ENVIRONMENTAL ASSESSMENT

Lake Mead Intake No. 3
Lake Mead National Recreation Area
Clark County, Nevada
October 2006

LAKE MEAD INTAKE NO. 3 PROJECT

LAKE MEAD NATIONAL RECREATION AREA

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U.S. Department of the Interior
National Park Service

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Lake Mead Intake No. 3 Project

Saddle Island, Lake Mead National Recreation Area
Nevada

Summary

At Lake Mead National Recreation Area (LMNRA), the Southern Nevada Water Authority (SNWA) proposes to construct a third water supply intake, Intake No. 3, in Lake Mead, including an intake pumping station on Saddle Island, intake tunnel, forebay, conveyance pipeline to the existing Alfred Merritt Smith Water Treatment Facility, access roads, staging areas and other associated project components.

SNWA is the regional water supply entity for the Las Vegas metropolitan area. The project is needed to protect the community's existing water supply system capacity against the potential loss of Intake No. 1's pumping capability should lake levels fall below 1,050 feet above mean sea level. Water levels in Lake Mead have fallen during the recent drought on the Colorado River, and long-term projections for river flows point to a continued decline in lake water levels.

This environmental assessment (EA) examines in detail two alternatives: no action and proposed project. The proposed project is described above, while the no-action alternative represents a continuation of the existing conditions – no new intake would be constructed, and the two existing water supply intakes in Lake Mead would continue to operate under declining long-term lake level conditions. The no-action alternative would risk the adverse effect of substantially reduced water system capacity. SNWA would have less flexibility to provide reliable water service to the community in Southern Nevada, and to preserve the water delivery system capacity of SNWA's Lake Mead water intake system. Also, under the no-action alternative, the effect of water withdrawals above the thermocline would be a reduced level of water quality provided to the community water system, or increased costs for constructing and operating additional water treatment processes, or both. These results would be a major, permanent, and adverse effect on system capacity and reliability and water quality in the SNWA system.

The EA addresses the following resource issues in detail: aesthetics, air quality, biotic communities, cultural resources, geology and soils, hydrology and water quality, noise and vibration, transportation and traffic, and visitor use and experience (recreation). The following summarizes the resource areas and conservation measures addressed in the EA - the effects indicated are an evaluation of impact intensity and duration after implementation of the conservation measures identified in the EA for the proposed Intake No. 3 project.

- Minor, temporary and permanent adverse effects would occur to aesthetics during construction activities of the proposed project. However, the proposed project would not permanently change the aesthetic elements of the vast majority of the overall acreage of the park, as the proposed project would occupy approximately only 50 acres of the LMNRA's 1.5 million acres, and the effects are limited to an area where similar facilities have been present for nearly 40 years.

- Minor, temporary adverse effects on air quality would occur during construction of the intake pumping station and associated construction activities. A slight localized affect on air quality would occur during construction activities.
- Minor, temporary adverse effects would occur to biotic communities from construction activities of the proposed project. Three sensitive species are identified in the project area for detailed evaluation of potential effect by project implementation: desert tortoise, bald eagle and razorback sucker. Implementation of the proposed project would have negligible effects to desert tortoise because of the general low quality of the habitat in the area and extensive conservation measures included in the project design. The proposed project would have negligible effects on the bald eagle because the project area is currently used by humans, and does not contain high cliffs or other suitable perching areas. No designated critical habitat for the desert tortoise or bald eagle would be affected by the proposed project. Construction and operation of the intake is not expected to have adverse effects on the razorback sucker because the intake would be below the normal depth range of adults and larvae in Lake Mead, in addition to the implementation of mitigation measures to minimize turbidity and disturbance during intake construction. The potential for adverse effects to critical habitat for the razorback sucker is considered negligible.
- No effect on cultural resources would occur from the proposed project. The effects of the project would be barely perceptible and would not alter resource conditions. It is not likely that cultural resources would be encountered within the project area; however, if cultural resources were encountered appropriate steps would be taken to ensure they were not damaged.
- Minor, temporary adverse effects on geology and soils would occur as a result of the proposed project. However, proposed conservation measures would minimize the effects to geology and soils in and around the Saddle Island area during construction.
- Negligible to minor, temporary adverse effects on hydrology and water quality are anticipated during construction of the proposed project. Effects to water quality would be detectable, but well below water quality standards or criteria and within historical or desired water quality conditions. Measures to minimize turbidity and limit its effects would be implemented along with conservation measures and permit conditions. Major, permanent beneficial effects to water system capacity and water quality would be realized as a result of implementation of the proposed project.
- Minor, temporary adverse effects on noise levels during construction would occur within the project area including some surface and subsurface blasting to remove rock. The increased noise levels resulting from the implementation of the proposed project would be permanent and adverse, but slight with few measurable consequences.
- The proposed project would have negligible to minor, temporary adverse effects to transportation and traffic within the park. The change to traffic conditions during construction activities would be slight and localized.
- Negligible, temporary adverse effects to visitor use and experience (recreation) would occur during construction of the proposed project. With the implemented mitigation measures, visitors to the park would not likely be aware of the effects associated with the implementation of the proposed project.

The proposed project would have no or negligible effects on agricultural resources, hazardous materials, land use and planning, mineral resources, population and housing, public services, or utilities and service systems. These issues are not addressed in detail in the EA.

The environmentally preferred alternative was chosen in accordance with criteria outlined in National Park Service's Director's Order #12. The environmentally preferred alternative for the Lake Mead Intake No. 3 project is the proposed project.

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
AMSL	above mean sea level
AOP	Annual Operating Plan
AMSWTF	Alfred Merritt Smith Water Treatment Facility
BPS 1-A	Booster Pumping Station No. 1-A
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CWA	Clean Water Act
CWC	Clean Water Coalition
EA	Environmental Assessment
EIS	Environmental Impact Statement
FONSI	Finding of No Significant Impact
IPS-1	Intake Pumping Station No. 1
IPS-2	Intake Pumping Station No. 2
IPS-3	Intake Pumping Station No. 3
IRP	integrated resource planning
LMNRA	Lake Mead National Recreation Area
MHWM	Mean High Water Mark
MM	Mitigation Measures
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
NPS	National Park Service
NRHP	National Register of Historic Places
P&N	purpose and need
PDF	Project Design Feature
PM10	Particulate matter with a diameter less than 10 microns
RMLT	River Mountains Loop Trail
ROW	Right-of-Way
SCOP	Systems Conveyance & Operations Program
SHPO	State Historic Preservation Officer
SNWA	Southern Nevada Water Authority
SNWS	Southern Nevada Water System
SWPPP	Stormwater Pollution Prevention Plan
TBM	tunnel boring machine
TTF	Treatment and Transmission Facility
US 515	U.S. Interstate Highway 515
US 93	U.S. Highway 93
US 95	U.S. Highway 95
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
WSE	water surface elevation

I. INTRODUCTION

This Environmental Assessment (EA) addresses the potential environmental effects associated with the construction and operation of a new drinking water intake system in Lake Mead for the Southern Nevada Water Authority (SNWA). Lake Mead is one of several major water control reservoirs on the Colorado River, and is within the Lake Mead National Recreation Area (LMNRA), managed by the National Park Service (NPS). The NPS is the lead federal agency overseeing compliance with the requirements of the National Environmental Policy Act (NEPA) for the proposed project.

The federal action being evaluated in this EA is the granting by the NPS for the expansion of existing rights-of-way (ROW) and the approval for new water supply facility construction and operation in the LMNRA. SNWA's proposed project would construct an additional deep water intake in Lake Mead serving the Alfred Merritt Smith Water Treatment Facility (AMSWTF) and the Southern Nevada Water System (SNWS), located in the LMNRA. SNWA would also expand its existing ROW to encompass the area surrounding the new intake structure, the corridor above the new intake tunnel, the new intake pumping station, the new access road, the new excavated material placement areas and viewshed berms, and the new connecting pipeline to the AMSWTF.

The contents of this EA are structured in conformance with the guidelines presented in NPS Director's Order #12: "Conservation Planning, Environmental Impact Analysis, and Decision-making" [DO-12], (NPS, 2001) and previous EAs prepared for other NPS actions in the LMNRA. The following major information and discussion sections are included in this EA in the order shown below:

- **Section I, Purpose and Need**
    - **Section I A, Background and Purpose and Need Statement** – This section presents a discussion of the ongoing drought on the Colorado River as the primary reason that the new intake project is needed, a summary of recent previous water supply planning activities in Southern Nevada, and a formal statement of the purpose and need for the proposed intake project.
    - **Sections I B and I C, Issues Addressed and Not Addressed in the EA** – Based on the proposed configuration and components of the intake project in relation to the resources present in the project area, this section presents a screening evaluation and identification of the environmental resources that may be affected by project implementation. Based on the results of the screening activity, these environmental issues were carried forward for detailed evaluation in this EA. Resources that the screening evaluation indicated would not be affected by project implementation and are not addressed are also identified.
- **Section II, Alternatives**
    - **Section II A, Alternatives** – Alternatives that are fully evaluated in this EA are identified, including the no-action alternative. A detailed description of the proposed intake project is presented. Alternatives considered but dismissed from further analysis are also described.
    - **Section II B, Summary of Conservation Measures Identified for the Proposed Project** – Both preventative design and implementation measures, as well as compensatory measures, for the proposed project are presented. These measures are identified based on the description of the proposed project, the environmental resources present in the project area, the expected effects of the implementation of the proposed project.

- **Section II C, Environmentally Preferred Alternative** – The process and evaluation leading to a determination of the environmentally preferred alternative is presented.
- **Section II D, Permits and Consultations** – Permits and consultations that would be required prior to implementation of the proposed project are identified.
- **Section II E, Comparative Summary of Impacts for the Alternatives Evaluated** – The expected effects of the no-action alternative are contrasted with expected effects of implementation of the proposed project, based on the proposed configuration and components of the intake project in relation to the resources present in the project area.

- **Section III, Affected Environment**
  - A description of the affected environment for each of the nine resource categories addressed in this EA is presented.
- **Section IV, Methodology of the Effects Assessment**
  - Descriptions of the effects assessment criteria for each of the nine resource categories addressed in this EA are presented. NEPA requires consideration of context, intensity, and duration of environmental effects, and consideration of potential cumulative impacts. An explanation of resource impairment criteria is also presented for the applicable resource categories.
- **Section V, Environmental Consequences**
  - The identified beneficial and adverse effects of the alternatives considered in this EA are presented for each of the nine resource categories addressed. The effects determination includes the context, intensity, and duration of the identified effects, a discussion of cumulative impacts, and identifies measures to mitigate identified impacts. A determination of potential resource impairment is also made for the applicable resource categories.
- **Section VI, References**
  - Reference materials used in the preparation of this EA are identified.
- **Section VII, Preparers**
  - The qualifications of the persons involved in preparing this EA are presented.

A. Purpose and Need

The purpose and need (P&N) statement of the EA reflects a statement of the goals and objectives of the Intake No. 3 project, and the reasoning for proposing the intake project at this time and in the place is described in Section II. The P&N statement for the Intake No. 3 project is consistent with the P&N statement developed and used in the Environmental Impact Statement (EIS) prepared for SNWA's Treatment and Transmission Facility program (TTF) (Reclamation, 1996; p. 1-11 *et seq*.). Consistent with the goals and objectives of the TTF program, the Intake No. 3 project would: 1) preserve water delivery system capacity; 2) provide reliable water delivery system back-up capability; and 3) provide operational flexibility for accessing the best available water quality for the public water supply.

This EA is **tiered** from the existing Environmental Impact Statement (EIS) for the Treatment and Transmission Facility project (TTF-EIS; Reclamation, 1996). The Council on Environmental Quality (CEQ) "encourages agencies to use a tiering process, working from broad, general NEPA environmental impact analysis documents to more site-specific ones in decision-making (40 Code of Federal Regulations [CFR] 1502.20)" (NPS, 2001), and "tiering" is addressed in Section 7.4 of DO-12. Since that EIS is more than five years old, the validity of the analyses and assumptions associated with the evaluation of the TTF program in that EIS were carefully re-examined to

determine that the criteria in 40 CFR Section 1502.9 were being met through the tiering approach. This evaluation determined that the conditions driving the implementation of the original TTF program remained unchanged – the primary change in the conditions existing in the region was the lowered level of Lake Mead, as a result of the reduced flow conditions in the Colorado River since the TTF-EIS was prepared. Those lowered water levels are the primary reason that the Intake No. 3 project is needed.

The Intake No. 3 project represents a modification of the configuration of the existing SNWA water intake and treatment systems in place adjacent to Lake Mead, described in the TTF-EIS and subsequent environmental documents. The Intake No. 3 project does not propose any change or increase in the quantity of Colorado River water authorized for diversion and use by the SNWA – the project is simply a modification of the location from which SNWA's existing contractual rights to water are withdrawn from the Colorado River at Lake Mead, giving the SNWA flexibility to take water from different levels and locations in Lake Mead depending on seasonal lake conditions and lake water levels.

The use of the tiering approach allows the EA for the Intake No. 3 project to "concentrate on the issues specific to the subsequent action" (40 CFR 1502.20), i.e., the construction and operation of the new water intake system. This approach allows for the incorporation by reference of applicable environmental analyses and information previously prepared by SNWA and LMNRA for the TTF program and related subsequent projects. As appropriate to the scope of the analysis for the Intake No. 3 project, reference is made to the TTF-EIS and subsequent environmental compliance documents, and to LMNRA management and environmental documents, for information on the Affected Environment, potential Environmental Effects, and Cumulative Effects discussions for the Intake No. 3 project.

Project Background Information

HISTORIC RANGE OF LAKE MEAD WATER LEVELS

Lake Mead is typically at its highest yearly elevation between the late fall and early spring months. The lake water level begins to drop in elevation in the late spring and early summer as warmer temperatures cause a higher demand for agricultural water in the Imperial Valley of southern California, and for agricultural and municipal water needed in southern Nevada, Arizona, California, and Mexico. In some years, the drop is greater than others, depending on how much difference there is between inflow and outflow. If there are several consecutive years where outflow exceeds inflow, Lake Mead begins each year with progressively lower water levels, and the lake elevation continues to drop until a "wet year" occurs in the Colorado River Basin. Then, Lake Mead typically receives more water than it releases, and the lake level again returns to higher elevations. The future projections for Lake Mead call for generally lower lake levels and more extreme annual fluctuations than have been experienced in the past (LMNRA, 2005).

On Lake Mead, the average daily water surface elevation (WSE) for the last ten years (1994 through 2004) has averaged 1,194 feet above mean sea level (AMSL). The elevation of 1,221 feet AMSL represents the elevation at the top of the spillway gates. On July 24, 1983, a maximum WSE of 1,226 feet AMSL was reached on Lake Mead. However, the drought conditions experienced over the last five years along the Colorado River Basin have resulted in some of the lowest lake elevations recorded for Lake Mead in over 40 years (Reclamation website; *http://www.usbr.gov/lc/riverops.html*).

For most of the last 50 years, the lake has generally operated within a 40-foot fluctuation range, between approximately 1,220 and 1,180 feet AMSL. Drought conditions in the west United States and lower-than-normal snow pack in the Rocky Mountains for the last several years have caused lake levels to drop significantly. For example, in 2000 runoff into Lake Mead was only 56 percent of normal. Between 2000 and the end of 2004, Lake Mead's surface elevation dropped almost 70 feet to elevation 1,130 feet AMSL, and could potentially drop much farther in the future.

More recently the wet winter of 2004-2005 contributed snowmelt and stormwater runoff to Lake Mead and temporarily depressed demand for irrigation water from the Colorado River, resulting in a slight increase in lake water level. As of August 2006, the WSE in Lake Mead was 1,127 feet AMSL. In July 2006, the Bureau of Reclamation's two-year projected reservoir operation levels for Lake Mead by the end of 2006 indicated that the lake would drop to elevation 1,127 feet AMSL and, by the middle of 2008, lake levels would continue to lower to elevation 1,105 feet AMSL (Reclamation website *http://www.usbr.gov/lc/riverops.html*). The theoretical minimum elevation, which is also required to generate power at Hoover Dam, is 1,050 feet AMSL, the minimum elevation required for the operation of the Southern Nevada Water Authority's original intake facility (LMNRA, 2005).

In early 2005, SNWA proposed a third water intake structure in the Boulder Basin of Lake Mead be constructed. The impetus for this proposal was stated as the need to maintain water supply system capacity in the face of recent and persistent drought, which has caused a significant drop in the lake level. SNWA currently operates and maintains two intakes in Lake Mead. Intake No. 1, which has a pumping capacity of 600 million gallons per day, requires a minimum lake level of 1,050 feet AMSL to operate. Intake No. 2 is 50 feet deeper than Intake No. 1 and will operate at lake levels as low as 1,000 feet AMSL. Continued drought could threaten the operation of Intake No. 1 within the next several years, and eventually could threaten the operation of Intake No. 2. The lowered Lake Mead water level, resulting from the reduced flow conditions in the Colorado River since the TTF-EIS was prepared, is the only major change in the conditions existing in the region, compared to the situation in 1996 when the TTF-EIS was prepared and authorized. The other conditions driving the implementation of the original TTF program (Reclamation, 1996b) remain unchanged. Environmental conditions in the project area are also similar to those described in the TTF-EIS – information on resource areas that could be affected by project implementation was updated to reflect current conditions.

Construction of a new intake would ensure that SNWA could maintain full system capacity at lake levels as low as 1,000 feet AMSL. The intake would be located so that even at the 1,000 foot AMSL level, water would be drawn from below the thermocline, where water is of higher quality and would not require additional treatment. The existing intakes have historically always drawn water from below the thermocline. Water from the new intake would be conveyed to the existing AMSWTF on the western shore of Lake Mead near Saddle Island.

In a press release dated June 1, 2005, LMNRA circulated a description of the proposed intake project and solicited public comments on alternatives and on potential issues and impacts to be addressed in the environmental assessment. No public or agency comments were received. LMNRA and SNWA have conducted an ongoing information activity associated with bringing information about the new intake project before the public and decision makers (see **Appendix A**).

LAKE MEAD WATER QUALITY

The location selected for the proposed Intake No. 3 project is based on Lake Mead geography and physiographic characteristics. The basis for the selection includes observations of historical events and ongoing hydrographic and water quality monitoring in the lake conducted by SNWA, its member agencies, and various federal agencies, including:

- Boulder Basin temperature and water quality characteristics have led to stratification in three observed layers:
    - Epilimnion, the warm light water at the top layer;
    - Metalimnion, thermocline layer that prevents mixing; and
    - Hypolimnion, the cool heavy water of the lower layer.

- The stratification pattern relates to air temperature, water temperature, and rainfall and runoff patterns:
    - The stratification pattern displays seasonal effects;
    - From May through September the epilimnion is heating up, developing a large thermocline;
    - From November through December the stratification begins to break down, the metalimnion is mixing with the warmer epilimnion water, resulting in destratification; and
    - In late February destratification is complete at the deepest sections of the lake. The lake destratifies with a uniform temperature and uniform dissolved oxygen.

- Different areas of Boulder Basin display different behavior in terms of depth and intensity of stratification. Historically, destratification statistically occurs in six out of every ten years. Therefore, there are years that destratification never occurs. During destratification:
    - The lake does not “turn over;” and
    - The strong thermocline observed during stratification weakens or disappears.

The location of the intake for Intake No. 3 was selected to achieve an intake opening elevation of 860 feet AMSL, putting it almost 300 feet below the current lake surface elevation and within the hypolimnion, even for lake water elevations down to 1,000 feet AMSL. This layer of the stratified lake has been demonstrated to have better source water quality for treatment and use in the community water supply. The selected location is also “upstream” of the historic alignment of the Las Vegas Wash, which receives the majority of stormwater runoff and treated wastewater flows from the Las Vegas metropolitan area. Discharged flows from the Las Vegas Wash tend to accumulate above the thermocline in the Boulder Basin.

LAKE MEAD NATIONAL RECREATION AREA

LMNRA is managed by the NPS, and includes two reservoirs (Lakes Mead and Mohave) along 140 miles of the Colorado River from the southern tip of Nevada to the northwest corner of Arizona. The recreation area contains 1,501,216 acres, of which 1,484,159 acres are in federal ownership administered by the National Park Service and 12,568 are non-federal lands (LMNRA website, 2006; *http://www.nps.gov/lame/index.htm*). LMNRA is the fourth largest unit of the national park system outside the state of Alaska.

The recreation area is located in one of the fastest growing regions of the United States. It is within a half-day drive of the large metropolitan area in southern California and within a one-day drive of population centers in Utah and Arizona. These states provide the largest number of visitors to LMNRA from outside Nevada. A total of over 9 million visitors were recorded in 2001, and more recent estimates range between 8 and 9 million visitors annually.

The LMNRA is to be administered for the "general purposes of public recreation, benefit, and use, and in a manner that will preserve, develop, and enhance, so far as practicable, the recreation potential, and in a manner that will preserve the scenic, historic, scientific, and other important features of the area, consistently with applicable reservations and limitations relating to such area and with other authorized uses of the lands and properties within such area" (Public Law No. 88-639, Section 4(a), LMNRA Establishing Act [1964]). The original Boulder Canyon Project dam and reservoir that created Lake Mead was authorized by Congress for the purpose of, among other things, "providing for storage and for the delivery of the stored waters thereof for reclamation of public lands and other beneficial uses" (43 U.S.C. Section 617 [Boulder Canyon Project Act of 1928]). Those purposes - providing for the storage and delivery of the stored waters for beneficial uses - remain, under the LMNRA establishing act, part of the purposes for which the LMNRA is to be administered for "public benefit and use," consistent with the applicable reservations and limitations and other authorized uses of the lands and properties in the LMNRA.

