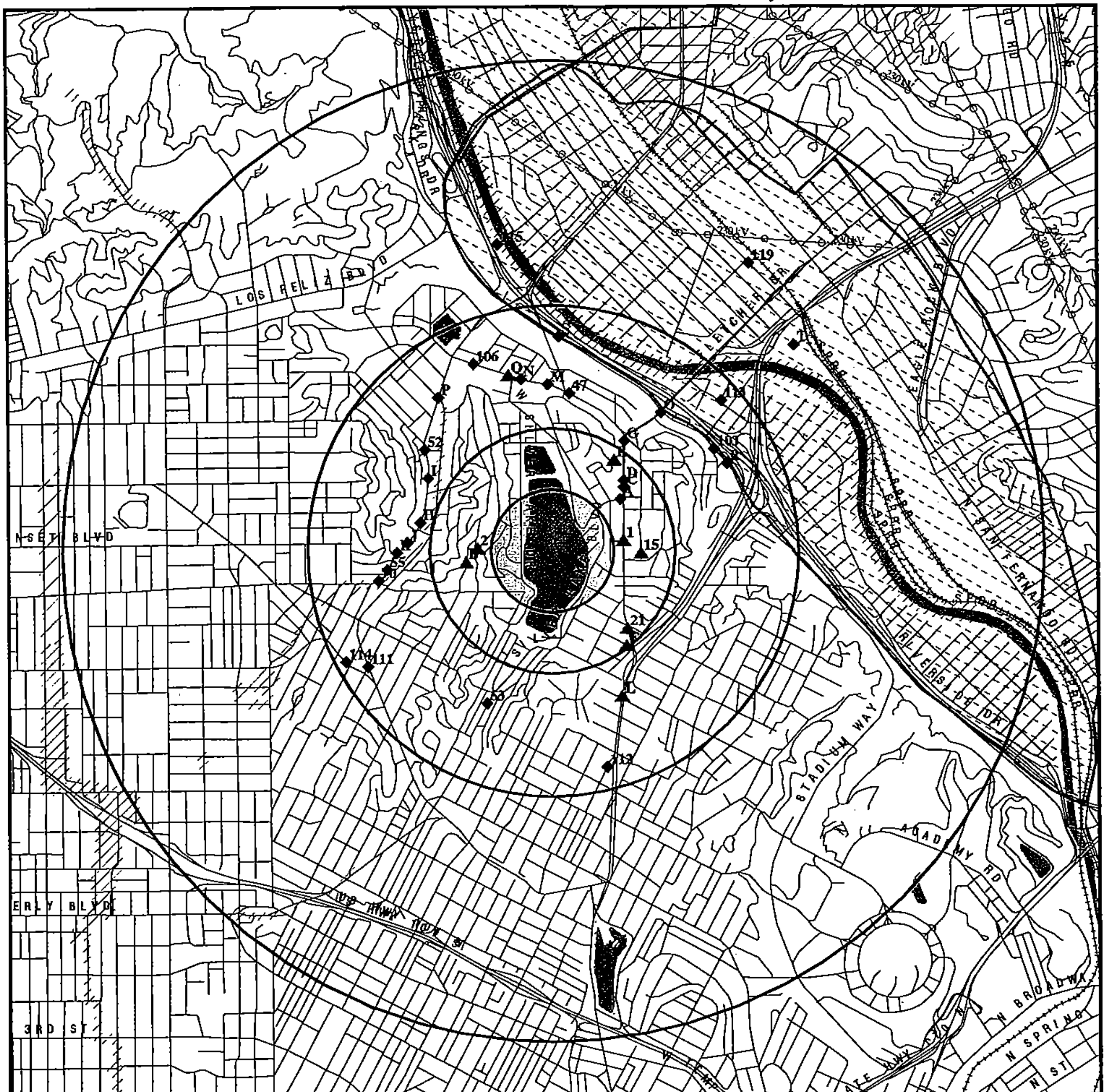
Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
HUFFMAN DESIGN BUILD	2062 RED CLIFF ST	1/4 - 1/2 W	2	10
OHN PARKER	1961 MICELTORENA ST	1/4 - 1/2 W	B14	22
RUTH OCHOA	2317 TEVIOT ST	1/4 - 1/2 E	15	22
NIGHT FALLS PRODUCTIONS	1923 MICHAEL TORRENA ST	1/4 - 1/2 WSW	B17	23
BROADWAY DEPT. STORE	2100 GLENDALE	1/4 - 1/2 SE	21	26
SAINT THERESA CHURCH	2223 FARGO ST	1/4 - 1/2 SE	F29	32
ST TERESA OF AVILA CHURCH	2216 FARGO ST	1/4 - 1/2 SE	F30	32