Management of the LMNRA is guided by a Lake Management Plan updated in 2003. The Final Environmental Impact Statement/Lake Management Plan (LMNRA, 2003a) tiers from the 1986 Final Environmental Impact Statement/General Management Plan (LMNRA, 1986) and proposes additional future management of recreational use for the waters of LMNRA. This plan describes alternatives for managing the recreation area, including the management of personal watercraft, that would protect the resources and values of the park while offering recreational opportunities as provided for in the park's enabling legislation, purpose, mission, and goals (*http://www.nps.gov/lame/index.htm*).

Previous Water Management Planning

COLORADO RIVER WATER MANAGEMENT

The Colorado River Compact of 1922 (Compact) divided the river into two basins, an upper basin and a lower basin. The lower basin includes portions of California, Nevada, most of Arizona, and a small portion of New Mexico. The Compact also apportioned (divided and assigned) the consumptive use of 7.5-million acre feet for each basin. Consumptive use is defined as the total water diversions (withdrawals) from the river, less return flows back to the river. The State of Nevada's share of Colorado River water was apportioned in the Boulder Canyon Project Act of December 21, 1928, and confirmed by the Supreme Court Decree in Arizona vs. California, in 1963. Between 1928 and 1992, the Secretary of the Interior (Secretary) entered into a number of contracts for the entitlement to divert for beneficial use Colorado River water in Nevada.

SOUTHERN NEVADA WATER AUTHORITY

The SNWA was formed in 1991 through a cooperative agreement among seven water and wastewater management entities located in southern Nevada - Boulder City, City of Henderson, City of Las Vegas, City of North Las Vegas, the Las Vegas Valley Water District, Big Bend Water District, and Clark County Water Reclamation District. SNWA's primary purpose is the responsible development and management of the region's water resources.

SNWA, its member agencies, and other local agencies have initiated ongoing regional water planning activities. The primary activities, both completed and ongoing, are described more fully in the TTF-EIS (Reclamation, 1996) and in subsequent planning documents referenced on the SNWA website (*http://www.snwa.com*). To ensure that various water planning efforts are coordinated, SNWA began a continuing integrated resource planning (IRP) process in early 1994. The IRP process is intended to help decision makers select the best mix of water resources, facilities, and conservation measures needed to meet future water demands. In addition to traditional resources and facility planning, the IRP also includes the following concepts:

- Extensive public involvement;
- Consideration of supply-side options, such as water resources and facilities, and demand-side options, such as conservation, as ways of meeting demands;
- Analysis of trade-offs among different, sometimes conflicting goals and objectives;
- Analysis of uncertainty in such areas as forecasts and regulations; and
- Analysis of the links among water management strategies, rates, and water demands.

Public involvement is important to the IRP process. An IRP Citizen's Advisory Committee was formed to ensure that public participation was included in the IRP process. The Committee developed recommendations to the SNWA for future water resources, facilities, and levels of conservation.

SNWA WATER SUPPLY RELIABILITY AND PLANNING ACTIVITIES

In 1992, the Secretary of Interior entered into a contract with SNWA which gave SNWA a right to divert and put to beneficial use all of the remaining Colorado River water available to Nevada not previously committed to others, including unused apportionments and surplus as determined and adjusted annually by the Secretary.

Demand for water in the Las Vegas Valley (Valley) has increased in the past and continues to increase. As early as 1944, groundwater supplies were no longer able to meet water demands in the Valley without depletion of the groundwater aquifer. To help meet the Valley's rising water demands, the Nevada State legislature passed a bill in 1947 authorizing the transport of Colorado River water into the Valley via a pipeline from Lake Mead. Federal legislation was passed on October 22, 1965, and a contract was signed in 1967 between the United States and the State of Nevada, acting through Nevada's Colorado River Commission (CRC), allowing the SNWS to begin the first stage of construction.

The SNWS was conceived as the primary facility for treatment and delivery of Colorado River water to the Valley, including an intake, intake pumping station, high-lift pumping station, tunnel, and water transmission system. These facilities are referred to as the Robert B. Griffith Water Project. State funds were also committed for construction of part of the SNWS, including the AMSWTF. Water pumped from Lake Mead is treated at the AMSWTF and distributed to the Valley. Together, the AMSWTF and the Robert B. Griffith Water Project form the SNWS. The SNWS was planned and built in two stages, based on water demand forecasts made in the late 1960s and early 1970s. Construction of Stage I began in 1968 and was completed in 1971. Water deliveries to the Valley via the SNWS started in 1971. Stage II construction of the SNWS began in 1977 and was completed in 1982.

In the mid-1990s performance studies undertaken for the CRC concluded that the capacity of the SNWS could not meet maximum day water demands projected for 1997 and beyond. In response, as the legally responsible steward for the SNWS at the time, the CRC proposed an upgrade and expansion of the existing SNWS facilities to; 1) supply more water, within Nevada's apportionment, to meet the projected water demands of the Valley and 2) improve the reliability of the existing SNWS. Reclamation issued an Environmental Assessment for upgrades to the water delivery system including the construction of a new water conveyance tunnel paralleling the existing River Mountains tunnel, a new water storage tank and regulating tank, improvements to the AMSWTF, a new pipeline from the water treatment facility to the new tunnel, two new pumping plants, and other improvements in urban areas of the Valley. These improvements would increase the reliable capacity of the SNWS, and would allow the facilities to achieve a peak production rate without further major structural improvements (Reclamation, 1994d).

In February 1995, the CRC and SNWA signed a cooperative agreement that transferred responsibility for design and construction of the 1999 phase improvements to SNWA. Effective January 1, 1996, SNWA assumed direct responsibility for the SNWS.

Continued demand for water supply led to the implementation of the SNWA Capital Improvements Plan (Plan). The Plan identified specific water system facilities to be constructed, including intake system improvements, water treatment improvements, transmission system improvements, and improvements to power and communication systems. The Plan covered a 30-year period from 1995 through 2025. The first large infrastructure program implemented by the Plan was the TTF, which included a new water treatment and transmission facility to serve Las Vegas, providing treated water from Lake Mead.

Long-Term Drought Along Colorado River

The operation of Colorado River reservoirs, including Lake Mead, is governed by numerous statutes, compacts, decrees, and a treaty; collectively referred to as the "Law of the River." Many of these mandates were individually formed and did not necessarily result in a seamless approach to river basin management. With the increase in competing demands for water on the Colorado River, the interaction of these mandates is continually tested. Recent years of drought, decreasing system storage, and growing demands on the Colorado River system have increased the need to develop guidelines for how Reclamation, the seven Colorado River Basin states, and other stakeholders would address limited water availability during times of low reservoir conditions.

Reclamation recently initiated the Sixth Review of the 1970 Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs. The Operating Criteria provide for the long-range operation of the dams and reservoirs constructed and operated under the authority of the Colorado River Storage Project Act and the Boulder Canyon Project Act for the purposes of complying with and carrying out the provisions of the Colorado River Compact, the Upper Colorado River Basin Compact, and the Mexican Water Treaty (*http://www.usbr.gov/lc/region/*). The Operating Criteria form the rules by which the Colorado River reservoir system is operated. The Annual Operating Plan (AOP) is prepared using the rules contained in the Operating Criteria. Each year an AOP is prepared which guides the operations of the reservoirs for the upcoming year. The Secretary of the Interior does preparation via a public process with input from all interested parties for issuance in the fall of each year. The types of decisions made in preparing the AOP include monthly and annual release patterns and reservoir storage levels for Colorado River reservoirs.

Reclamation has also undertaken the Development of Lower Colorado River Basin Shortage Guidelines & Coordinated Management Strategies for Lakes Powell and Mead Under Low

Reservoir Conditions. Under NEPA, Reclamation is preparing an EIS for the development and implementation of these guidelines (*http://www.usbr.gov/lc/region/*). In May 2005, Reclamation initiated a public process to develop and adopt water supply guidelines that can be used when low water conditions exist. By developing additional management strategies, the Secretary will be able to better manage and operate the key Colorado River reservoirs while also providing mainstream users of Colorado River water, particularly those in the Lower Basin states of Arizona, California and Nevada, a greater degree of predictability with respect to the amount of annual water deliveries in future years, particularly under low reservoir conditions. These strategies are also designed to delay the onset and reduce the magnitude of shortages, and maximize the protection afforded to water supply, hydropower production, recreation, and environmental benefits by water storage in Lakes Mead and Powell.

As the land management agency for Lake Mead and the activities that take place, the NPS is also addressing the potential ramifications of lower lake water levels in the future. LMNRA continues to receive large numbers of recreational visitors, and will continue to deal with lowered lake levels and the potential for further lake elevation reductions in the future. The park has been operating since 1986 under the General Management Plan/ Development Concept Plan/Environmental Impact Statement (LMNRA, 1986). A subsequent Lake Management Plan/Environmental Impact Statement was prepared to provide additional and more specific guidance for the long-term management of Lakes Mead and Mohave (LMNRA, 2003a). Although most of the 1986 and 2003 plans are still applicable, they did not foresee the current and predicted drought conditions and did not fully consider the effects of greater fluctuations in the lake's water levels. LMNRA has prepared a General Management Plan Amendment/Environmental Assessment (LMNRA, 2005) addressing lowered lake levels and the management approaches that will be taken to deal with this situation.

Facility Operation Limits at Lower Lake Levels

The existing SNWA water system intakes (Intakes No. 1 and No. 2) draw water from a zone extending vertically 20 to 30 feet above the intake openings. As the lake surface elevation drops, the existing intake pumping facilities expend more energy lifting the water a greater distance with a corresponding decrease in flow. The gradual decrease in system pumping capacity as a result of lowering lake levels is serious, but can be mitigated to some extent by adding pumping units. However, if the lake levels fall far enough, the intake systems become totally inoperable. Elevation 1,050 feet AMSL is the approximate lake surface level at which the existing Intake No. 1 would cease to be operable. Elevation 1,000 feet AMSL is the approximate lake level at which the existing Intake No. 2 would cease to be operable.

Purpose and Need Statement for the Proposed Lake Mead Intake No. 3

The purpose and need for the proposed Intake No. 3 project is consistent with the goals of the original SNWA TTF program implemented in compliance with the environmental documentation culminating in a Record of Decision in November 1996 (Reclamation, 1996a).

As described in "Southern Nevada Water Authority Treatment and Transmission Facility – Final Environmental Impact Statement, September 1996" (Reclamation, 1996b), the purpose and need of the planning efforts for the SNWA-TTF project was:

"to develop a reliable and demand-responsive municipal water system that will supplement the existing Southern Nevada Water System during periods of curtailed production or system failures, and provide the State of Nevada full access to its Colorado River water entitlement."

The Intake No. 3 project will continue to meet the goals of this purpose and need in the following ways:

- By providing additional protection to the SNWS from loss of system intake **capacity** resulting from declines in Lake Mead water levels in the event of severe drought conditions or long-term changes in average river flow conditions, in combination with water use patterns in the Colorado River Basin.
- By increasing system reliability by providing **back-up capability** to deliver water from Lake Mead to the Las Vegas Valley during periods of outage, repair, inspections, or upgrade to the infrastructure facilities currently designated as Intake No. 1 and Intake No. 2.
- By offering increased operational flexibility for accessing water at various depths and locations in Lake Mead to provide the best available **water quality for the public water supply** under various seasonal lake conditions and lake water levels.

B. Issues to be Addressed

Specific impact topics were identified for focused discussion and to allow comparison of the environmental consequences of each alternative. Impact topics were identified based on federal law, regulations, and Executive Orders; *NPS Management Policies* (NPS, 2000a); Sections C and D of the Environmental Screening Form (Appendix 1, Section 1 of DO-12 [NPS, 2001]); and National Park Service guidance on sensitive or potentially impacted resources. A News Release circulated by LMNRA on June 1, 2005 elicited no public or agency comments (Appendix A). Informal discussions of the permit requirements and appropriate scope of environmental analysis for the proposed intake project were conducted with involved federal and state agencies, including the U.S. Army Corps of Engineers, Bureau of Reclamation, and Nevada Division of Environmental Protection. A brief rationale for the selection of each impact topic is presented below.

Issues that are addressed in this EA include:

- Aesthetics
- Air Quality
- Biotic Communities
- Cultural Resources
- Geology and Soils
- Hydrology and Water Quality
- Noise and Vibration
- Transportation and Traffic
- Visitor Use and Experience (Recreation)

NEPA requires an examination of the effects on all components of affected ecosystems and is the charter for the protection of the environment. NEPA also requires federal agencies to use all practicable means to restore and enhance the quality of the human environment and to avoid and minimize any possible adverse effects of their actions upon the environment.

Aesthetics

NPS *Management Policies* (2001) include a standard of no impairment of park resources and values. The NPS strives to fulfill its mandate to preserve the natural setting and resources of parks for future generations. Effects to aesthetics may occur during construction of the intake pumping

station. In addition, the anchored construction barge may potentially have visual impacts on aesthetics to LMNRA users in the northern Boulder Basin.

Air Quality

The 1963 Clean Air Act, as amended, requires land managers to protect air quality. Section 118 of the Clean Air Act requires parks to meet all federal, state, and local air pollution standards. National Park Service *Management Policies* (2001) address the need to analyze potential effects to air quality during park planning. Dust, construction equipment and batch plant emissions from the proposed project will have an effect on air quality. In addition, effects to LMNRA users may occur during construction activities.

Biotic Communities

National Park Service *Management Policies* (2001) policy is to protect the components and processes of naturally occurring biotic communities, including the natural abundance, diversity, and ecological integrity of plants and animals. The project area provides habitat to the razorback sucker (endangered), the bald eagle (threatened), and the desert tortoise (threatened). Potential disturbance/loss of biotic communities and habitat in the project area are addressed in the Biological Assessment. Construction activities involving human presence and noise may also impact wildlife.

Cultural Resources

In accordance with NPS *Management Policies* (2001), the NPS will ensure that cultural resources are preserved and protected, receive appropriate treatments (including maintenance), and are made available for public understanding and enjoyment. While the land-based and water-based cultural surveys indicated the absence of cultural resources in the project area, the cultural resource survey findings are summarized in further detail in the Environmental Consequences section.

Geology and Soils

In accordance with NPS *Management Policies* (2001), the NPS will allow natural geologic process to proceed unimpeded. In addition, the NPS will actively seek to understand and preserve the soil resources of parks, and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources. Excavation, grading and drilling activities associated with project implementation will have localized effects on soils. Geologic and seismic conditions may impact project design integrity and constructability.

Hydrology and Water Quality

The 1972 Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, is a national policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters, to enhance the quality of water resources, and to prevent, control, and abate water pollution. The NPS *Management Policies* (2001) provide direction for the preservation, use, and quality of water in national park units. Drilling muds, lubricants, fuels, sedimentation and turbidity from the anchored barge, and drilling and construction activities may have an effect on water quality. Improved drinking water quality through the new intake is expected to be a project benefit.

Noise and Vibration

In accordance with NPS *Management Policies* (2001), the NPS will preserve, to the greatest extent possible, the natural soundscapes of parks. The NPS will restore degraded soundscapes to the natural condition wherever possible, and will protect natural soundscapes from degradation due to noise. Construction equipment and batch plant activities have the potential to effect local noise levels. Surface, subsurface, and underwater blasting may be required for facility construction.

Transportation and Traffic

In accordance with NPS *Management Policies* (2001), the NPS will work with appropriate governments, private organizations and individuals to minimize the impacts of traffic on park resources and values. Traffic may be affected during construction activities. If it is determined that excavated material requires transportation out of the LMNRA, haul trucks may have an effect on local park traffic. Construction traffic may have an effect on LMNRA users during busy seasons.

Visitor Use and Experience (Recreation)

The NPS is committed to providing appropriate, high quality opportunities for visitors to enjoy the parks, and will maintain within the parks an atmosphere that is open, inviting, and accessible to every segment of American society (NPS *Management Policies,* 2001). Recreation is the prime use of resources at LMNRA. Activities from the anchored barge in Lake Mead may have an effect on lake users. Facilities and operations associated with the project could potentially have an effect on known recreation facilities in the immediate project area.

C. Environmental Resources Not Addressed

The screening analysis also indicated resource issues that were not likely to be substantially affected by project implementation. Issues that are not addressed in this EA include:

- Agriculture Resources
- Hazards and Hazardous Materials
- Land Use/Planning
- Mineral Resources
- Population/Housing
- Public Services
- Utilities/Service Systems

The rationale for not addressing these issues in this EA is presented below.

Agricultural Resources

No effects to agricultural resources will occur as a result of the implementation of the proposed project as there are no agricultural activities in the proposed project area.

Hazards and Hazardous Materials

The proposed project does not include industrial-type processes that will generate or require disposal of hazardous material or hazardous material byproducts. While fuels and lubricants will be used for construction equipment during building activities, the storage and use of the materials will

be addressed by management practices and standard guidelines during this period. No effects caused by hazardous materials will occur as a result of project implementation; therefore, hazardous materials were dismissed from detailed analysis.

Land Use and Planning

No effects to land use or planning are anticipated. Implementation of the proposed project is consistent with current ongoing water supply infrastructure activities in the existing special use zone within the LMNRA. The Saddle Island area where the intake pumping station will be located is currently use-restricted and access-restricted. No changes from the current status are planned. The small increase in the affected area of the special use zone to accommodate the project, in relation to the overall size and extent of LMNRA, will not result in any changes to common recreational and visitor uses in the area.

Mineral Resources

No effects to known mineral resources or extraction activities from project activities will occur as a result of the proposed project. No preclusion of future minerals extraction activities from project activities will occur as a result of the implementation of the proposed project.

Population and Housing

No effects to population or housing will occur as a result of the implementation of the proposed project. The proposed project will use the existing local workforce; therefore, no special workforce housing is required in LMNRA or elsewhere.

Public Services

No effects to public services will occur from project implementation; therefore public services were dismissed from detailed analysis. The purpose and need for the project points to a benefit to public services from project implementation.

Utilities and Service Systems

No effects to utility or service systems will occur as a result of the implementation of the proposed project; therefore, utilities and services systems were dismissed from detailed analysis. Improved system flexibility and reliability is expected as a result of project implementation.

II. ALTERNATIVES

A. Alternatives Addressed in the EA

This EA must evaluate a reasonable range of alternatives for the Intake No. 3 project that meet the objectives stated in the P&N statement, are economically and technically feasible, and are implementable (DO-12, Section 2.7). As a result of the decision to tier the Intake No. 3 EA from the TTF-EIS, the range of alternatives considered requires consistency with the P&N of the TTF program. This narrows the range of potential structural and non-structural solutions to meet the demands of the issues and objectives identified. The objectives of protecting and improving water delivery system capacity, reliability, and operation at lowered lake levels dictates the structural solution of a new intake location that could operate in conjunction with the existing SNWA intake facilities at Saddle Island. This is referred to as the "proposed project" for Intake No. 3.

The alternatives that are evaluated in the Intake No. 3 EA are; 1) the no-action alternative (no intake project would be constructed [per DO-12 requirements, Section 2.7]) and 2) the proposed project (constructing and operating Intake No. 3 as described in the Project Description). This EA includes a discussion of "Alternatives Considered but Dismissed from Detailed Analysis." These other alternatives included potential intake locations in Boulder Canyon northeast of Callville Bay, and in Black Canyon just upstream of Hoover Dam. These other potential intake alternatives were eliminated from consideration based on construction, operation, permitting, environmental, and cost issues. The evaluation criteria and results of the comparative evaluation for these alternative locations, versus the proposed project, and the reasons for eliminating these alternatives from further consideration are discussed in this EA.

The federal action being evaluated in this EA is the granting by NPS of the expansion of existing ROW and the approval for new water supply facility construction and operation in the LMNRA. SNWA's proposed project would construct an additional deep water intake in Lake Mead serving the AMSWTF and SNWS, located in the LMNRA. SNWA would also expand its existing ROW to encompass the area surrounding the new intake structure, the corridor above the new intake tunnel, the new intake pumping station, the new access road, the new excavated material placement areas and viewshed berms, and the new connecting pipeline to the AMSWTF.

No-Action Alternative

The no-action alternative provides a baseline for evaluating the changes and effects related to the implementation of the proposed project alternative. Under this alternative, NPS would not grant the expansion of the existing ROW or approve new water supply facility construction and operation. SNWA would not construct and operate a new water supply intake to provide additional protection to the SNWS from loss of system intake capacity resulting from declines in Lake Mead water levels. The existing SNWS would continue to operate under its existing configuration (including the existing Intake No. 1 and Intake No. 2), foregoing the potential increased system reliability and flexibility that would be possible with the additional intake. Under this alternative, the SNWS would have less flexibility to respond to lowered water levels in Lake Mead resulting from greater demand on Colorado River resources and reduced inflows due to drought in the Colorado River watershed. The capacity of the SNWS to deliver water to the Las Vegas Valley could be reduced, and flexibility for accessing water at various depths and locations in Lake Mead to provide the best available water quality for the public water supply would not be achieved.

Proposed Project

The Southern Nevada Water Authority presently operates two water intakes at Saddle Island on the west shore of Lake Mead, approximately five miles northwest of Hoover Dam and approximately 20 miles east of the center of Las Vegas, within the Lake Mead National Recreation Area. Severe drought has caused declining water levels in Lake Mead during recent years - lake elevation was approximately 1,127 feet AMSL in August 2006, compared to a level ranging between 1,175 and 1,215 feet AMSL between 1972 and 2000. Long-term water supply modeling conducted by the Bureau of Reclamation indicates that the lake level is expected to decline even further over the next several years, even under normal hydrologic conditions in the Colorado River basin, until the system recovers from the recent severe drought.

The SNWA desires to construct a third deep-water intake, Intake No. 3, in Lake Mead, and other associated project components to protect the existing water system capacity against the potential loss of pumping capability of Intake No. 1 should the lake levels fall below 1,050 feet AMSL.

Prior to the initiation of construction, SNWA would file an application with NPS to expand the existing SNWA right-of-way within the LMNRA to include the area surrounding Intake No. 3, the associated Intake Pumping Station No. 3 (IPS-3), the intake tunnel corridor, the interconnecting tunnel corridor between IPS-3 and IPS-2, the utility corridors, the access road, the excavated material placement areas and viewshed berms, and the connecting pipeline to the AMSWTF.

PROJECT COMPONENTS

The major project components would include a new intake structure and intake tunnel beneath the lake and beneath Saddle Island, IPS-3 on Saddle Island, the caverns or forebays beneath Saddle Island and shafts around IPS-3 for construction and connections, a conveyance pipeline from the IPS-3 pumping station connecting with AMSWTF, and a tunnel interconnecting the Intake No. 3 tunnel with the existing Intake No. 2 tunnel beneath Saddle Island (see **Figure 1**).

Intake Structure

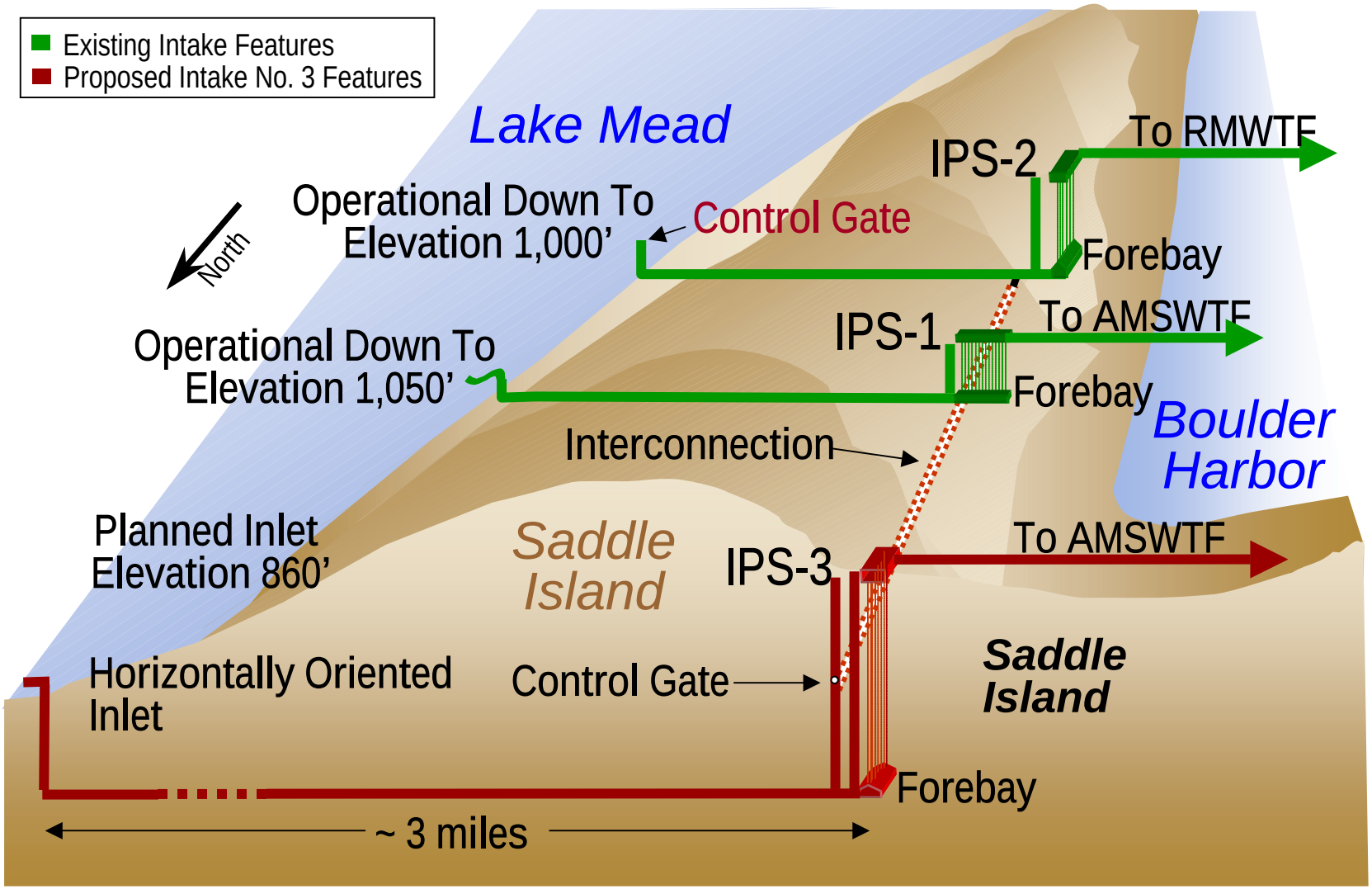
The intake structure would be a single level intake with the inlet configuration oriented horizontally, and the centerline of the intake opening at about 860 feet AMSL. The location of the intake is in Boulder Basin, northeast of Saddle Island (see **Figure 2**). The final location and elevation of the intake structure is to be determined pending the results of the geotechnical exploration program. The method of construction anticipated for the intake structure would be similar to that used for the construction of the Intake No. 2 intake structure, consisting of a vertical shaft in the lake bottom, which connects to the horizontal tunnel.

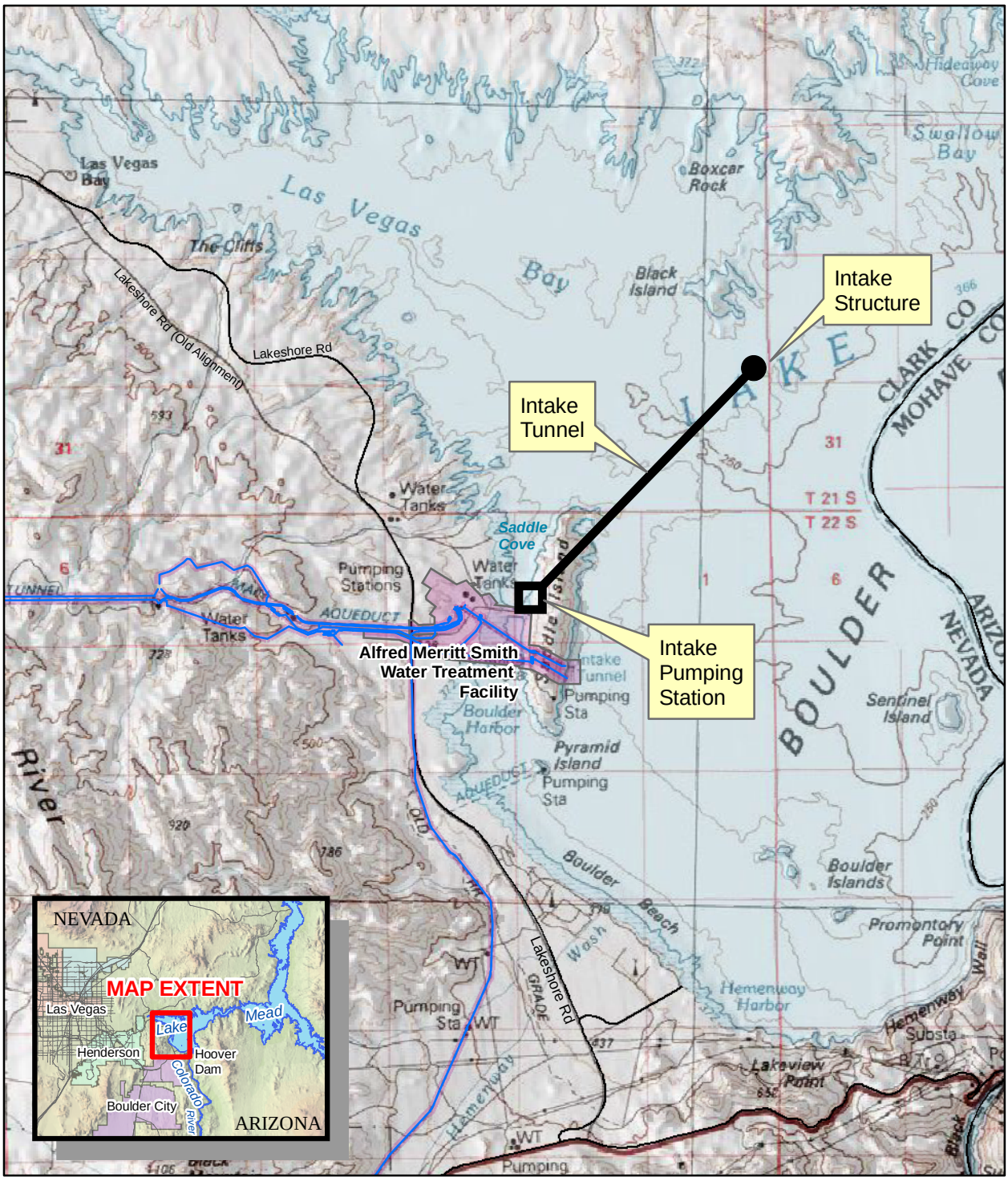
Intake Tunnel

The intake tunnel could have an inside diameter of approximately 20 feet, be approximately 18,000 feet long, depending on the final tunnel alignment, and will likely be lined with precast concrete segments. The tunnel likely would be constructed using a tunnel boring machine (TBM). The actual alignment of the tunnel will be defined during the design phase of the project, as it is subject to the highly variable nature of the area's geology. However, in all possible alignments, the terminal endpoints and all other construction effects to the environment would be identical.

Figure 1 – Planned Intake No. 3 System Concept

(Isometric View – Shows General Orientation and Elevation Information – Not To Scale)





Southern Nevada Water Authority

Figure 2

Lake Mead Intake No. 3

Potential Location of Intake, Tunnel, and Pumping Station

SNWA Pipelines

SNWA ROW

Map produced by SNWA-Eng., KTM, Mapping & Analysis.
Map Author: EN
Background: USGS 1:100K Quad.
ROW general ref. only, not to scale.

MAP-ID: LMI3-019
DATE: 12 OCT 2006

0 1 2 3 Miles

Intake Pumping Station No. 3

The proposed intake pumping station would be located on the northern portion of Saddle Island, approximately 3,000 feet north of Intake Pumping Station No. 1 (IPS-1) (see **Figure 3**). There are two types of pumping station configurations being considered. The first type utilizes turbine pumps, similar to the existing IPS-1 and IPS-2 facilities, which use a large number of relatively "small" pumps. An alternative arrangement utilizes centrifugal pumps, which would require a fewer number of pumps with larger individual capacity. The footprint of the pumping station site could be up to approximately 4.5 acres depending on the selected configuration.

At the initial construction of the facility, the site would be excavated and graded to the foundation level. Due to the presence of rock in the area, blasting will be required.

Following surface and underground excavation for the pumping station site, the IPS plumbing, power conduits and other infrastructure beneath the facility floors would be installed. The foundations of the buildings would then be constructed, followed by the floors, walls and roof. The mechanical and other interior components would be installed once the buildings are completed. If a centrifugal pump configuration is selected, a significant portion of the mechanical components of IPS-3 would be constructed in underground chambers, thus reducing the extent of structures on the ground surface.

Shafts

Various vertical shafts will be necessary depending on the final pumping station configuration selected for design, as discussed above. For the vertical turbine pumps up to 90 vertical well shafts would be constructed. The approximately 5-foot diameter well shafts would connect the surface pumping station to the underground intake forebays and would be approximately 500 feet deep.

For the vertical centrifugal pump arrangement, six larger-diameter shafts are required for access to the underground caverns and the discharge piping from the caverns. These shafts would be 20 to 30 feet in diameter and be approximately 600 feet deep.

Other shafts will be needed for construction access, equipment access, and hydraulic surge control.

Forebay

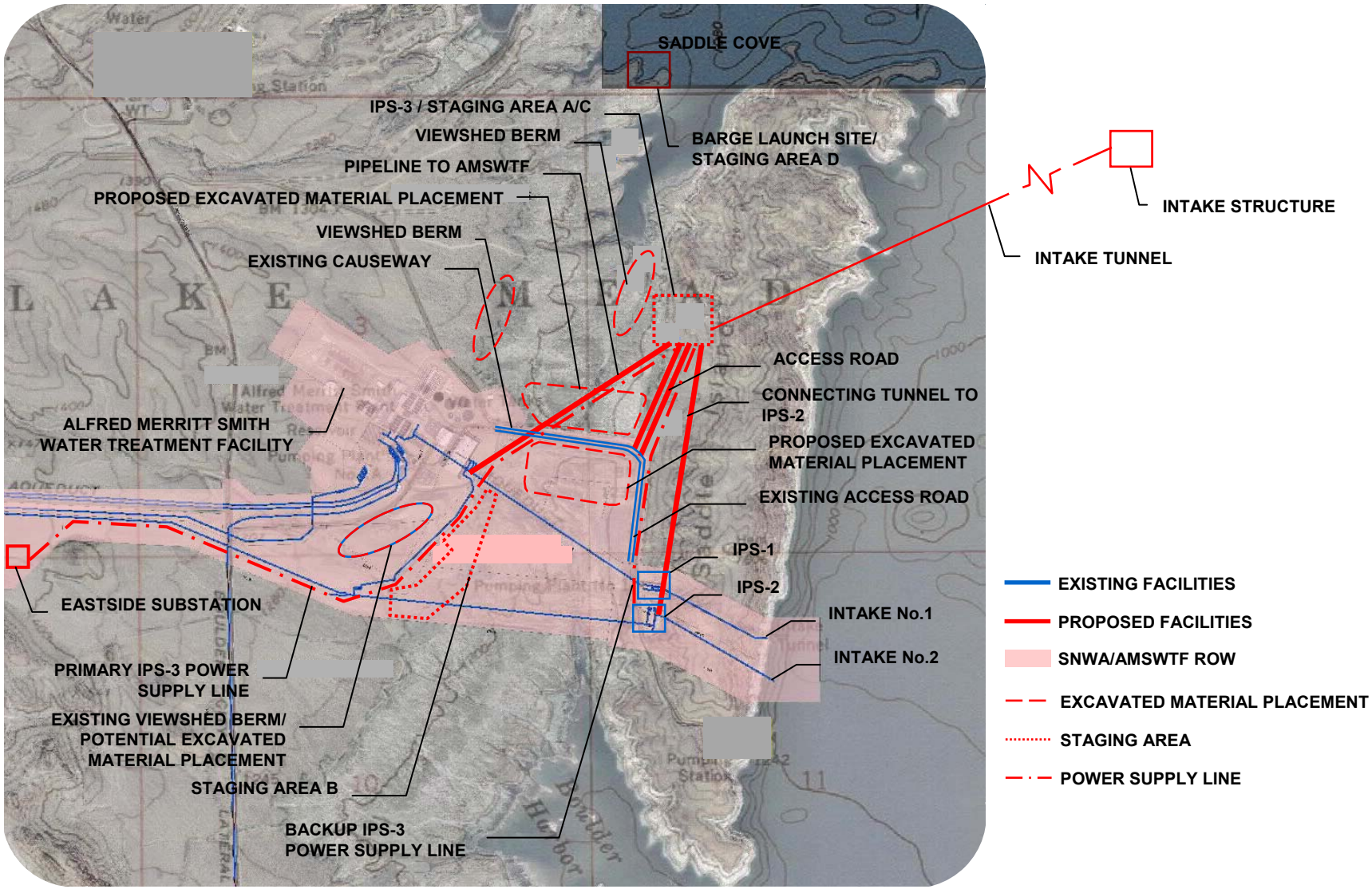
Forebays at the bottom of the well shafts are required for the turbine pumps to provide for the efficient hydraulic distribution of the water. It is anticipated that the forebays would be caverns with appropriate hydraulic elements such as flow guidance walls incorporated. For the centrifugal pump arrangement, pressure manifolds would be constructed instead of forebays. The forebays or manifolds would likely be constructed by drill and blast methods.

Conveyance Pipeline to AMSWTF

The proposed IPS-3 would deliver raw water to the AMSWTF. A pipeline with an approximate 12-foot diameter from IPS-3 to AMSWTF would be constructed beneath the ground surface, crossing from Saddle Island to AMSWTF across the currently-dry lake inlet adjacent to Saddle Cove, within or beneath the planned excavated material placement area (discussed below). Pipeline construction would most likely be by the cut-and-cover technique. The pipeline from IPS-3 to AMSWTF would be approximately 3,000 feet in length (see **Figure 3**), disturbing an estimated 14 acres during construction.

Figure 3 - Plan View of Proposed Intake No. 3 Facilities

(Conceptual Representation of Proposed Facilities for Information Only
Does Not Accurately Depict Location or Alignment of Facilities)



Interconnecting Tunnel

The Intake No. 3 tunnel will be interconnected to the Intake No. 2 tunnel in order to provide reliability and flexibility in system operations. The connection would likely be made by mining an interconnecting tunnel (see **Figure 3**). This connecting tunnel is estimated to be approximately 3,000 feet long and would likely be constructed as a 16-foot diameter horseshoe-shaped structure using drill and blast methods. The tunnel will likely be lined with shotcrete and/or concrete. A remotely-operated gate structure would be constructed at the opening of Intake No. 2. With this gate the existing intake opening would then be able to be closed to allow IPS-2 to draw water from the Intake No. 3 tunnel when desired and appropriate for improving source water quality or in other operational situations.

Power

Temporary power during the construction phase, including power for the TBM, would likely be supplied by a temporary power line from the existing IPS-2 to the area of the new pumping station. The power line would likely be a 13.8-kV line hung above ground on wooden poles, and be similar in appearance to the existing above-ground power line that currently runs along the Saddle Island causeway road (HRA and PBS&J, 2006).

The permanent power required by SNWA design standards to operate the pumping station would be supplied through two independent and separate 69-kV circuits via underground lines. One circuit source would likely be from the Eastside Substation adjacent to Booster Pumping Station 1-A (BPS 1-A), west of Lakeshore Road. The second circuit source would likely be taken from the substation near the existing IPS-2 on Saddle Island. These feeders would be routed from the sources in the most direct line possible and constructed by trenching and filling along existing access roads and across the currently-dry lake bed to the new substation at IPS-3 (see **Figure 3**).

Access Roads and Staging Areas

The primary access to the proposed pumping station site and staging area by construction personnel, vehicles and equipment would be via Lakeshore Road to the main entrance of the AMSWTF, to the existing causeway access road, and north from the causeway on a new access road on Saddle Island to the pumping station site (see **Figure 3**). Temporary access may also be via the Saddle Cove access road and across the dry bed of Saddle Cove.

The access road on Saddle Island would be approximately 1,500 feet in length and disturb a total area of 2.5 acres. The road from the causeway to the pumping station site would initially be graded, then may be finished with gravel cover or asphalt paving at the completion of construction for use as the permanent access to the pumping station. The access road would be designed to preserve existing drainage patterns from Saddle Island to Saddle Cove. SNWA would restrict public access into the project site.

Temporary construction staging areas would be required for the storage of equipment, materials and fuel. In addition, the staging areas would be needed for equipment maintenance, temporary stockpiling, handling of excavated material, and other related construction activities during construction of the proposed pumping station. Temporary security fencing may enclose the staging areas to secure the equipment and materials.

Staging Area A would be located adjacent to the pumping station site on Saddle Island (see **Figure 3**). Staging Area A would be approximately 2 acres, which would be cleared and graded to allow for a level storage surface. Staging Area A would be primarily utilized for equipment and fuel storage, construction employee parking, construction-related materials, and other related activities. Fuel containers would be stored in a secured area with spill containment.

Staging Area B would be located within the SNWA ROW and would be approximately 15 acres. This area would most likely be adjacent to the current SNWA viewshed berm south of AMSWTF. Staging Area B would be primarily utilized for stockpiling and handling of excavated materials. Earthen materials from the excavation may be processed using on-site screening, processing and a rock separation plant.

Staging Area C would be another temporary staging area required during the construction of the intake structure/tunnel. The staging area would be located on Saddle Island north of the causeway near the proposed intake pumping station site with a size of approximately 2 acres. The staging area would be graded, followed by installation of a temporary security fence to secure the equipment and materials. The staging area would be used to store construction equipment, fuels and other related construction materials and for employee parking.