Lower Elevation	Address	Dist / Dir	Map ID	Page
CHEVRON 96284	2411 GLENDALE BLVD	1/4 - 1/2 ENE	A7	14
CHEVRON #9-6284 (FORMER)	***2411 GLENDALE BLVD***	***1/4 - 1/2 ENE***	***A8***	***15***
EUROPEAN MOTORS	***2511 1/2 GLENDALE BLVD***	***1/4 - 1/2 NE***	***C16***	***22***
RALPHS GROCERY CO	2520 GLENDALE BLVD	1/4 - 1/2 NE	C18	24
SAV ON DRUG #3099	2530 GLENDALE BLVD	1/4 - 1/2 NE	D19	24
WESTERN REALTY	2530 GLENDALE	1/4 - 1/2 NE	D20	25
THRIFTY OIL CO #278	2560 GLENDALE BLVD	1/4 - 1/2 NE	E26	30

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
PALM CLEANERS	CLEANERS
CHEVRON #9-5108	LUST
CHEVRON STATION #9-0552	UST
ROBERT & SHEILA SNUKAL	UST
ARCO AM/PM #1597	UST
TOSCO CORPORATION #30345	UST
TOSCO CORPORATION #30307	UST
TOSCO CORPORATION #30811	UST
GABRIEL'S SHELL SERVICE STATION	UST
TOSCO CORPORATION #30355	UST
TOSCO CORPORATION #30329	UST
CHEVRON STATION #9-0953	UST
ARCO STATION #183 (THRIFTY)--9605	UST
CHILDREN'S HOSPITAL OF L.A.	UST
3 POINTS DISPOSAL SITE	WMUDS/SWAT
SHELDON-ARLETA SITE, LA	WMUDS/SWAT, CA WDS
CORONADO APARTMENTS	HAZNET
CARMEN STARK	HAZNET
SHELL	HAZNET
SAE YOUNG RHEE	HAZNET
TUTOR SLIBA	HAZNET
SFPP LP (TAYLOR YARD)	HAZNET
BLUE LINE CONSTRUCTION AUTHORITY	HAZNET
GLENDALE CARBURETORS	HAZNET
FORMER MOBIL STATION	HAZNET
AMIGO TRUCKING	RCRIS-SQG
BIDDULPH VW ISUZU	RCRIS-SQG, FINDS
BEVERLY PARK HOTEL SITE	ERNS
SOUTH SIDE BANDINI FIELD, SOUTHERN	ERNS
DAMSON OIL SITE	FINDS
FORMER CROWN COACH SITE	FINDS
DAMSON OIL SITE	US BROWNFIELDS
FORMER CROWN COACH SITE	US BROWNFIELDS
RAMONA PRIMARY SITE #1	SCH
RAMONA PRIMARY SITE #2	SCH
BELMONT NEW PRIMARY CENTER NO. 12	SCH
RAMONA PRIMARY SITE #6	SCH
RAMONA PRIMARY SITE #3	SCH
CENTRAL LOS ANGELES HIGH SCHOOL #1	SCH
SANTA FE PACIFIC REALTY CORP	LOS ANGELES CO. HMS
CHEVRON USA CO	LOS ANGELES CO. HMS
RALPHS GROCERY CO	EMI