The marine activities would require a separate staging area, Staging Area D, covering 2 acres. The intake construction barge would be trucked to this temporary staging area and launch site within the LMNRA at Saddle Cove. The staging area and barge launch location would be located northwest of Saddle Island and is the same site that was used during the construction of the Intake No. 1 Modification in early 2004 (see **Figure 3**). It is anticipated that the marine equipment would consist of a clamshell dredge, a separate support barge, and other equipment to support the construction of the intake riser and cap. Grading, excavation, fill and temporary ground improvement or support (i.e., sheet piles, retaining walls/tie backs, erosion protection) may be required at the launch site for mobilization and operation of offshore equipment. Temporary marine facilities, such as floating docks and piers, may also be required. The staging area for the intake construction is sensitive to the lake elevation. In the event that the lake WSE is substantially different during the construction period, an alternative marine staging area may be required.

CONSTRUCTION METHODS

Shafts

The initial construction access shafts would likely be constructed using drill and blast methods, drill-down methods, or a combination of both. In order to construct the shafts, blasting will be required. Subsequent access shafts, well shafts and pump discharge shafts would likely be constructed using drill-down and/or raised bore methods. If the subsequent shafts are constructed using drill-down methods, blasting would be required. If the contractor selects raised bore methods for subsequent shaft construction, blasting may not be required. Well shafts for the turbine pumping units can likely be constructed without the need for blasting.

Tunneling

To bore the intake tunnel from Saddle Island to the intake structure, a TBM would likely be used. The TBM would be brought to the site by trucks and partially assembled on-site. The TBM would access the work area by the new access road described previously. A large construction shaft would be excavated and the TBM components lowered to a constructed launching chamber where

final assembly would be completed. The TBM would likely be powered by electric power supplied from local SNWA facilities.

A TBM typically consists of one or two shields and trailing support mechanisms. A rotating cutting wheel is located on the front end of the shield. Behind the cutting wheel there is a chamber where, depending on the type of TBM and ground conditions encountered, the excavated soil (muck) is either mixed with slurry or left unmixed. Behind the chamber a set of hydraulic jacks is supported by the finished part of the tunnel, which are used to push the TBM forward, much like a caterpillar. Behind the shield, inside the finished part of the tunnel, several support mechanisms, which are part of the TBM, can be found: excavated material removal, slurry pipelines (if applicable), control rooms, and rails for transport of the precast concrete segments and other equipment. The cutting wheel would cut the rock face into chips or muck. Depending on the type of TBM and the ground conditions encountered, the muck would fall onto a conveyor belt or rail car system and be carried out of the tunnel or be mixed with slurry and pumped back to the tunnel entrance. Once out of the tunnel the muck would be hauled to Staging Area B for processing or other locations for storage and placement.

Depending on geology, tunnel configuration and sizing, the tunnel would probably be fully lined for its entire length, using either precast or cast-in-place concrete segments. Precast segments would be installed immediately behind the machine to minimize water intrusion, followed by grouting behind the liner. Grouting of the tunnel liner can be accomplished by injecting grout behind the liner wall to fill the void spaces.

Because of the substantial cost and safety concerns that would result from removing the TBM shield from the finished intake tunnel, the TBM would most likely be driven past the point of the planned intake riser and the bulk of the machine abandoned in place rather than trying to remove it from the tunnel. Some of the salvageable parts would be stripped from the TBM and removed through the tunnel and shaft. After that salvage operation is complete, the TBM carcass would be concreted into place.

Depending on geology, the interconnection tunnel between Intake No. 3 and Intake No. 2 may be concrete-lined or lined with shotcrete. This tunnel would probably be constructed by drill and blast methods due to its short length, which may make it uneconomical to construct using a TBM.

A minor amount of lake bottom disturbance around Intake No. 2 will occur during installation of the gate structure on the intake opening. The intake opening would then be able to be closed to allow IPS-2 to draw water from Intake No. 3, as discussed previously. The minor disturbance (<0.1 acre) would include installation of a rockfall protection device on the 45-degree slope of Saddle Island upslope of the intake.

Intake Riser Shaft

The intake shaft could be constructed either prior to the arrival of the TBM, or after it passes the designated intake shaft site. The material from the shaft excavation would be removed by a combination of downhole drilling and excavation by a clamshell dredge mounted on a barge. The excavated material would be placed on the lake bottom downslope of the intake site. The excavation methods would be chosen to minimize dispersion of fine materials in the water column.

Excavated Materials Removal and Placement

Excavated material would come from the site preparation as well as excavation of the intake tunnel, intake shafts/forebay, and system interconnections. Mass excavation methods would be used to remove surface material from the pumping station site. Much of this material may be good quality rock that may be stockpiled and use by the LMNRA for other construction operations. Excavators, conveyers, bucket lifts, and other equipment would remove construction materials from the intake tunnel, drilling of the intake shafts, and placement of the pipeline from IPS–3 to AMSWTF. The total amount of material generated by construction of project facilities is estimated at approximately 900,000 cubic yards (CY), including an expansion bulking of the excavated material.

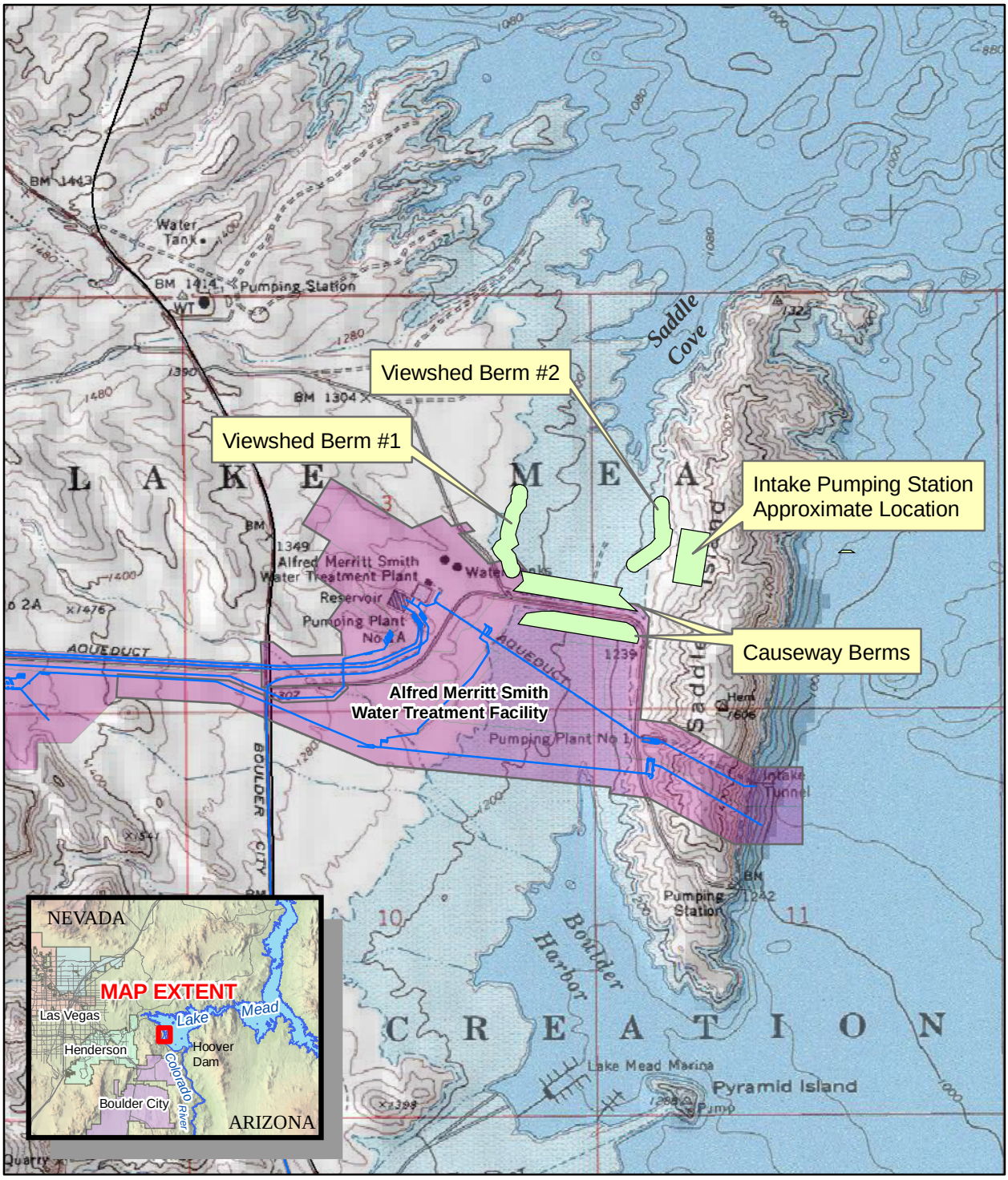
Some of the excavated material would be used to construct viewshed berms to screen the new pumping station and AMSWTF from recreation users in Saddle Cove, north of the causeway, when water levels in that area rise to again allow public recreation access (see **Figure 4**). (AMSWTF has an existing viewshed berm that hides the facility from users in Boulder Harbor, south of the causeway.) The berms would have a base width of approximately 200 feet, at approximately 30 to 50 feet high and 1,000 feet long, and would have their longitudinal axis centered on the 1,221-foot contour [estimated volume of approximately 500,000 CY].

The remainder of the excavated material would be placed in fills located immediately north and south of the existing Saddle Island causeway. These fills would be shaped as an extension of the existing causeway, with the fill placed below the 1,221-foot contours north of the causeway. Both areas would display a sloped toe at the outer fill margin. The fills in the areas north and south of the causeway would extend approximately 200 feet and 150 feet, respectively, farther out from the existing causeway [estimated volume approximately 400,000 CY].

Material in excess of the estimated 900,000 CY would be placed on the existing large viewshed berm located south of AMSWTF (see **Figure 3**). This is a permitted placement area currently used for excavated material storage and transfer for other ongoing projects at AMSWTF.

Of the estimated 900,000 CY of excavated material, approximately 30,000 CY may be affected by the introduction of additives inserted in front of the TBM necessary to maintain the integrity of the tunnel face and allow pumping of the slurry/muck mixture for removal at the tunnel access shaft. Some of the additives may render the excavated material unsuitable for permanent placement in the park, particularly in areas that may be inundated by future rising lake levels. This excavated material may need to be transported to an off-site disposal facility, likely either in Boulder City or at Apex, northeast of Las Vegas.

The approximate quantities that may require off-site disposal are based on the findings of recent geotechnical investigations performed for the project regarding rock conditions along the selected tunnel alignment. The excavated material affected by the additives would generate about 1,200 truck cycles (round trips) between the project site and the off-site disposal area. The haul activity would occur over an approximately 6-month period. The excavated material could be temporarily stockpiled at the project site to avoid haul-truck traffic during peak LMNRA recreation visitor use periods. The trucks will use a route through the park as designated by LMNRA. The hauling plan and schedule will be coordinated with the LMNRA to minimize disruption to visitor activities.



Southern Nevada Water Authority

Figure 4

Lake Mead Intake No. 3

Proposed Placement of Excavated Material

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

SNWA Pipelines
Spoils Locations
SNWA Right of Way

Map produced by SNWA-Eng., KTM, Mapping & Analysis.
Background: USGS 1:24K Quad.
ROW general ref. only, not to scale.
Map Author: EN

MAP-ID: LMI3-020
DATE: 12 OCT 2006

Dewatering

Dewatering would be required during the construction of the underground openings for the pumping station, the tunnels and the various shafts due to infiltration from Lake Mead or groundwater. During the construction of the well shafts, water generated at the drill holes may be recycled for drilling operations. The processed water would be pumped to holding tanks next to the drill rig for solids settling. The water may be reused as needed. Excess water may be pumped to sedimentation tanks for treatment prior to discharge to Lake Mead. Alternatively, temporary infiltration ponds that would be used for disposal of water may be constructed in the dry lake bottom area that is planned for excavated material placement.

Barge Operations

Once the barge is launched and reaches the drill locations, anchors would be set to stabilize the vessel. For safety, buoys would be placed along the anchor cables to alert boaters. In addition, notices would be posted at nearby marinas to notify boaters and lake users of the work areas.

Grouting of the tunnel may also be accomplished from outside the tunnel excavation using a drilling barge on the lake surface to drill small holes through the lakebed down to the vicinity of the tunnel liner. These holes would be used to inject grout around the planned tunnel alignment to minimize seepage into the tunnel during "interventions" when cutters on the TBM head or seals require replacement. As many as 500 or more grouting holes may be drilled along the tunnel alignment to accomplish this activity.

Construction water would be needed for the drilling operations and may be obtained from Lake Mead. The water would then be recycled through settling tanks on the barge. Solids removed from the settling tanks would be temporarily contained on the barge and periodically transported to land for appropriate disposal.

Off-Site

A batch plant may be used to process excavated material from the pumping station excavation, well drilling, forebay, caverns, and the tunnel excavation. The raw material would be used to process concrete and building material for the pumping station, concrete liner, and other facilities. The batch plant would be located on the excavated material stockpile area (Staging Area B). The batch plant would comply with Clark County Department of Air Quality and Environmental Management regulations for operation. The batch plant staging area may be used for stockpiling of material, separation, process and other related activities.

AREA AFFECTED BY PROJECT IMPLEMENTATION

Table 1 presents the combined area of effect of implementation of the proposed intake and associated facilities. The affected areas are presented in the categories of newly disturbed areas, re-disturbed areas and currently disturbed areas. Re-disturbed areas are defined by LMNRA as areas that had been previously disturbed by construction of facilities, but have since returned to a relatively natural state (LMNRA, 2004a). Temporary (only during construction) versus permanent disturbance is identified for each category.

Table 1 - Summary of Affected Areas for Implementation of the Intake No. 3 Project

Facility/Component	DISTURBANCE TYPE AND AREA (acres)					
	Duration	New Disturbance	Re-Disturbed Areas*	Total (New + Re-Disturbed)	Currently Disturbed	TOTAL**
1. Intake tunnel (tunneled)	Temporary	0	0	0	0	
	Permanent	0	0	0	0	
2. Intake shaft	Temporary	1	0	1	0	
	Permanent	0.5	0	0.5	0	
TOTAL LAKE BOTTOM DISTURBANCE	**Temporary**	**1**	**0**	**1**	**0**	**1**
	Permanent	**0.5**	**0**	**0.5**	**0**	**0.5**
3. Vertical shaft to IPS-3	Temporary	part of 5. below				
	Permanent					
4. Pump shafts	Temporary	part of 5. below				
	Permanent					
5. IPS-3 excavation	Temporary	4.5	0	4.5	0	
	Permanent	4.5	0	4.5	0	
6. AMSWTF connection	Temporary	4	0	4	10	
	Permanent	2	0	2	10	
7. Power (primary and backup)	Temporary	0	0	0	9	
	Permanent	0	0	0	9	
8. Access roads	Temporary	1	0	1	2.5	
	Permanent	1	0	1	0	
9. IPS-3 Staging A / Tunnel Staging C	Temporary	4	0	4	0	
	Permanent	1	0	1	0	
10. AMSWTF area / Staging B	Temporary	0	0	0	15	
	Permanent	0	0	0	15	
11. Barge launch / Staging D	Temporary	0	0	0	2	
	Permanent	0	0	0	0	
12. Excavated material placement	Temporary	9	2	11	20.5	
	Permanent	5.5	2	7.5	20.5	
TOTAL LAND SURFACE DISTURBANCE	**Temporary**	**22.5**	**2**	**24.5**	**59**	**83.5**
	Permanent	**14**	**2**	**16**	**54.5**	**70.5**

Source: SNWA, 2006

AMSWTF Alfred Merritt Smith Water Treatment Facility
IPS Intake Pumping Station
* definition of "re-disturbed" similar to that in LMNRA (2004a)
** TOTAL = “Total New Disturbance+ Re-disturbed” + “Currently Disturbed”

SYSTEM OPERATION

IPS-3 Operation

The power to operate the pumping station was discussed above under the 'Project Components' heading. The pumping station would require various types of hydrocarbons for lubricants and synthetics and hydrocarbons for fluids use. In addition, various chemicals would be needed for the hydraulic system and for water quality. Staff would be required to operate the pumping station. A total of one to two employees may be added to the current staff, increasing traffic trips to the vicinity of AMSWTF by four trips per day. The pumping station would be architecturally designed to blend with the surrounding environment.

Intake and Tunnel Operation

The intake riser structure would be at a depth of approximately 275 feet below the water surface (assuming a normal WSE of 1135 feet AMSL). Due to the extreme depth of the tunnel and the routing beneath the lake bottom, the Intake No. 3 tunnel and riser would not impact recreational use on Lake Mead.

System Operation and Maintenance

The general operation and maintenance activities associated with IPS-3, once construction is complete, can be summarized in four categories: 1) Structural; 2) Mechanical; 3) Electrical; and 4) Security. The following are general descriptions of the typical activities that SNWA would routinely perform to keep the station operating 24 hours a day, seven days a week:

1) Structural Maintenance – Typical janitorial services would be performed weekly by one person with one utility vehicle utilizing associated cleaning products and tools. All natural landscaping will not require additional staff activities.

2) Mechanical Maintenance – Equipment lubrication would take place monthly by two people with two utility vehicles utilizing associated synthetic and hydrocarbon-based lubricants. These people would check and "top-off" hydraulic fluid systems as well as any other closed fluid systems requiring routine fluid level checking (such as glycol cooling systems, refrigerants, etc.). Some routine maintenance activities would require cleaning of equipment, which would utilize grease cleaners, steam cleaners, and various solvents. Potassium permanganate ($KMnO_4$) may also be used in bulk form to mitigate potential problems with zebra mussels in Lake Mead – if used, replenishing activities would involve tractor-trailer transport as needed.

3) Electrical Maintenance – Electrical equipment maintenance and inspection would take place twice a month by two people with two utility vehicles. Electrical contact cleaning fluids and hydrocarbon-based lubricants would be used routinely.

4) Security – Security guards would routinely inspect IPS-3 six times a shift, three shifts a day, seven days a week, 365 days a year using one person and one vehicle.

Alternatives Considered but Dismissed from Detailed Analysis

Other intake locations were considered for the siting of Intake No. 3. The evaluation of potential sites took into account several primary considerations:

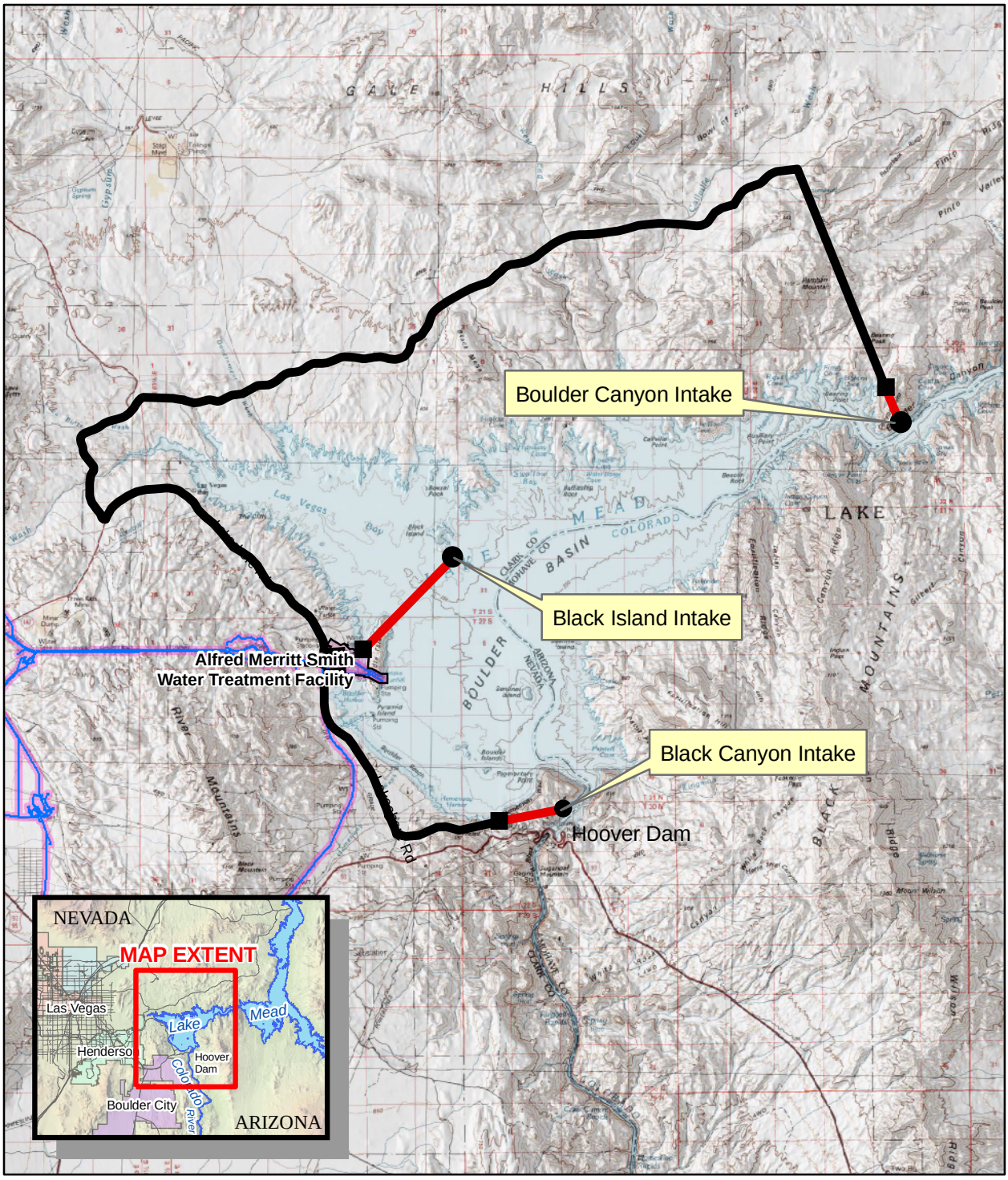
- The new intake needed to be deep enough to function at the lower expected lake levels.
- The intake needed to be located to be able to draw lake water from below the thermocline at lower lake levels.
- Operations and maintenance requirements were considered, with a preference given to sites closest to existing facilities and support services, and the potential for synergy in water system operations between existing and new facilities.
- Environmental impacts associated with construction in previously-undisturbed areas of LMNRA and the aesthetic concerns of building new facilities in these areas were taken into account.
- The difficulty of acquiring the necessary permits was considered.
- Construction difficulty and cost were given substantial consideration, especially geologic conditions for underground construction for the intake, the state of current construction technology for tunneling under substantial water pressure, and the additional costs of long pipelines and access to the more remote intake sites.

Three sites were identified that appeared to be capable of meeting the requirements for the intake project:

- An intake in Black Canyon that included a tunnel and intake pumping station constructed underground in the solid rock of Promontory Point just upstream of Hoover Dam, with a pipeline transmission system to convey water from the underground pumping station to AMSWTF.
- An intake in Boulder Canyon located upstream of Callville Bay with an intake pumping station and a long cross-country transmission system to get the water to AMSWTF.
- An intake near Black Island in the Boulder Basin. This was the location selected as the proposed project.

The intake site near Black Island was selected because of its lower comparative cost, the least perceived permitting concerns, the fewest environmental impacts, the ability of facilities in this location to effectively share existing infrastructure at AMSWTF, IPS-1 and IPS-2, and the acceptable water quality available at this location. Permitting concerns were directly related to the magnitude of potential environmental effects of the alternative, with greater permitting concerns equating to greater environmental effects.

The Boulder Canyon and Black Canyon sites were judged less favorable due to higher operations and maintenance requirements, less favorable permitting potential, greater environmental impacts, equivalent or greater construction difficulty, and higher overall project costs. Many of those impacts and costs were associated with long pipeline runs to connect the intake locations with existing SNWA water supply facilities and infrastructure (see **Figure 5**).



Southern Nevada Water Authority

Figure 5

Lake Mead Intake No. 3

Alternatives to the Black Island Intake Location Considered But Dismissed From Detailed Analysis

Miles
0 1 2 3 4 5 6 7 8 9 10

Alternate Alignment
Tunnel Segment
SNWA Pipelines
SNWA ROW

Map produced by SNWA-Eng., KTM, Mapping & Analysis.
Base layer USGS 1:100K Quad.
ROW gen. ref. only, not to scale.

MAP-ID: LMI3-025
DATE: 16 OCT 2006

B. Summary of Conservation Measures for the Proposed Project

Conservation measures are identified in response to determinations in the screening evaluation in Section I-B, Issues to be Addressed, that project-related activities will result in effects to the resources being addressed in the evaluation. Conservation measures are identified to avoid, minimize, reduce, rectify, or compensate for the identified effects of project implementation. Two types of mitigation actions are identified in this summary:

1) Features that are incorporated into the design of the proposed project, in some cases specifically to reduce potential environmental effects, are identified as Project Design Features (PDFs). These types of project features are designed with the additional intent to avoid, minimize, or reduce potential effects.
2) Features that are specified to compensate for the effects of project implementation on environmental resources are identified as Mitigation Measures (MMs). These types of measures will rectify or compensate for the identified effects of project implementation.

Table 2 summarizes the conservation measures for the proposed project, the Lake Mead Intake No. 3 near Black Island. The table presents the conservation measures as either PDFs or MMs in each of the resource issue areas addressed. For each measure, the mitigation responsibility and frequency of implementation is also presented. A more detailed description of the identified effects and conservation measures for each resource issue evaluated is presented in Section V, Environmental Consequences.

Table 2 - Summary of Conservation Measures for the Proposed Project

Resource Issue Addressed in the EA	Conservation Measures (PDF or MM)	Mitigation Responsibility / Report Recipient	Frequency
Aesthetics	• Design the coloration and shape of intake pumping station building to blend with the natural surroundings through the use of materials that blend with the existing environment, use of coloring techniques such as surface painting and concrete varnishing and/or coloring, and shaping of building walls, corners and angles to minimize intrusion in the visual landscape. (PDF)	SNWA, contractor / LMNRA	During design and construction
	• Design the intake pumping station to minimize the total area of disturbance. (PDF)	SNWA, contractor / LMNRA	During design and construction
	• Implement a topsoil management plan to encourage re-growth of native plant species on the viewshed berm(s). (PDF)	SNWA, contractor / LMNRA	During design and construction
	• Restore disturbed areas surrounding the intake pumping station site back to the original contours of the area where possible. (MM)	SNWA, contractor / LMNRA	During design and construction
	• Construct viewshed berms adjacent to the intake pumping station and AMSWTF to screen the view of these facilities from recreation area users in Saddle Cove. (MM)	SNWA, contractor / LMNRA	During design and construction
	• Design the excavated material placement areas adjacent to the causeway such that the fill is lower than the 1221-foot elevation to minimize the visual effect. (PDF)	SNWA, contractor / LMNRA	During construction
	• Construction contractor will follow the Clark County Department of Air Quality and Environmental Management Air Quality Regulations to control dust. (PDF)	SNWA, contractor / LMNRA	During construction
	• Limit lighting to necessary safety and security requirements during both construction and operation, and use downshielded lighting to minimize intrusion to distant recreation users when possible. (MM)	SNWA, contractor / LMNRA	During construction and operation
	• Limit construction to the shortest practical duration. (PDF)	SNWA, contractor / LMNRA	During construction
Air Quality	• Construction contractor will obtain and comply with a Clark County Dust Control Permit and follow the Clark County Department of Air Quality and Environmental Management's Air Quality Regulations. (PDF)	SNWA, contractor / LMNRA	During construction
	• Soil will be maintained in a sufficiently damp condition to avoid blowing dust. (MM)	SNWA, contractor / LMNRA	During construction
	• Construction contractor will obtain and comply with a Clark County Various Location Operating Permit. (PDF)	SNWA, contractor / LMNRA	During construction
	• Construction contractor will limit idling of equipment. (MM)	SNWA, contractor / LMNRA	During construction
	• Construction contractor will employ Best Available Control Measures in all phases of construction. (PDF)	SNWA, contractor / LMNRA	During construction

Resource Issue Addressed in the EA	Conservation Measures (PDF or MM)	Mitigation Responsibility / Report Recipient	Frequency
Biotic Communities	• Minimize the area of disturbance to the smallest practical extent. (PDF)	SNWA, contractor / LMNRA	Prior and during construction
	• Conduct pre-construction clearance surveys to relocate any tortoises out of the affected area. (PDF)	SNWA, contractor / LMNRA	During construction
	• Construction contractor will install approved tortoise fencing around the work areas. (PDF)	SNWA, contractor / LMNRA	During construction
	• If a tortoise is found in the work area, temporarily halt ground-disturbing activity that could endanger the tortoise until the tortoise is relocated. (MM)	SNWA, contractor / LMNRA	During construction
	• A qualified biologist will conduct pre-construction surveys within 30 days prior to construction activities to identify potential bald eagle night roosts within a 0.5-mile radius of the proposed construction site. (PDF)	SNWA / LMNRA	Prior and during construction
	• No nighttime surface construction or surface blasting will occur within 0.5 miles of active night roosts during the bald eagle wintering season (November through April). Nighttime surface construction and blasting would be prohibited from one hour before sunset until 9:00 am local time. (PDF)	SNWA / LMNRA	Prior and during construction
	• Construction contractor will obtain and comply with a Nevada Division of Environmental Protection (NDEP) permit to minimize potential effects to lake water quality. (PDF)	SNWA, contractor / LMNRA, NDEP	During construction
	• Construction contractor will choose excavation and placement methods to minimize dispersion of fine materials through the water column. (PDF)	SNWA, contractor / LMNRA, NDEP	During construction
	• Design and construction contractors will comply with all applicable conservation measures contained in the Biological Opinion issued for the project. (MM)	SNWA, contractor / LMNRA	During construction
Cultural Resources	• Conduct cultural resource surveys and State Historic Preservation Officer (SHPO) consultation in areas not previously surveyed prior to construction. (PDF)	SNWA / LMNRA, SHPO	Prior to and during construction
	• If resources are encountered, temporarily halt all ground disturbing activities in the area of a find, contact NPS, and complete any required mitigation activities before allowing construction in the area to proceed. (MM)	SNWA / LMNRA, SHPO	Prior to and during construction
Geology and Soils	• Design and construct the intake pumping station site, access road, and excavated material placement area to accommodate existing drainage patterns and maintain historic runoff patterns and rates. (PDF)	SNWA, contractor / LMNRA	During design and construction
	• Construction contractor will be required to develop and implement an approved Topsoil Management Plan. (PDF)	SNWA, contractor / LMNRA	During construction
	• Respread saved topsoil on viewshed berms to encourage regrowth of native vegetation. (MM)	SNWA, contractor / LMNRA	During construction

Resource Issue Addressed in the EA	Conservation Measures (PDF or MM)	Mitigation Responsibility / Report Recipient	Frequency
Geology and Soils (continued)	• SNWA will develop a Supplemental Seeding and Revegetation Plan and Weed Management Plan, and implement the plans in consultation with LMNRA in response to field conditions. (PDF)	SNWA / LMNRA	During design, construction, and operation
	• Construction contractor will obtain a NDEP General Stormwater Discharge permit and follow a stormwater pollution prevention plan. (PDF)	SNWA, contractor / LMNRA	During construction
	• Construction contractor would implement Best Management Practices to control stormwater runoff sediments from entering Lake Mead from the land-based portion of the construction area. (PDF)	SNWA, contractor / LMNRA	During construction
	• Soil construction conditions will be determined in detail by a pre-construction geotechnical survey and soil sampling program, with the resulting requirements and approaches incorporated into the detailed project design and construction plans. (PDF)	SNWA, contractor / LMNRA	During design and construction
Hydrology and Water Quality	• Construction contractor will obtain and comply with all required NDEP permits, including a NDEP Groundwater Discharge permit. (PDF)	SNWA, contractor / LMNRA	During design and construction
	• Construction contractor will implement appropriate Best Management Practices. (PDF)	SNWA, contractor / LMNRA	During design and construction
	• Construction contractor will utilize settling tanks or other approved technology to remove sediment and meet NDEP water quality requirements prior to discharge. (PDF)	SNWA, contractor / LMNRA	During construction
	• SNWA would obtain permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 from the U.S. Army Corps of Engineers (USACE). Contractors would implement the requirements of these permits during construction. (PDF)	SNWA, contractor / LMNRA, USACE	During construction
Noise and Vibration	• Schedule surface blasting activities to non-peak visitor hours. (PDF)	SNWA, contractor / LMNRA	During construction
	• Blasting contractor will obtain and comply with a Clark County blasting permit. (PDF)	SNWA, contractor / LMNRA	During construction
	• Keep blasting activities to a minimum. (PDF)	SNWA, contractor / LMNRA	During construction
	• Construction contractor will implement appropriate Best Management Practices and abide by the requirements of applicable Clark County noise ordinances. (PDF)	SNWA, contractor / LMNRA	During construction
	• Locate all major noise-producing equipment associated with the pumping station inside the building structure; design the pumping station building and all on-site noise-producing equipment to meet applicable noise ordinance requirements. (PDF)	SNWA / LMNRA	During operations

Resource Issue Addressed in the EA	Conservation Measures (PDF or MM)	Mitigation Responsibility / Report Recipient	Frequency
Transportation and Traffic	• Restrict contractor's personal and work vehicles to an approved roadway route. (MM)	SNWA, contractor / LMNRA	During design and construction
	• Encourage employee carpooling to the work site. (MM)	SNWA, contractor / LMNRA	During design and construction
Visitor Use and Experience	• Design and operate the excavated material placement and staging areas so that use of the River Mountains Loop Trail is maintained, by use of temporary detours of the trail, or, if use cannot be continuously maintained, to minimize disruptions to use. (PDF)	SNWA, contractor / LMNRA	During design and construction

Source: SNWA Project Staff, 2006

MM Mitigation Measure
PDF Project Design Feature

AMSWTF Alfred Merritt Smith Water Treatment Facility
EA Environmental Assessment
LMNRA Lake Mead National Recreation Area
NDEP Nevada Division of Environmental Protection
NPS National Park Service
SHPO State Historic Preservation Officer
SNWA Southern Nevada Water Authority

C. Environmentally Preferred Alternative

In accordance with Director's Order #12, the National Park Service is required to identify the "environmentally preferred alternative" in all environmental documents, including environmental assessments (NPS, 2001; Section 2.7.D). The environmentally preferred alternative is determined by applying the criteria suggested in NEPA, which is guided by the Council on Environmental Quality. The Council on Environmental Quality provides direction that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in Section 101 of NEPA," which considers the following criteria:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
2. Ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
4. Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
5. Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources (NEPA, section 101).

For identifying the Environmentally Preferred Alternative for the proposed action, these criteria allow the decisionmaker to consider both the direct physical effects of the implementation of an alternative – the quantitative biological and physical impacts of facility construction and operation, for example – as well as the other factors associated with the evaluation that bear on the selection and may be determined to outweigh the strictly physical effects. The proposed action by the NPS - to permit the construction and operation of new water supply facilities within the LMNRA – is consistent with the enabling legislation that created the National Recreation Area in 1964. This legislation incorporated the original Boulder Canyon Act purpose for what later became Lake Mead, in "providing for storage and for the delivery of the stored waters thereof for reclamation of public lands and other beneficial uses". Those purposes - providing for the storage and delivery of the stored waters for beneficial uses - remain, under the LMNRA establishing act, part of the purposes for which the LMNRA is to be administered for "public benefit and use," consistent with the applicable reservations and limitations and other authorized uses of the lands and properties in the LMNRA.

Based on the above criteria and considerations, the environmentally preferred alternative is the proposed project. In the proposed project, a new water supply intake system would be constructed for operation at lower lake levels and in conjunction with the two existing intakes to maximize water supply system operability and flexibility. Because the proposed project would enhance the long-term quality of the water supply delivered to SNWA's customers, and attain a wider range of beneficial uses of the resource by preserving the water supply system's purpose and goals, this alternative best realizes criteria 2, 3, 4, and 5 above. (The alternatives differ little with respect to criteria 1 and 6). The proposed project ensures a safe and healthful environment, and attains beneficial uses of the environment without degradation, risk of health or safety, or other undesirable consequences, maintains an environment that supports diversity and variety of individual choice, and achieves a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.

The no-action alternative represents a continuation of the existing condition - no new intake would be constructed, and the two existing water supply intakes in Lake Mead would continue to operate under declining long-term lake level conditions. Declining lake levels could result in decreased water supply system operability and reliability, and SNWA would have less flexibility to select water supply withdrawal levels based on source water quality. In relation to the water delivery system reliability and water quality protection aspects of the proposed intake project, the no-action alternative does not fully realize criteria 2, 3, 4, and 5 listed above.

D. Permits and Consultations

No new permits would be required for the no-action alternative.

The following approvals, permits, or consultation from jurisdictional agencies would be required before the proposed project could be implemented:

- For Planning/Design Activities:
    - Lake Mead National Recreation Area
        - Research and/or Collect Permit - Required to conduct research activities within the National Park
        - Archeology and Resources Protection Act (ARPA) Permit - Required prior to cultural surveys within a National Park
        - Special Use Permit for Use of Remote Sensing Equipment - Required to use remote sensing equipment within a National Park
        - Finding of No Significant Impact (FONSI) - Compliance with NEPA requirements
        - Right-of-way - Amend existing ROW agreement and define location of intake and other access and staging areas for construction and operation
    - U.S. Department of Interior, Bureau of Reclamation
        - Permission to operate new point of diversion - Approval of the authorizing agency to operate a new water diversion
    - U.S. Department of Interior, Fish and Wildlife Service
        - Evaluation of a Biological Assessment and conduct an informal consultation resulting in a concurrence letter, or conduct a formal consultation resulting in issuance of a Biological Opinion under Section 7 of the Endangered Species Act, detailing potential effects of the project to listed species and specifying appropriate conservation measures
    - State Historic Preservation Officer (SHPO)
        - Cultural resources clearances for areas affected by borehole drilling and intake construction - Determination of effect and any required mitigation must be completed prior to effects of drilling
    - Nevada Division of Environmental Protection
        - Temporary Working in Waterways (formerly Rolling Stock Permit) - Required for construction activity conducted in waters under State of Nevada jurisdiction (for exploratory borehole work)

- Prior to Construction:
    - United States Army Corps of Engineers
        - Section 404 Permit - Required to allow discharges of dredged and fill material to all waters of the United States under Clean Water Act (CWA) Section 404
    - Nevada Division of Environmental Protection
        - 401 Water Quality Certification - State certification required when a Temporary Working in Waterways or Section 404 permit is required
        - Temporary Working in Waterways - Required for construction activity conducted in waters under State of Nevada jurisdiction (445A.266)
        - Individual Permit - Required for groundwater discharge from the intake tunnel excavation and construction
        - Letter of Approval to Construct - Plans and Specifications must be approved prior to the construction, modification or expansion of any public water system in Nevada (Nevada Administrative Code [NAC] Chapter 445, Section 370)
        - Temporary Groundwater Discharge Permit - Required prior to the discharge of groundwater
        - Temporary Discharge Permit for Hydrotest - Required prior to the discharge of hydrotest water
        - Oil/Water separator septic tank permit - Required prior to the discharge of groundwater
        - General Stormwater Discharge Permit and Stormwater Pollution Prevention Plan (SWPPP) - Required for construction activities 1 acre or more (CWA Section 402; NVR100000)
    - Nevada Division of Water Resources
        - Well Driller's Permit - Required before the drilling of temporary dewatering wells
    - Clark County Department of Air Quality and Environmental Management
        - Authority to Construct - Required for any permanent new stationary source (i.e. boilers)
        - Dust Control Permit - Required for projects with soil-disturbing activities affecting greater than or equal to 0.25 acres, trenching greater than or equal to 100 feet in length
        - Various Location Permit - Required for each new stationary source during construction with a potential to emit more than 70 tons per year of particulate material
        - Sand and Gravel Processing Permit - Required to operate machinery as part of a material processing operation
    - Clark County Fire Department
        - Blasting Permit - Required before any explosives work may be conducted in Clark County
        - Aboveground Fuel Storage Tank Permit - Required for the storage of flammable and explosive materials stored in above ground tanks

E. Comparative Summary of Impacts

Table 3 summarizes the potential environmental effects of the two alternatives evaluated in this EA for each of the resource issues addressed. The expected effects of the implementation of the proposed project are summarized, based on the proposed configuration and components of the intake project, and presented in Section II-A, in relation to the resources present in the project area. Those resources are described in detail in Section III, Affected Environment.

The methods and criteria used to determine the extent of effect for each of the resource issues evaluated in the EA are presented in detail in Section IV, Methodology of the Effects Assessment. For each resource issue, detailed criteria are presented that address the intensity and duration of the potential effect, as well as for the potential for project implementation to impair park resources and values.

A complete discussion of the expected effects of the implementation of the proposed project, summarized in **Table 3**, are presented in detail in Section V, Environmental Consequences.

For the no-action alternative, no environmental effects have been identified for the listed resource issues. For the proposed project, potential environmental effects are identified, as well as a determination of the intensity of the effect on the resource being evaluated. (Definitions of impact intensity are presented in detail in Section IV, Methodology of the Effects Assessment.) A conclusion regarding any potential impairment of park resources and values is also presented in the table for each applicable resource area.