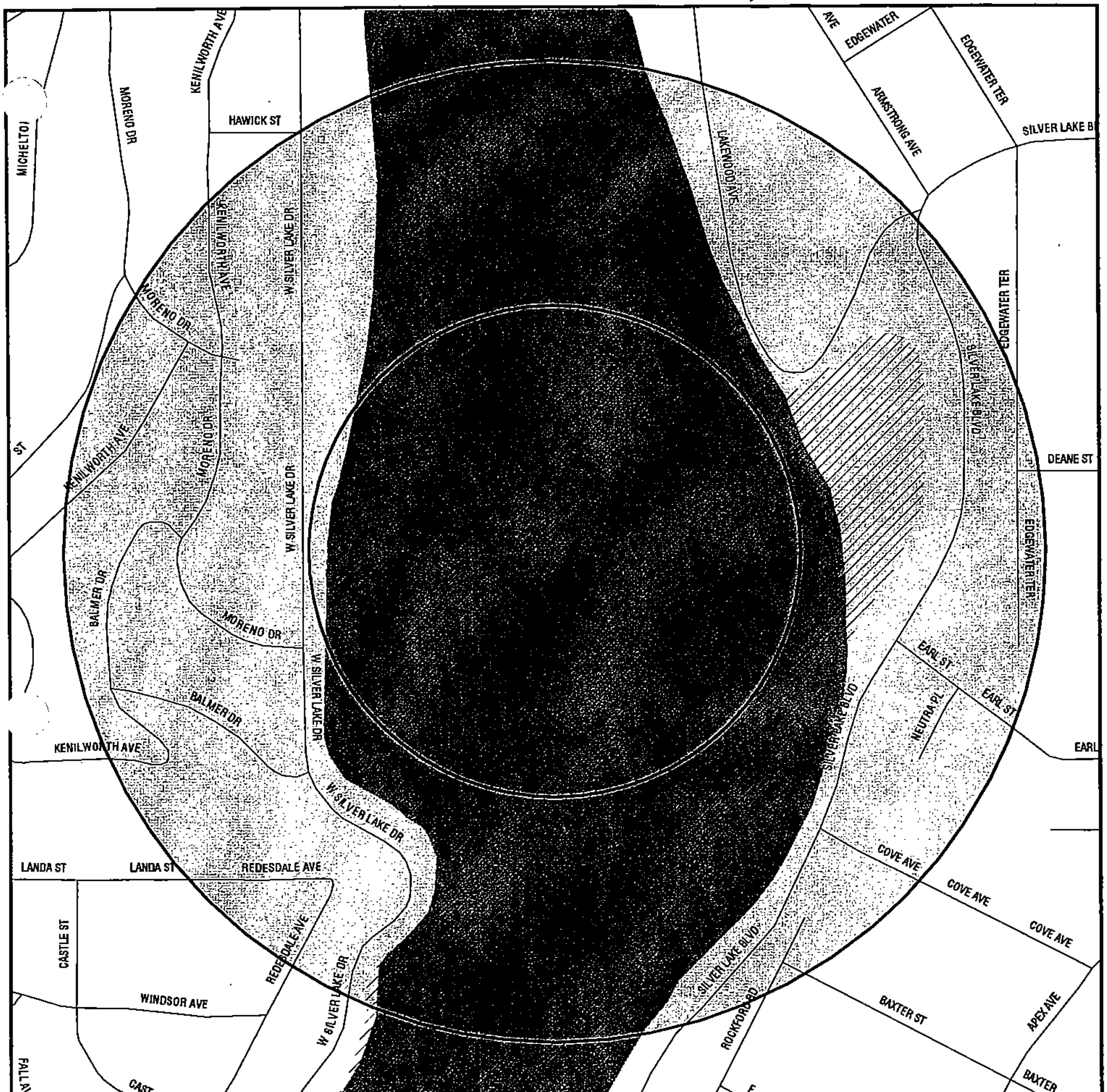
OVERVIEW MAP - 01222635.1r - CH2M Hill, Inc.



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Coal Gasification Sites
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Federal Wetlands
- Areas of Concern

TARGET PROPERTY:	SLRC Site	CUSTOMER:	CH2M Hill, Inc.
ADDRESS:	Silver Lake Dr/Armstrong Ave	CONTACT:	David Golles
CITY/STATE/ZIP:	Los Angeles CA 90039	INQUIRY #:	01222635.1r
LAT/LONG:	34.0977 / 118.2643	DATE:	June 30, 2004 5:59 pm

DETAIL MAP - 01222635.1r - CH2M Hill, Inc.