Table 3 - Comparative Summary of Environmental Consequences for Project Alternatives

Resource Issue	No-Action	Proposed Project – Lake Mead Intake No. 3		
	Potential Environmental Effect	**Potential Environmental Effect**	**Intensity Before Mitigation**	**Potential Impairment?**
Aesthetics	• None	• Construction of the intake pumping station may adversely affect the existing scenic vista of Saddle Island for recreation users.	Moderate	No
	• None	• Excavated material placement activities may temporarily adversely affect the scenic vista of Saddle Island for recreation users.	Moderate	No
	• None	• Construction and operation of the intake pumping station will introduce artificial lighting into the night landscape that may adversely affect the scenic vista of Saddle Island for recreation users.	Moderate	No
	• None	• The construction barge will temporarily adversely affect the scenic vista of Lake Mead for recreation area users in the northern Boulder Basin.	Minor	No
Air Quality	• None	• Operation of construction equipment will temporarily adversely affect air quality in the project area by increasing the amount of airborne particulates (dust) in the project vicinity.	Moderate	No
	• None	• Operation of construction equipment will temporarily adversely affect air quality by increasing the amount of vehicle emissions in the project vicinity.	Moderate	No
	• None	• Operation of a concrete batch plant may temporarily adversely affect air quality by increasing the amount of dust in the project vicinity.	Moderate	No
	• None	• Operation of a concrete batch plant may temporarily adversely affect air quality by increasing the amount of emissions in the project vicinity.	Moderate	No
Biotic Communities	• None	• Ground-disturbing activities resulting from intake pumping station construction and placement of excavated material may adversely cause loss of vegetation.	Moderate	No

Resource Issue	No-Action	Proposed Project – Lake Mead Intake No. 3		
	Potential Environmental Effect	**Potential Environmental Effect**	**Intensity Before Mitigation**	**Potential Impairment?**
Biotic Communities (continued)	• None	• Ground-disturbing activities resulting from intake pumping station construction and placement of excavated material disposal may adversely kill or injure desert tortoises and/or cause loss or modification of desert tortoise habitat.	Moderate	No
	• None	• Ground-disturbing activities resulting from intake pumping station construction and placement of excavated material disposal may have an adverse effect on the bald eagle.	Moderate	No
	• None	• Increased turbidity in Lake Mead resulting from construction of the intake structure may adversely affect the razorback sucker and other fish species.	Moderate	No
Cultural Resources	• None	• Low probability to uncover previously unknown cultural resources during construction-related ground disturbance for the intake pumping station and facilities.	Minor	No
	• None	• Low probability to uncover previously unknown cultural resources during construction-related ground disturbance for the tunnel and intake structure.	Minor	No
	• None	• Low probability to uncover previously unknown cultural resources in the excavated material placement sites.	Minor	No
Geology and Soils	• None	• Ground disturbance activities from construction of the pumping station, access road, and excavated material placement area may adversely cause soil erosion by altering existing drainage patterns.	Minor	No
	• None	• Ground disturbance activities from the construction of the pumping station and access road may adversely cause loss of topsoil.	Moderate	No
	• None	• Ground disturbance activities from the construction of the pumping station and access road may adversely cause soil erosion from storm event runoff.	Minor	No

Resource Issue	No-Action	Proposed Project – Lake Mead Intake No. 3		
	Potential Environmental Effect	**Potential Environmental Effect**	**Intensity Before Mitigation**	**Potential Impairment?**
Geology and Soils (continued)	• None	• Design and implementation of project facilities must deal with a range of specific soil conditions, including expansive soils, areas of potential subsidence, unstable soils, collapsible soils, and other site-specific conditions.	Moderate	No
Hydrology and Water Quality	• None	• Intake construction activities from the construction barge may adversely affect water quality in Lake Mead.	Moderate	No
	• None	• Tunnel drilling activities will require groundwater discharge, which may adversely affect water quality in Lake Mead.	Minor	No
	• None	• Excavated material placement area below mean high water mark (MHWM) may adversely affect water quality in Lake Mead.	Moderate	No
	• None	• Ground disturbing activities from construction of the intake pumping station, access road, and excavated material placement area may adversely alter existing drainage patterns, which may affect water quality in Lake Mead.	Minor	No
	• Adverse effect of substantially reduced water system capacity and reduced source water quality and increased treatment costs.	• A beneficial effect to water system capacity and water quality would be realized as a result of implementation of the proposed project.	Major	No
Noise and Vibration	• None	• Blasting may be required during the construction of the intake pumping station and vertical shafts and may temporarily adversely affect noise and vibration levels in the project vicinity.	Minor	No
	• None	• Operation of the batch plant may temporarily adversely affect noise levels in the Lake Mead Marina.	Minor	No
	• None	• Operational noise from the intake pumping station and other equipment may adversely affect noise levels in and around the Saddle Island area.	Minor	No
Transportation and Traffic	• None	• Contractor personnel traffic may adversely increase congestion on Lakeshore Road.	Minor	Not Applicable

Resource Issue	No-Action	Proposed Project – Lake Mead Intake No. 3		
	Potential Environmental Effect	**Potential Environmental Effect**	**Intensity Before Mitigation**	**Potential Impairment?**
Visitor Use and Experience	• None	• Excavated material placement and staging area activities may adversely affect the River Mountains Loop Trail in the vicinity of Alfred Merritt Smith Water Treatment Facility.	Minor	Not Applicable

Source: SNWA Project Staff, 2006

III. AFFECTED ENVIRONMENT

The Affected Environment section provides the baseline information in each resource category against which potential project environmental effects are judged. Evaluations are presented for each of the nine resource categories previously identified: aesthetics, air quality, biotic communities, cultural resources, geology and soils, hydrology and water quality, noise and vibration, transportation and traffic, and visitor use and experience.

A. Aesthetics

In an evaluation of scenic quality, both the visual character and visual quality of a viewshed are considered. A viewshed comprises the limits of the visual environment associated with the preferred alternative. NPS *Management Policies* (2001) state that the National Park Service will preserve, to the greatest extent possible, the natural lightscapes of parks, including natural darkness. The agency strives to minimize the intrusion of artificial light into the night scene by limiting the use of artificial outdoor lighting to basic safety requirements, shielding the lights when possible, and using minimal impact lighting techniques.

The proposed project would be located in the area east of the AMSWTF on Saddle Island, which is within the Boulder Basin of the LMNRA. The Boulder Basin originates on or near the northern and western edges of Lake Mead. This area is geomorphically described as a zone where the Basin and Range Province meets the Colorado Plateau. It is characterized by large block fault uplifts on the southern and far eastern sections of Lake Mead (TTF-EIS, section 3.1-1).

Visitors at the LMNRA find spectacular scenic vistas from park roads, the lake surface, and hiking routes. Because the desert vegetation tends to be low and sparse, and the air generally clear, the views are unobstructed for miles. Striking backdrops for all recreational activities include lake views, deep canyons, dry washes, sheer cliffs, distant mountains, colorful soils and rock formations, and mosaics of different vegetation.

Saddle Island is located approximately five miles northwest of the Alan Bible Visitor Center along Lakeshore Road, directly east of the existing AMSWTF. Saddle Island is approximately 1,500 feet offshore of Lake Mead and is 1.75 miles long. No recreational facilities are located on the island itself. However, the adjacent Saddle Cove is extensively used by personal watercraft when lake levels permit. The island is closed to recreational visitors, but provides a significant visual landmark to the public from the lake and along Lakeshore Road. Traveling southeast along Lakeshore Road, views of Saddle Cove and Saddle Island are limited by the deep roadcuts along Lakeshore Road and the earthen wall constructed to shield the AMSWTF from the surrounding area (TTF-EIS, section 3.1-2).

Lakeshore Road extends along the western edge of the Boulder Basin for approximately ten miles. Lakeshore Road is a two-lane paved road in good condition with speed limits ranging from 15 to 50 miles per hour. Due to the nature of the road location and geography of the Boulder Basin many recreational and visual features in the basin are easily visible along its length. Lakeshore Road is the primary route for visitors to access marinas, picnic areas, and viewpoints along the edge of Boulder Basin.

The Boulder Basin of Lake Mead covers approximately 56 square miles. View lines from marinas and Lakeshore Road extend from SE to NE for distances of up to 20 miles, with massive geologic features towering over the lands bordering the basin.

Additional details regarding aesthetics in the Lake Mead area are addressed in the TTF-EIS, section 3.1.

B. Air Quality

NPS *Management Policies* (2001) state that the NPS has a responsibility to protect air quality under both the 1916 Organic Act and the Clean Air Act (CAA). Accordingly, the NPS will seek to perpetuate the best possible air quality in parks to: 1) preserve natural resources and systems; 2) preserve cultural resources; and 3) sustain visitor enjoyment, human health, and scenic vistas. Vegetation, visibility, water quality, wildlife, historic and prehistoric structures and objects, cultural landscapes, and most other elements of a park environment are sensitive to air pollution and are referred to as "air quality-related values." The NPS will assume an aggressive role in promoting and pursuing measures to protect these values from the adverse impacts of air pollution. In cases of doubt as to the impacts of existing or potential air pollution on park resources, the NPS will err on the side of protecting air quality and related values for future generations.

Air resource management requirements will be integrated into NPS operations and planning, and all air pollution sources within parks including prescribed fire management and visitor use activities will comply with all federal, state, and local air quality regulations and permitting requirements.

The proposed project area would be located in the southwestern desert region of Nevada. The climate in the Mojave Desert is usually characterized by high temperatures and low precipitation throughout the year, with warm, dry winters, and hot summers, with occasional thunderstorms. Surface evaporation rates are extremely high, even in wet years. Temperatures and amounts of precipitation are dependent on elevation, with lower elevation generally experiencing the warmest temperatures and receiving the least rainfall. Temperatures vary significantly along elevation gradients and may decrease approximately 5.3°F (15°C) for every 1,000-feet (305-meter) increase in elevation. Daily and seasonal temperatures can vary greatly - daytime to nighttime temperatures may vary by 20° to 30°F in the winter and 30° to 40°F in the summer. Maximum temperatures in the summer exceed 100°F (38°C) at the lower elevations. Minimum winter temperatures drop below freezing at the higher elevations.

Under the CAA Amendments of 1990, the U.S. Environmental Protection Agency has established the National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants: lead, ozone, sulfur dioxide, oxides of nitrogen, carbon monoxide (CO), and particulate matter smaller than 10 microns in diameter (PM10). Based on air quality monitoring data, a portion of Clark County (the Las Vegas planning area is Hydrographic Basin 212) has been designed as being in serious non-attainment with the NAAQS for PM10 and CO. The proposed project area is not located within the non-attainment boundary.

The proposed project would occur within the LMNRA, which is designated a Class II air quality area under the CAA Amendments of 1990. The air quality within the region is generally good.

C. Biotic Communities

The NPS *Management Policies* (2001) state the NPS will maintain as parts of the natural ecosystems of parks all native plants and animals. The term "plants and animals" refers to all five of the commonly recognized kingdoms of living things and includes such groups as flowering plants, ferns, mosses, lichens, algae, fungi, bacteria, mammals, birds, reptiles, amphibians, fishes, insects, worms, crustaceans, and microscopic plants and animals. The NPS will achieve this maintenance

by: preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur; restoring native plant and animal populations in parks when they have been extirpated by past human-caused actions; and minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them.

Vegetation

The Mojave Creosote Bush Scrub vegetation community occurs extensively throughout the Mojave Desert region, and is the dominant plant community below 3,000 to 4,000 feet AMSL. Mojave Creosote Bush Scrub occurs on well-drained soils with very low available water holding capacity. As such, the Mojave Creosote Bush Scrub community is generally found on slopes, fans, and in valleys. In areas with high soil salinity, Mojave Creosote Bush Scrub is replaced by Desert Saltbush Scrub. Saddle Island is vegetated primarily with Mojave Creosote Bush Scrub.

Tamarisk vegetation is characterized by a non-native invasive tamarisk or saltcedar (*Tamarix* sp.), found on sand or gravelly soils along braided washes or intermittent streams, often in areas where high evaporation increases the stream's saltiness. Tamarisk is an aggressive competitor of native riparian plant species. Since the decrease in water level of Lake Mead, the area between Saddle Island and the mainland that was formerly inundated has been extensively colonized by tamarisk.

The proposed project area would include developed areas around the AMSWTF and relatively undisturbed habitat on Saddle Island. Natural vegetation in the project area consists of Mojave Creosote Bush Scrub. Some portions of the project area are dominated by tamarisk. Undisturbed areas of Saddle Island are vegetated with Mojave Creosote Bush Scrub. Tamarisk grows in the exposed lakebed and extends up to the AMSWTF. Near AMSWTF, a wash flows east into the tamarisk in the exposed lakebed. This wash is currently dominated by tamarisk, but has a substantial stand of arrow weed (*Pluchea sericea*), which indicates this area was filled with arrow weed until it was replaced by tamarisk (TTF-EIS, section 3.3).

Mammals

Of the numerous mammal species found in the LMNRA, the following have been previously seen in the proposed project area: desert cottontail (*Sylvilagus audobonii*), black-tailed jack rabbit (*Lepus californicus*) desert bighorn sheep (*Ovis canadensis*), coyote (*Canis latrans*), and desert kit fox (*Vulpes macrotis*) (SNWA, 2006).

Reptiles

Reptiles include a variety of lizard and snake species. The following lizards were observed in the proposed project area during biological surveys: side-blotched lizard (*Uta stansburiana*), Great Basin whiptail lizard (*Cnemidophorus tigris tigris*), desert iguana (*Dipsosaurus dorsalis*), zebra-tailed lizard (*Callisaurus dracondoides*), and desert collard lizard (*Crotophytus insularis*) (SNWA, 2006). Snakes are also typically numerous, and include coachwhip (*Masticophis flagellum*), Mojave patchnose snake (*Salvadora hexalepis mojavensis*), Great Basin gopher snake (*Pituophis melanoleucus deserticola*), desert glossy snake (*Arizona elegans eburnata*), western longnose snake (*Rhinocheilus lecontei lecontei*), Sonoran ground snake (*Sonora semiannulata*), sidewinder (*Crotalus cerastes*), and speckled rattlesnake (*C. mitchelli*) (SNWA, 2006). Turtles have been observed in nearshore areas of Lake Mead (SNWA, 2006).

Birds

Birds observed in the proposed project area include: Says phoebe (*Sayornis saya*), common raven (*Corvus corax*), greater roadrunner (*Geococcyx californianus*), red-tailed hawk (*Buteo jamaicensis*), and osprey (*Pandion haliaetus*). Resident bird species typically associated with upland desert scrub habitats also include LeConte's thrasher (*Toxostoma lecontei*), house finch (*Carpodacus mexicanus*), mourning dove (*Zenaida macroura*), horned lark (*Eremophila alpestris*), rock wren (*Salpinctes obsoletus*), and black-throated sparrow (*Amphispiza bilineata*) (SNWA, 2006).

Fish

Most of the fish in Lake Mead were introduced into the Colorado River drainage basin, many as a result of Lake Mead's historical use and management as a recreational fishery. The most common species in the lake are carp (*Cyprinus carpio*), largemouth bass (*Micropterus salmoides*), small mouth bass (*M. dolomieui*), threadfin shad (*Dorosoma petenense*), and bluegill (*Lepomis macrochirus*).

Status of Listed Species within the Project Vicinity

Under the Endangered Species Act, an endangered species is defined as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species likely to become an endangered species in the foreseeable future throughout all or significant portion of its range. After consulting the Listing of Threatened and Endangered Species maintained by the U.S. Fish and Wildlife Service, the only species of concern for this project are the desert tortoise, razorback sucker and bald eagle.

DESERT TORTOISE

The desert tortoise (*Gopherus agassizii*) is a large herbivorous reptile that is widely distributed over portions of the Mojave, Sonoran and Colorado deserts of the western United States and northwestern Mexico. Desert tortoises have been observed throughout the middle elevations of the LMNRA and are considered widespread, but at low densities throughout the LMNRA below about 4,000 feet AMSL. Desert tortoises were previously observed in the proposed project area. All undisturbed areas in the proposed project area are considered potential habitat for desert tortoise (LMNRA, 2004).

RAZORBACK SUCKER

Razorback sucker (*Xyrauchen texanus*) is an endemic catastomid (sucker) that inhabits the great Colorado River system. The largest existing population is in Lake Mojave, but there are small numbers of suckers in Lake Mead, which has been designated as critical habitat for the razorback sucker. Studies have shown that razorback sucker spawn in a few limited areas of Lake Mead. Spawning appears to be concentrated in Echo Bay and Las Vegas Bay, which both have small recruiting populations of razorback sucker. Although spawning areas have been identified, the distribution of adult razorback suckers in Lake Mead during the remainder of the year is not well understood (Reclamation, 1996b).

BALD EAGLE

Open lakes, rivers, and other wetlands are the preferred habitat of bald eagles (*Haliaeetus leucocephalus*), which are winter residents of the proposed project area. The results of the NPS' annual mid-winter bald eagle survey indicate that a fairly stable wintering population of bald eagles resides in the LMNRA. The most recent NPS surveys showed a total of 60 bald eagles in 2004 (36 adult and 24 immature), a total of 67 bald eagles in 2005 (42 adult and 25 immature), and a total of 67 bald eagles in 2006 (31 adult and 36 immature). The 2004 survey documented eight bald eagles in the Boulder Basin, while the 2005 survey found five bald eagles in Boulder Basin. During the 2006 survey, five bald eagles were again sighted in Boulder Basin and an adult bald eagle was observed on the northern tip of Saddle Island. Areas used by bald eagles are generally high cliffs above the lake, and the eagles generally avoid areas heavily used by humans. Although eagles are occasionally sighted in the project vicinity, the project area would not be expected to be heavily used by bald eagles (SNWA, 2006).

D. Cultural Resources

In accordance with NPS *Management Policies* (2001), the NPS will ensure that cultural resources are preserved and protected, receive appropriate treatments (including maintenance), and are made available for public understanding and enjoyment. Cultural resource management will be carried out in a manner consistent with implementing policies and procedures. A written scope of work, research design, project agreement, proposal, or other description of work to be performed will be prepared and approved before any research is conducted. All archeological research, whether for inventory, data recovery, or other purposes, must comply with the Archaeological Resources Protection Act of 1979 (ARPA), the Antiquities Act, and the Native American Graves Protection and Repatriation Act (NAGPRA), as applicable.

Cultural resources are places or objects that are important for scientific, historic, and/or cultural values to cultures, communities, groups, or individuals. Cultural resources include prehistoric, protohistoric, and historic sites; architectural remains and structures; and other artifacts that provide evidence of past human activity. Historically, the southern Nevada region was occupied by numerous different non-native groups, including early Spanish explorers, Hispanic traders, Mormon missionaries and settlers, American miners and ranchers, and 20th century residents who prompted rapid regional growth and developments such as the construction of Hoover Dam (TTF-EIS, section 3.4-1).

The proposed project would be located in the area east of the AMSWTF on Saddle Island and northeast of Saddle Island in Lake Mead. The proposed project area would be within a region that is a cultural and physiological transition zone between the Great Basin to the north and west, the Sonoran Desert to the east and southeast, and the Mohave Desert to the west and southwest. The culture history of the desert region that includes the Lower Colorado River Basin can be discussed with reference to four major periods: Paleo-Archaic (10,000-5500 BC), Archais (5500 BC-AD 500), Ceramic (AD 500-1800), and Historical (AD 1500-1950). The first three periods deal with Native American history, and the fourth with both Native American and Euroamerican history (HRA & PBS&J, 2006).

The area near AMSWTF and Saddle Island is historically far from known water sources and has experienced sustained human use only since the filling of Lake Mead in the 1930s and the construction of water supply facilities in the 1990s. The area around the proposed intake structure is near but not proximal to facilities used in the construction of Hoover Dam. The northeastern

corner of the area explored for the intake site crossed over the apparent 1930s railroad link between the gravel pit (on the Arizona side of the Colorado River opposite Callville) and the gravel plant west of the current-day Boulder Islands. The gravel plant was an important facility in preparing material for the concrete used to build the dam. All of these features were inundated by the filling of Lake Mead in 1935.

HRA, Inc conducted the terrestrial archaeological survey and PBS&J conducted the underwater archaeological survey of the proposed project area. All sites were evaluated for potential National Register of Historic Places (NRHP) eligibility; none of the sites identified were found eligible for the NRHP (HRA & PBS&J, 2006).

E. Geology and Soils

In accordance with *NPS Management Policies* (2001), the NPS will allow natural geologic process to proceed unimpeded. Geologic processes are natural physical and chemical forces that act within natural systems, as well as upon human developments, across a broad spectrum of space and time. Geological processes will be addressed during planning and other management activities in an effort to reduce hazards that can threaten the safety of park visitors and staff and the long-term viability of the park infrastructure. In addition, the NPS will actively seek to understand and preserve the soil resources of parks, and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources. When soil excavation is an unavoidable part of an approved facility development project, the NPS will minimize soil excavation, erosion, and off-site migration during and after the development activity.

The project area would be located in Clark County, southern Nevada. The region is part of the Basin and Range Geomorphic province, and area characterized by a series of north-south trending valley and mountain ranges. The Basin and Range Province, which spans parts of Nevada, Utah, California, Arizona, and New Mexico, is a series of mountains and valleys. These mountains and valleys were formed by a series of parallel faults that resulted from stretching the earth's crust. Starting in the late Tertiary (approximately 20 million years ago), large-scale normal faults developed in a north-south direction, and movement along these faults has created the characteristic mountains and valleys of this province.

The western basin in Lake Mead is primarily an erosional feature. It was formed by the Colorado River cutting down, or incising into, underlying sediments and rocks. It lies adjacent to the eastern edge of the River Mountains. Metamorphic, igneous, and sedimentary rocks are exposed in the surrounding hills. In general, with the exception of Precambrian rocks exposed on Saddle Island, Tertiary sedimentary and volcanic rocks are found in the area surrounding Lake Mead. This area is characterized by an undulating topography of low hills, with average slopes of approximately one degree (TTF-EIS, section 3.5-2).

F. Hydrology and Water Quality

In accordance with NPS *Management Policies* (2001), an important part of the NPS mission is to work with appropriate governmental bodies to obtain the highest possible standards available under the Clean Water Act for the protection for park waters. In addition, the NPS will take all necessary actions to maintain or restore the quality of surface waters and ground waters within the parks consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations. The NPS will enter into agreements with other agencies and governing bodies, as

appropriate, to secure their cooperation in maintaining or restoring the quality of park water resources.

The intake would be located northeast of Saddle Island in Lake Mead. Lake Mead is located in the Mojave Desert of southeastern Nevada and northwestern Arizona. It is the largest man-made reservoir in the United States in terms of volume and second in surface area only to Lake Powell. Lake Mead was formed in 1935 by the construction of Hoover Dam in Black Canyon. It consists of four large basins: Boulder, Virgin, Temple, and Gregg Basin. The lake extends 114 miles up-river from Hoover Dam and has approximately 550 miles of total shoreline when the lake is at full capacity. The shoreline is irregular and includes several bays, as well as numerous coves (TTF-EIS, section 3.11-1).

The SNWA intake facilities are located along the western margin of the Boulder Basin. Because Boulder Basin is the closest basin to the Las Vegas metro area, it receives the majority of the LMNRA's visitors. The Boulder Basin has approximately 139 miles of shoreline and comprises less than 3 percent of the LMNRA.

Water quality within Lake Mead is threatened by external sources such as the Las Vegas Wash and the Virgin and Muddy Rivers, and internal sources such as LMNRA wastewater treatment, human sanitation, and gasoline and oil from boats and personal watercraft. The highest established standard for water quality in Nevada is for swimming (full body contact). The full body contact designation is also the highest bacteriological protected use. Other protected uses may be limited for other parameters such as temperature, chemical quality, or anti-degradation. Fishing is also an important visitor activity, with established water quality standards. To let people enjoy the waters located in the State of Nevada, the Nevada Department of Environmental Protection (NDEP) has designated beneficial uses for ground and surface waters located throughout the state. To ensure that designated beneficial uses are not impaired, the NDEP sets water quality standards. These beneficial uses and water quality standards are adopted into the NAC Chapter 445 by the State Environmental Commission. A more detailed discussion regarding beneficial uses and water quality standards in the project area is in the TTF-EIS, section 3.11-4.

G. Noise and Vibration

The area on the west shore of Lake Mead is a major tourist area, with the Lake Mead Marina and Boulder Beach area campgrounds and lodges. A number of private watercraft (including patioboats, ski boats, and fishing boats) are located in the marina. Saddle Cove, located northwest of Saddle Island, is utilized by personal watercraft, such as waverunners and jet skis. The main roadway servicing the area is NV 166 (Lakeshore Road). Visitation to the LMNRA is typically more frequent during the warmer months.

The predominant noise source in and around the proposed project area is lake and roadway vehicle traffic and aircraft overflights. Noise is generated by watercraft activities on Lake Mead, outdoor recreational activities by campers, and vehicle traffic on nearby roadways. The approach path for passenger aircraft arriving in Las Vegas is above Lake Mead; however, flights are periodic, transitory and not intrusive. User expectation of the LMNRA is a quiet, relaxing environment for kayaking, hiking, picnicking, bird watching and other outdoor activities. Summer noise levels are higher with increase visitor (and vehicle) use and greater use of powerboats and personal watercraft. Noise levels within the LMNRA are overall generally low and the environment is tranquil. A more detailed discussion regarding the noise and vibration setting in the project area is in the TTF-EIS, section 3.8.

The proposed project facility would be located in the area east of the AMSWTF. The existing treatment facility and pumping plants are the stationary noise sources in this area. The mass of Saddle Island shields noise-producing activities at the facility from the main portion of the Boulder Basin.

Noise-producing activities can also affect local wildlife. Creosote brush scrub and white bur-sage biotic communities occur extensively throughout the Saddle Island area. Saddle Island and the adjacent mainland support various species of wildlife, such as the desert tortoise, chuckwalla, and multiple reptile, rodents and bird species. A more detailed discussion regarding biotic communities is in the Biotic Communities section of this EA and in the TTF-EIS, section 3.3-1.

In accordance with NPS *Management Policies* (2001) and Director's Order 47: *Sound Preservation and Noise Management*, an important part of the National Park Service mission is preservation of natural soundscapes associated with national park units. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds. Natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans perceive and can be transmitted through air, water, or solid materials. The frequency, magnitude, and duration of human-caused sound considered acceptable varies among National Park Service units, as well as potentially throughout each park unit, being generally greater in developed areas and less in undeveloped areas.

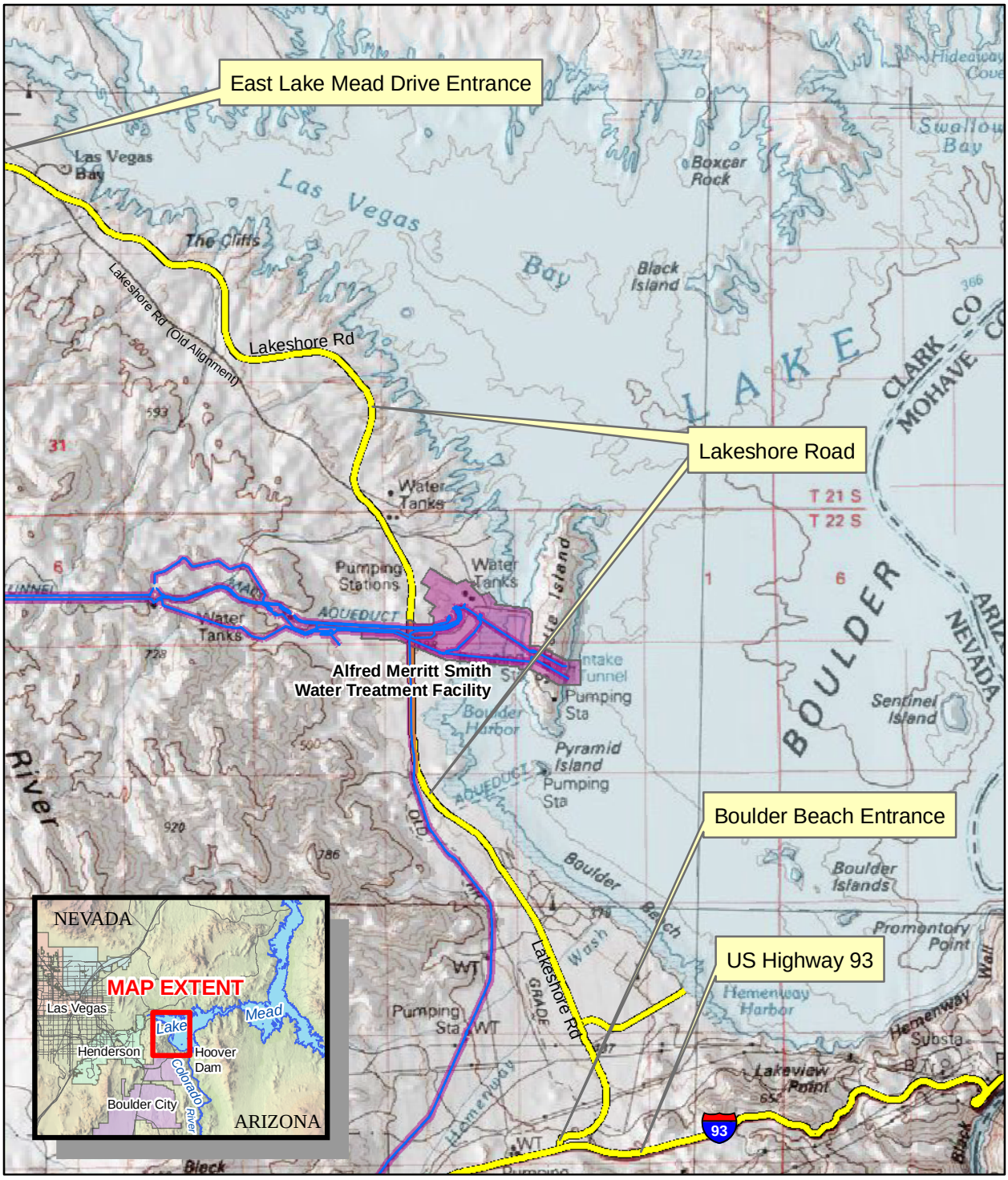
H. Transportation and Traffic

In accordance with NPS *Management Policies* (2001), the location, type, and design of transportation systems and their components (e.g., roads, bridges, trails, and parking areas), and the use of alternative transportation systems, all strongly influence the quality of the visitor experience. The NPS will work with appropriate governments, private organizations and individuals to minimize the impacts of traffic on park resources and values.

A major highway, US 93 extends from Hoover Dam northwest through Boulder City and Henderson. The highway crosses through the LMNRA (see **Figure 6**). Eventually, US 93 turns into US 95/US 515 north of the Railroad Pass interchange. Traffic on US 93 includes all types of recreational vehicles at Lake Mead, commuter vehicles, construction vehicles, and large commercial trucks traveling between Arizona and Nevada.

Lake Mead Drive, also known as SR-146, runs east-west along the southern portion of the Valley through Henderson between US 515 and I-15, and turns into Lakeshore Road. In the vicinity of the proposed project, Lake Mead Parkway is a local highway that has a functional classification of principal and minor arterial. The roadway has between two and three travel lanes in each direction and is located west of the proposed project. The majority of the vehicles on Lake Mead Parkway are recreational vehicles traveling to Lake Mead, or construction vehicles going to project sites.

Lakeshore Road, also known as Boulder Beach Road, is a rural highway that runs north-south along the western shoreline of Lake Mead. The roadway primarily carries recreational vehicles. Lakeshore Drive has one travel lane in each direction. Vehicles traveling to AMSWTF travel on Lakeshore Road (see **Figure 6**).



Southern Nevada Water Authority

Figure 6

Lake Mead Intake No. 3
Location of Transportation Facilities in the Boulder Basin Area

0 1 2 3 Miles

Major Streets
SNWA Pipelines
SNWA ROW

Map produced by SNWA-Eng., KTM, Mapping & Analysis.
Background USGS 1:100K Quad.
ROW general ref. only, not to scale.
Map Author: EN
MAP-ID: LMI3-026
DATE: 12 OCT 2006

Traffic counts in the LMNRA are collected and maintained for a variety of locations around the Recreation Area (LMNRA, 2005 unpublished data). LMNRA collects traffic counts at the Highway 93 entrance near Boulder Beach, which is related primarily to LMNRA recreation users traveling north on Lakeshore Road, adjacent to the more popular marinas, campgrounds, and overlooks around the western margin of the Boulder Basin. Another set of counts is maintained along Lakeshore Road southbound as vehicles enter the LMNRA from Lake Mead Drive in Henderson. Vehicle counts for the combined northbound-southbound traffic flow on Lakeshore Road in the area of the AMSWTF range from 59,000 to 145,000 vehicles monthly - a daily average combined traffic volume range of 3,000 to 4,800 vehicles in a 30-day month. Traffic volumes are lowest during the late Fall and early Winter months (November and December) and highest during the late Spring and Summer (May through September, with June the highest during this period).

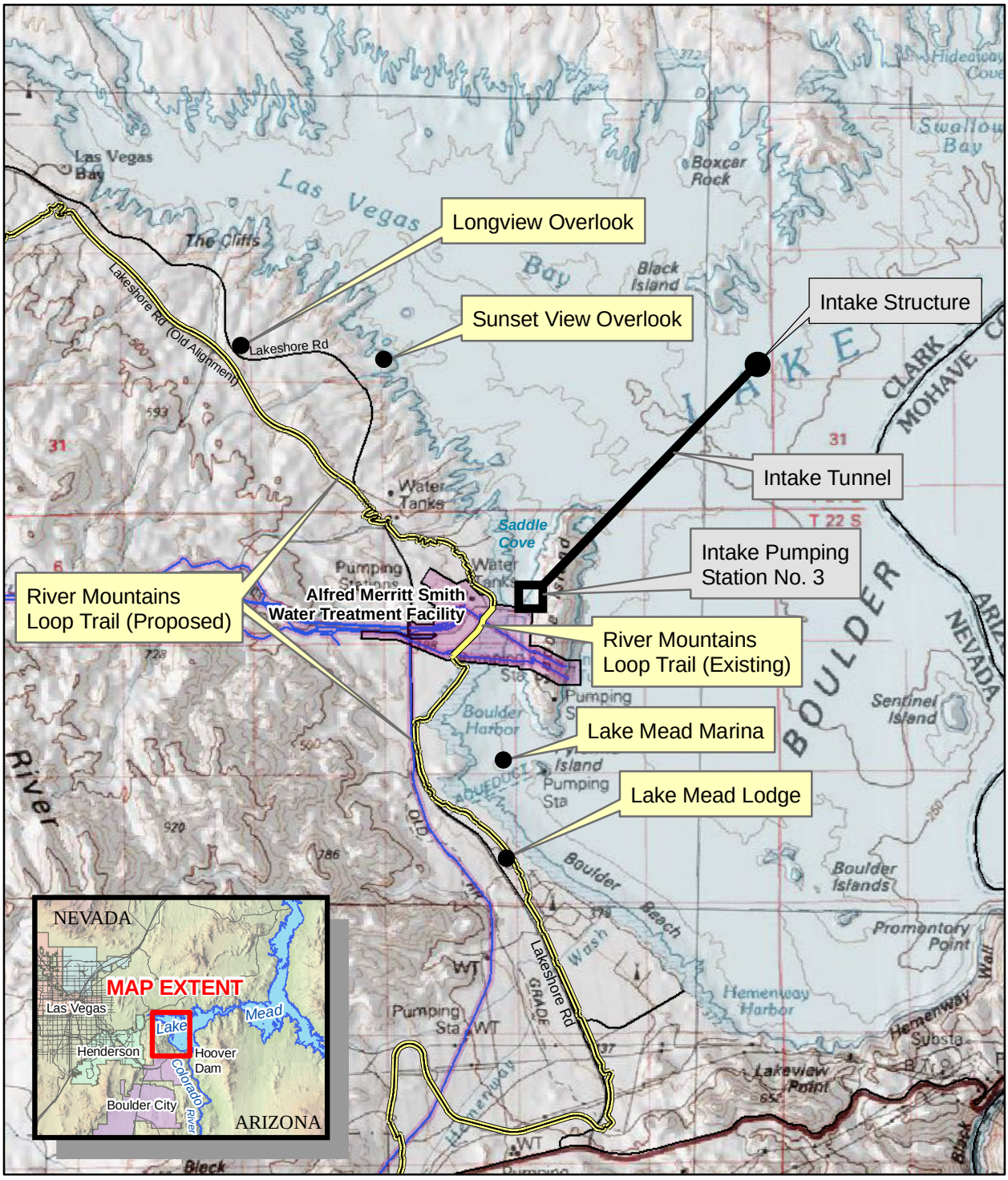
I. Visitor Use and Experience

The LMNRA is the oldest and largest national recreation area administered by the National Parks system. The recreation area contains 1,502,216 acres, of which 1,484,159 acres are in Federal ownership administered by the NPS and 12,568 acres are on non-Federal lands. The recreation area extends along 140 miles of the Colorado River from near the southern tip of Nevada to the northwest corner of Arizona, and is geographically divided into two separate regions: Lake Mead and Lake Mojave. Lake Mead was formed by the construction of Hoover Dam, which was completed in 1935.

The LMNRA is within a half-day's drive of large metropolitan areas in southern California and within a one-day drive of population centers in Utah and Arizona. These areas provide the major points of origin for Lake Mead visitors. However, the adjacent attractions of Las Vegas and Laughlin, Nevada, draw people from throughout the nation and world, many of who visit the recreation area while they are in the area. The peak use days of the year usually occur during the three summer holiday weekends of Memorial Day, Fourth of July, and Labor Day. The highest monthly visitation occurs in July, with the lowest in December. Recreational activities within the LMNRA include pleasure boating, jet skiing, sailing, fishing, swimming, camping, and hiking.

A number of LMNRA's facilities and resorts are located in the vicinity of the proposed project, including the Lake Mead Resort and Marina, Longview Overlook, Sunset View Overlook and the River Mountains Loop Trail (RMLT). The Lake Mead Resort and Marina is a development/ concession area that is a popular stop for tour buses on their way to Hoover Dam. Major activities include pleasure boating, water skiing, jet skiing, and fishing. No swimming is allowed in the harbor area (TTF-EIS, section 3.9-3). Saddle Cove is an area bound on the east by the northwestern shore of Saddle Island, on the west by the eastern shoreline of Lake Mead and to the south by the maintenance causeway to Saddle Island. The area offers few facilities. There is a designated unimproved campground along the shoreline. A restroom facility is the only structure in the campground. Aside from camping, the primary recreation at Saddle Cove is personal watercrafting on jet skis, wet bikes, and wave runners.

The RMLT is a proposed trail route that would accommodate pedestrians, bicyclists, wheelchairs and other trail users. The RMLT would connect LMNRA, Hoover Dam, Boulder City, Henderson and the rest of the Las Vegas Valley, expanding recreational and alternative transportation opportunities for the region's growing population and for visitors to southern Nevada. In the AMSWTF area, the RMLT runs along the east side of the facility and west of the causeway (see **Figure 7**).



Southern Nevada Water Authority

Figure 7

Lake Mead Intake No. 3

Location of Scenic Overlooks and View Points along Lakeshore Road in Relation to Proposed Project Components

Miles
0 1 2 3 4

RM Loop Trail
SNWA Pipelines
SNWA ROW

Map produced by SNWA-Eng., KTM, Mapping & Analysis.
Base layer USGS 1:100K Quad.
ROW gen. ref. only, not to scale.
Map Author: EN
MAP-ID: LMI3-027
DATE: 12 OCT 2006

IV. METHODOLOGY OF THE EFFECTS ASSESSMENT

A. Effects Assessment Approach

The methods for assessing the environmental consequences of the actions evaluated in this EA are discussed below. NEPA requires consideration of context, intensity, and duration of environmental effects, cumulative impacts, and measures to mitigate identified impacts. An explanation of resource impairment is also addressed; impairment of park resources and values must also be assessed by alternative for particular resource topics, according to National Park Service policy. The methods used to conduct the environmental impact analyses are presented in this section. The methods are described only for those resource topics carried forward in the environmental consequences discussion and are presented in the following order:

- Aesthetics
- Air Quality
- Biotic Communities
- Cultural Resources
- Geology and Soils
- Hydrology and Water Quality
- Noise and Vibration
- Transportation and Traffic
- Visitor Use and Experience (Recreation)

The impact assessment will broadly characterize the affected resource and potential effects of proposed project actions. Because the approach is expected to concentrate on an evaluation of expected mitigation success (i.e., whether the identified measures can effectively reduce or eliminate the anticipated effects), the context of the analyses will generally be qualitative. Quantitative information will be presented as appropriate and available to support the evaluation of potential effects and the appropriateness of the proposed conservation measures.

The description of potential effects is structured by project component and/or action (i.e. effects of the excavation of the site for the intake pumping station; or the effects of treatment and disposal of dewatering flows from intake tunnel construction).

B. Effects Assessment Criteria

Impact analyses and conclusions are based on review of existing literature and studies, information from Lake Mead NRA staff; professional judgments and insights; and experience with the development of water supply infrastructure projects in the LMNRA and the Las Vegas region. Definitions used to evaluate the context, intensity, and duration of impacts, as well as cumulative impacts, are discussed below. The anticipated Environmental Consequences of the considered actions are evaluated based on the implementation of conservation measures outlined in Section II, Alternatives, and presented in detail in Section V.

Context is the setting within which effects are analyzed, such as the affected region, society as a whole, the affected interests, and/or a locality. In this EA, the intensity of impacts are evaluated within a local context (generally the Boulder Basin of Lake Mead), while the intensity of cumulative impacts are evaluated in a more regional context.

Intensity is the degree to which a resource would be beneficially or adversely affected. The criteria used to rate the intensity of the impacts for each resource topic are presented later in this section under each topic heading.

The *Duration* of an effect is the time period for which the impacts are evident and are expressed in the temporary or in the permanent. A temporary effect would be short-term in duration and would be associated with the construction of the proposed facilities, as well as the period of site restoration. Temporary effects would last only as long as construction takes place. A permanent effect would persist after construction activities have been completed.

Impact *Type* can be beneficial or adverse. Beneficial impacts would improve resource conditions while adverse impacts would deplete or negatively alter resources.

A listing for each resource issue of the significance criteria for use in the effects analysis is presented below. The resource issues to be addressed in the EA were identified previously. The approach uses a four-tiered determination of effect, ranging from "negligible" or unobservable to "major," the latter indicating serious degradation to the resource with permanent and/or regional implication. The term "impact intensity" used in the listing corresponds to terminology used in NPS guidance in Director's Order #12: "Conservation Planning, Environmental Impact Analysis, and Decision-making" (DO-12 [NPS, 2001]).

Aesthetics

The *NPS Management Policies* (2001) include a standard of 'no impairment' of park resources and values. The NPS strives to fulfill its mandate to preserve the natural resources of parks for future generations. The potential for project activities to affect visitor enjoyment is related to the perceptions that visitors would have of the activities associated with implementation of the project. Parks present a landscape and ambiance generally associated with remoteness, natural beauty, setting, and tranquility. Human-related activities such as infrastructure development, while necessary, can introduce distraction for recreation users ranging from barely perceptible to jarring contrast on a large scale. Impacts to aesthetics are measured in terms of the following impact thresholds:

AESTHETICS	
Impact Intensity	**Intensity Description**
Negligible	Aesthetics would not be affected, or the effects would be at the lowest levels of perception and would not have an appreciable effect on aesthetics.
Minor	The effect would be perceptible but would not have an appreciable effect on aesthetics. If mitigation were needed, it would be relatively simple and would likely be successful.
Moderate	The effects would be readily apparent and result in substantial, noticeable effects to aesthetics on a local scale. Mitigation measures would probably be necessary and would likely be successful.
Major	The effects would be readily apparent and result in substantial, noticeable effects to aesthetics on a regional scale. Extensive mitigation measures would be needed, and success would not be guaranteed.