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Coal Gasification Sites
- Sensitive Receptors
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Federal Wetlands
- Areas of Concern

TARGET PROPERTY:	SLRC Site	CUSTOMER:	CH2M Hill, Inc.
ADDRESS:	Silver Lake Dr/Armstrong Ave	CONTACT:	David Golles
CITY/STATE/ZIP:	Los Angeles CA 90039	INQUIRY #:	01222635.1r
LAT/LONG:	34.0977 / 118.2643	DATE:	June 30, 2004 6:00 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL ASTM STANDARD								
NPL		1.500	0	0	0	1	0	1
Proposed NPL		1.500	0	0	0	0	0	0
CERCLIS		1.000	0	0	0	1	NR	1
CERC-NFRAP		0.750	0	0	0	0	NR	0
CORRACTS		1.500	0	0	0	1	1	2
RCRIS-TSD		1.000	0	0	0	1	NR	1
RCRIS Lg. Quan. Gen.		0.750	0	0	0	0	NR	0
RCRIS Sm. Quan. Gen.		0.750	0	0	3	15	NR	18
ERNS		0.500	0	0	1	NR	NR	1
STATE ASTM STANDARD								
AWP		1.500	0	0	0	1	1	2
Cal-Sites		1.500	0	0	0	1	1	2
CHMIRS		0.500	0	0	0	NR	NR	0
Cortese		1.000	0	0	4	19	NR	23
Notify 65		1.500	0	0	0	1	0	1
Toxic Pits		1.500	0	0	0	0	1	1
State Landfill		1.000	0	0	0	2	NR	2
WMUDS/SWAT		1.000	0	0	0	1	NR	1
LUST		1.000	0	0	4	22	NR	26
CA Bond Exp. Plan		1.500	0	0	0	0	2	2
UST		0.750	0	0	0	3	NR	3
VCP		1.000	0	0	0	0	NR	0
INDIAN UST		0.750	0	0	0	0	NR	0
INDIAN LUST		1.000	0	0	0	0	NR	0
CA FID UST		0.750	0	0	5	17	NR	22
HIST UST		0.750	0	0	3	11	NR	14
FEDERAL ASTM SUPPLEMENTAL								
CONSENT		1.500	0	0	0	0	0	0
ROD		1.500	0	0	0	0	0	0
Delisted NPL		1.500	0	0	0	0	0	0
FINDS		0.500	0	0	3	NR	NR	3
HMIRS		0.500	0	0	0	NR	NR	0
MLTS		0.500	0	0	0	NR	NR	0
MINES		0.750	0	0	0	0	NR	0
NPL Liens		0.500	0	0	0	NR	NR	0
PADS		0.500	0	0	0	NR	NR	0
FUDS		1.500	0	0	0	0	0	0
UMTRA		1.000	0	0	0	0	NR	0
INDIAN RESERV		1.500	0	0	0	0	0	0
DOD		1.500	0	0	0	0	0	0
US BROWNFIELDS		1.000	0	0	0	0	NR	0
RAATS		0.500	0	0	0	NR	NR	0
TRIS		0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
TSCA		0.500	0	0	0	NR	NR	0
SSTS		0.500	0	0	0	NR	NR	0
FTTS		0.500	0	0	0	NR	NR	0
STATE OR LOCAL ASTM SUPPLEMENTAL								
AST		0.500	0	0	0	NR	NR	0
CLEANERS		0.750	0	0	1	4	NR	5
CA WDS		0.500	0	0	0	NR	NR	0
DEED		0.500	0	0	0	NR	NR	0
SCH		0.750	0	0	0	0	NR	0
NFA		0.750	0	0	0	0	NR	0
EMI		0.500	0	0	0	NR	NR	0
REF		0.750	0	0	0	0	NR	0
NFE		0.750	0	0	0	0	NR	0
CA SLIC		1.000	0	0	0	0	NR	0
HAZNET		0.500	0	0	14	NR	NR	14
Los Angeles Co. HMS		0.500	0	0	0	NR	NR	0
LA Co. Site Mitigation		0.500	0	0	0	NR	NR	0
AOCONCERN		1.500	0	0	0	0	0	0
EDR PROPRIETARY HISTORICAL DATABASES								
Coal Gas		1.500	0	0	0	0	0	0
BROWNFIELDS DATABASES								
US BROWNFIELDS		1.000	0	0	0	0	NR	0
VCP		1.000	0	0	0	0	NR	0

NOTES:

AQUIFLOW - see EDR Physical Setting Source Addendum

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database