Air Quality

The 1963 Clean Air Act, as amended (42 U.S.C. 7401 *et seq*.), requires land managers to protect air quality. Section 118 of the Clean Air Act requires parks to meet all federal, state, and local air pollution standards. *NPS Management Policies 2001* (NPS, 2000a) address the need to analyze potential impacts to air quality during park planning. Under the Clean Air Act, LMNRA is designated as a Class II area. Impacts to air quality would be measured in terms of the following impact thresholds:

AIR QUALITY	
Impact Intensity	**Intensity Description**
Negligible	An action that could affect air quality, but the change would be so small and temporary that it would not be of any measurable or perceptible consequence.
Minor	An action that could affect air quality, but the change would be slight and localized with few measurable consequences. Mitigation measures would be relatively simple to implement.
Moderate	An action that would result in readily apparent changes to air quality, with measurable consequences. Mitigation measures would require project changes or specialized equipment.
Major	A severely adverse and permanent effect to air quality would result.

Biotic Communities

The biotic communities impact topic includes vegetation and wildlife. The National Park Service Organic Act, which directs parks to conserve wildlife unimpaired for future generations, is interpreted by the agency to mean that native animal life should be protected and perpetuated as part of the park's natural ecosystem. Natural processes are relied on to control populations of native species to the greatest extent possible; otherwise, they are protected from harvest, harassment, or harm by human activities. According to *NPS Management Policies 2001* (NPS, 2000a), the restoration of native plant and animal species is a high priority (Section 4.1). Management goals for plants and animals include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and the ecological integrity of plants and animals.

The Endangered Species Act (16 U.S.C. 1531 *et seq*.) mandates that all federal agencies consider the potential effects of their actions on species listed as threatened or endangered. If the National Park Service determines that an action may adversely affect a federally listed species, consultation with the U.S. Fish and Wildlife Service is required to ensure that the action will not jeopardize the species' continued existence or result in the destruction or adverse modification of critical habitat. *NPS Management Policies 2001* (NPS, 2000a) state that potential effects of agency actions will also be considered on state or locally listed species. The National Park Service is required to control access to critical habitat of such species, and to perpetuate the natural distribution and abundance of these species and the ecosystems upon which they depend. Information on possible threatened, endangered, candidate species and species of special concern was gathered from species lists made available through the U.S. Fish and Wildlife Service and the Nevada Natural Heritage Program. Threatened and endangered species potentially affected by project activities were addressed in detail in the Biological Assessment prepared for this project (SNWA, 2005).

Information on wildlife, vegetation, and vegetative communities potentially impacted in the project area was compiled. Where possible, sensitive vegetation species, populations, and communities were identified and avoided. The thresholds of change for the intensity of an impact to biotic communities are defined as follows:

BIOTIC COMMUNITIES	
Impact Intensity	**Intensity Description**
Negligible	No native vegetation or wildlife would be affected or some individual native plants or wildlife could be affected as a result of the alternative, but there would be no effect on native species populations. The effects would be temporary and well within natural fluctuations.
Minor	Impacts would be detectable, but they would not be expected to be outside the natural range of variability and would not be expected to have any permanent effects on native species, their habitats, or the natural processes sustaining them. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they could be outside the natural range of variability for short periods of time. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they would be expected to be outside the natural range of variability for long periods of time or be permanent. Key ecosystems processes might be disrupted permanently. Loss of habitat might affect the viability of at least some native wildlife species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Cultural Resources

Certain important questions about human culture and history can only be answered by gathering information about the cultural content and context of cultural resources. As defined by NPS Director's Order 28 (DO-28: NPS, 1998), cultural resources include archaeological resources, cultural landscapes, structures, museum objects, and ethnographic resources.

These impact analyses are intended to comply with the requirements of both NEPA and Section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 of the National Historic Preservation Act (36 CFR Part 800, Protection of Historic Properties), impacts to cultural resources were identified and evaluated by: 1) determining the area of potential effects; 2) identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the NRHP; 3) applying the criteria of adverse effect to affected, NRHP eligible or listed cultural resources; and 4) considering ways to avoid, minimize or mitigate adverse effects.

Under the Advisory Council's regulations, a determination of either adverse effect or no adverse effect must also be made for affected NRHP listed or eligible cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the NRHP; e.g., diminishing the integrity (or the extent to which a resource retains its historic appearance) of its location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance or be cumulative (36 CFR 800.5, Assessment of Adverse Effects). A determination of no adverse effect means there

is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the NRHP.

Council on Environmental Quality regulations and DO–12 (NPS, 2001) also call for a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact; e.g., reducing the intensity of an impact from major to moderate or minor. Any reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Cultural resources are non-renewable resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under Section 106 may be mitigated, the effect remains adverse. The thresholds of change for the intensity of an impact to cultural resources are defined as follows:

CULTURAL RESOURCES	
Impact Intensity	**Intensity Description**
Negligible	There would be no impacts or the impacts would be barely perceptible and would not alter resource conditions or site preservation. For purposes of Section 106 there would be no effect or no adverse effect on cultural resources.
Minor	Impact(s) would be slight and noticeable but would not alter resource conditions or site preservation. For purposes of Section 106 there would be no adverse effect on cultural resources.
Moderate	Impact(s) would be apparent and would alter resource conditions. For purposes of Section 106 there would be an adverse effect.
Major	Impact(s) would alter resource conditions or destroy resources. For purposes of Section 106 there would be an adverse effect.

Geology And Soils

Available information on soils potentially impacted should the proposed alternative be implemented was compiled. Where possible, map locations of sensitive soils were compared with locations of proposed developments and modifications of existing facilities. Predictions about temporary and permanent site impacts were based on previous projects with similar soils and recent studies. The thresholds of change for the intensity of an impact are defined as follows:

GEOLOGY AND SOILS	
Impact Intensity	**Intensity Description**
Negligible	Geology/soils would not be affected or the effects to geology/soils would be below or at the lower levels of detection. Any effects to geology/soils would be slight.
Minor	The effects to the geology/soils would be detectable. Effects to the geology/soil area would be small. Mitigation may be needed to offset adverse effects and would be relatively simple to implement and likely be successful.
Moderate	The effect on the geology/soil would be readily apparent and result in a change to the geology/soil character over a relatively wide area. Mitigation measures would be necessary to offset adverse effects and likely be successful.
Major	The effect on the geology/soils would be readily apparent and substantially change the character of the soils over a large area in and out of the park. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

Hydrology And Water Quality

The *NPS Management Policies 2001* (NPS, 2000a) state that the NPS will "take all necessary actions to maintain or restore the quality of surface waters and ground waters within the parks consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations" (Section 4.6.3).

A water quality standard defines the water quality goals of a water body by designating uses to be made of the water, by setting minimum criteria to protect the uses, and by preventing degradation of water quality through antidegradation provisions. The antidegradation policy is only one portion of a water quality standard. Part of this policy (40 CFR 131.12(a)(2)) strives to maintain water quality at existing levels if it is already better than the minimum criteria. Antidegradation should not be interpreted to mean that "no degradation" can or will occur, as even in the most pristine waters, degradation may be allowed for certain pollutants as long as it is temporary and temporary.

Other considerations in assessing the magnitude of water quality impacts is the effect on those resources dependent on a certain quality or condition of water. Sensitive aquatic organisms, submerged aquatic vegetation, riparian areas, and wetlands are affected by changes in water quality from direct and indirect sources.

Given the above water quality issues and methodology and assumptions, the following impact thresholds were established in order to describe the potential effects to hydrology and water quality for implementation of the proposed project:

HYDROLOGY AND WATER QUALITY	
Impact Intensity	**Intensity Description**
Negligible	Impacts to water quality are chemical, physical, or biological effects that would not be detectable, would be well below water quality standards or criteria, and within historical or desired water quality conditions.
Minor	Impacts to water quality (chemical, physical, or biological effects) would be detectable, but well below water quality standards or criteria, and within historical or desired water quality conditions.
Moderate	Impacts to water quality (chemical, physical, or biological effects) would be detectable but would be at or below water quality standards or criteria; however, historical baseline or desired water quality conditions would be altered on a temporary basis.
Major	Impacts to water quality (chemical, physical, or biological effects) would be detectable and would be frequently altered from the historical baseline or desired water quality conditions; and/or chemical, physical, or biological water quality standards or criteria would be slightly and singularly exceeded on a temporary basis.

Noise and Vibration

NPS Management Policies 2001 (NPS, 2000a) requires the managing agency to preserve, to the greatest extent possible, the natural soundscapes of the park. Natural soundscapes exist in the absence of human-caused sound. The natural soundscape is the aggregate of all the natural sounds that occur in parks, together with the physical capacity for transmitting natural sounds.

Management Policies direct superintendents to identify what levels of human-caused sound can be accepted within the management purposes of the parks.

Director's Order DO-47, "Soundscape Preservation and Noise Management" (NPS, 2000b) defines appropriate and inappropriate noise. The overall goal of NPS units, as defined in the order, is the protection, maintenance, or restoration of the natural soundscape resource. However, it does state that some sound-producing activities, including recreational activities, may be appropriate if they are included in the park's purpose as defined by its enabling legislation.

The thresholds of change for the intensity of an impact to noise and vibration are defined as follows:

NOISE AND VIBRATION	
Impact Intensity	**Intensity Description**
Negligible	An action that could affect noise or vibration levels, but the change would be so small and temporary that it would not be of any measurable consequence.
Minor	An action that could affect noise or vibration levels, but the change would be slight and localized with few measurable consequences. Any effects would be temporary. Mitigation measures would be relatively simple to implement.
Moderate	An action that would result in readily apparent changes to noise or vibration levels, with measurable consequences. Mitigation measures would require project changes or specialized equipment.
Major	A severely adverse and permanent effect on noise or vibration levels would result.

Transportation and Traffic

In accordance with *NPS Management Policies 2001* (NPS, 2000a), the NPS will work with appropriate governments and private organizations and individuals to minimize the impacts of traffic on park resources and values. Traffic may be affected during construction activities. If excavated material requires transportation out of the Recreation Area, haul trucks may have an effect on local park traffic. Construction traffic may have an effect on Recreation Area users during busy seasons.

Visitor use in parks is authorized under the NPS *Organic Act* and managed under the *NPS Management Policies* in the "Use of Parks" chapter, which includes commercial as well as public use. The policies state that enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that the National Park Service is committed to providing appropriate, high quality opportunities for visitors to enjoy the parks. Further, the National Park Service will strive to protect human life and provide for injury-free visits and will seek to provide a safe and healthful environment for visitors and employees.

The transportation and traffic analysis relates to these factors through the potential for increased traffic volumes during construction activities to affect visitor opportunities (through traffic delays) and safety (through increased traffic volumes). The thresholds of change for the intensity of an impact to transportation and traffic are defined as follows:

TRANSPORTATION AND TRAFFIC	
Impact Intensity	**Intensity Description**
Negligible	An action that could affect traffic conditions, but the change would be so small and temporary that it would not be of any measurable or perceptible consequence.
Minor	An action that could affect traffic conditions, but the change would be slight and localized with few measurable consequences. Any effects would be temporary. Mitigation measures would be relatively simple to implement.
Moderate	An action that would result in readily apparent changes to traffic conditions, with measurable consequences. Any effects would be temporary. Mitigation measures would require project changes.
Major	A severely adverse and permanent effect to traffic conditions would result.

Visitor Use and Experience

NPS Management Policies 2001 (NPS, 2000a) states that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all national parks, and that the National Park Service is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks.

Part of the purpose of LMNRA is to offer opportunities for recreation, education, inspiration, and enjoyment. Consequently, one of the park's management goals is to ensure that visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.

Public scoping input and observation of visitation patterns, combined with an assessment of what is available to visitors under current management, were used to estimate the effects of the actions in the various alternatives in this document. The impact on the ability of the visitor to experience a full range of recreation opportunities at LMNRA was analyzed by examining resources and objectives presented in the park's significance statement. The potential for change in visitor use and experience proposed by the project's alternatives was evaluated by determining whether or how these projected changes would affect the desired visitor experience and to what degree and for how long. The thresholds of change for the intensity of an impact to visitor use and experience are defined as follows:

VISITOR USE AND EXPERIENCE	
Impact Intensity	**Intensity Description**
Negligible	Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be temporary. The visitor would not likely be aware of the effects associated with the alternative.
Minor	Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely temporary. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.
Moderate	Changes in visitor use and/or experience would be readily apparent and likely permanent. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the change.
Major	Changes in visitor use and/or experience would be readily apparent, severely adverse, or exceptionally beneficial, and have important permanent consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.

Impairment Analysis

In addition to determining the environmental consequences of the alternatives, conformance with *NPS Management Policies 2001* (NPS, 2000a) requires the analysis of potential effects to determine if the proposed project actions would impair park resources. Under the NPS *Organic Act* and the *General Authorities Act*, as amended, the NPS may not allow the impairment of park resources and values except as authorized specifically by Congress. The NPS must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment to the affected resources and values (Management Policies 1.4.3).

Impairment to park resources and values has been analyzed within this document. Impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation or proclamation of the park; is a key to the cultural or natural integrity of the park or to opportunities for enjoyment of the park; or is identified as a goal in the park's general management plan or other relevant NPS planning documents. An impact would be less likely to constitute impairment to the extent that it is an unavoidable result, which cannot be reasonably further mitigated, of an action necessary to preserve or restore the integrity of park resources or values.

Not all of the issues identified for discussion in the EA are considered "resources" subject to impairment by activities that affect the environment of the park. Criteria for only those issues are listed below and addressed in the Effects sections of the EA. No "impairment" evaluations were conducted for resource issues such as Traffic and Transportation or Visitor Use and Experience, as these are not "resources" and NPS does not have impairment policies for these issues. Criteria for the evaluation of impairment of park resources and values is presented in **Table 4.**

Table 4 - Criteria for Determination of Impairment of Park Resources and Values for Each Resource Issue Evaluated in the EA

RESOURCE	THRESHOLD OF IMPAIRMENT
Aesthetics	A permanent change in a large portion of the overall acreage of the park, affecting the resource to the point that the park's purpose could not be fulfilled and the resource would be degraded precluding the enjoyment of future generations. The impact would contribute substantially to the deterioration of the park's aesthetic appeal and value.
Air Quality	Air quality would be degraded over the permanent to the point that the park's purpose could not be fulfilled and the visitor experience would be negatively affected.
Biotic Communities	The impact would contribute substantially to the deterioration of natural resources to the extent that the park's wildlife and habitat would no longer function as a natural system. Wildlife and its habitat would be affected over the permanent to the point that the park's purpose (*Enabling Legislation, General Management Plan, Strategic Plan*) could not be fulfilled and the resource could not be experienced and enjoyed by future generations.
Cultural Resources	Loss, destruction, or degradation of a cultural property, resource, or value to the point that it negatively affects the park's purpose and visitor experience.
Geology and Soils	A permanent change in a large portion of the overall acreage of the park, affecting the resource to the point that the park's purpose could not be fulfilled and the resource would be degraded precluding the enjoyment of future generations. The impact would contribute substantially to the deterioration of the park's soils.
Hydrology and Water Quality	Water quality standards are exceeded several times on a temporary and temporary basis. Impacts are effects that alter baseline or desired water quality conditions on a permanent basis. Impacts result in the deterioration of water quality to the extent that the park's aquatic life and habitat no longer function as a natural system. Water quality impairment can affect other aspects of the natural environment dependent on the condition of this resource. Aquatic life are affected over the permanent to the point that the park's purpose (*Enabling Legislation, General Management Plan, Strategic Plan*) could not be fulfilled and the resource could not be experienced and enjoyed by future generations.
Noise and Vibration	Noise or vibration that, through frequency, magnitude, or duration, adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified as being acceptable to, or appropriate for, visitor uses to the point that the park's purpose (*Enabling Legislation, General Management Plan, Strategic Plan*) could not be fulfilled and the resource could not be experienced and enjoyed by future generations.

Source: *NPS Management Policies 2001* (NPS, 2000a)

Cumulative Impacts

Council on Environmental Quality regulations, which implement NEPA, require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts are considered for both the no-action and any other alternatives.

Cumulative impacts were determined by combining the impacts of the alternatives with other past, present, or reasonably foreseeable actions. It was, therefore, necessary to identify major past, ongoing, or reasonably foreseeable future actions affecting LMNRA. The EA lists other federal, state and local actions in the project area that have the potential to have, when considered with the proposed project, cumulative effects on environmental resources. Projects or actions considered included:

- The Clean Water Coalition Systems Conveyance and Operations Program (SCOP) Draft EIS, September 2005 (Reclamation and LMNRA, 2005); and
- LMNRA's recent EA and associated actions to amend the Lake General Management Plan to address low water level conditions (LMNRA, 2005).

Cumulative Action	Past	Present	Future
SCOP Wastewater Disposal Project		X	
Management of Lake Mead at Low Lake Levels	X	X	X

Descriptions of the cumulative projects considered are presented below:

SCOP WASTEWATER DISPOSAL PROJECT

Currently, treated effluent and urban runoff from the Las Vegas Valley is discharged into Las Vegas Wash at various points, from which it flows into Lake Mead at Las Vegas Bay. The City of Las Vegas, Clark County Water Reclamation District, and City of Henderson comprise the Clean Water Coalition (CWC). The CWC has developed SCOP to create an alternate discharge location in the Boulder Basin to alleviate some of the problems associated with increased runoff and decreasing water quality. The U.S. Bureau of Reclamation and the National Park Service are preparing an Environmental Impact Statement (EIS) that evaluates alternatives for the improved treatment and ultimate discharge of municipal wastewater from the entities that comprise the CWC. The Draft EIS for this project was circulated for public comment in September 2005.

The SCOP system would be designed to collect the treated effluent flows from the three treatment facilities, for conveyance to an area in the lower Colorado River system, while the majority of the flows bypass the lower Las Vegas Wash. The SCOP would be located in Clark County, Nevada and would include activities and infrastructure located on lands owned and/or managed by the City of Las Vegas, Clark County, City of Henderson, U.S. Bureau of Land Management, Reclamation, and LMNRA. The three agencies currently responsible for municipal wastewater treatment and discharge would expand and optimize their facilities to handle the increasing quantities of wastewater through 2050. Facility additions would occur on lands currently owned by the cities and county. Under the Boulder Islands North Alternative, a pipeline would be constructed that collects and transports highly treated effluent from the three treatment facilities to a receiving area in the vicinity of Boulder Islands. The Boulder Islands North Alternative includes the generation of electricity at a hydroelectric generation facility for location on NPS land.

The actions associated with the construction of the SCOP project may occur during the implementation period of the proposed Intake No. 3 project.

MANAGEMENT OF LAKE MEAD AT LOW LAKE LEVELS

The purpose of the *General Management Plan Amendment/Environmental Assessment* (LMNRA, 2005) is to provide guidance on a long-term strategy for addressing low water conditions on Lake Mead that affect lake access. The park has been operating under the 1986 *General Management Plan/Development Concept Plans/Environmental Impact Statement* (NPS, 1986). Tiering from the 1986 *General Management Plan*, a *Lake Management Plan/Environmental Impact Statement* was prepared in 2003 (LMNRA, 2002) to provide additional and more specific guidance for the long-term management of Lakes Mead and Mohave. In an effort to ensure the protection of park resources while allowing a range of recreational opportunities, the plan provides for an increase in boating capacity targeted at areas where growth can be accommodated within the physical, environmental, and social carrying capacity of the lakes. Although most of the 1986 and 2003 plans are still applicable, they did not foresee the current and predicted drought conditions and did not fully consider the effects of greater fluctuations in the lake's water levels.

The actions associated with the low lake level program will occur prior to, during, and after the implementation period of the proposed Intake No. 3 project.

V. ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences of the no-action and proposed project alternatives. The subsections in this chapter are organized by impact topic, first for the no-action alternative, then for the proposed project alternative. For each resource, the potential environmental effects on each resource of implementing the alternatives are discussed. That discussion is followed by an evaluation of the potential cumulative environmental effects of the alternative, a discussion of the appropriate mitigation measures required to avoid, reduce, or compensate for the identified effects, a conclusion regarding the resulting effect in consideration of the measures proposed, and a statement regarding the potential for the alternative to result in the impairment of park resources and values as a result of implementing the alternative.

A. Aesthetics

No-Action Alternative

EFFECTS ASSESSMENT

There would be no new effects to aesthetics as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CUMULATIVE IMPACTS

There would be no cumulative impacts on aesthetics as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

MITIGATION

There would be no mitigation requirements for aesthetics as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CONCLUSION

There would be no effects to the existing aesthetics in the Saddle Island and Lake Mead area, as result of the no-action alternative. Because there are no new effects to aesthetics, there would be no cumulative impacts.

IMPAIRMENT OF PARK RESOURCES AND VALUES

There would be no impairment of park resources and values as a result of the no-action alternative, as no effects to aesthetics would occur.

Proposed Project

EFFECTS ASSESSMENT

The scenic vista of Saddle Island would be temporarily affected by the construction of the intake pumping station caused primarily by the presence of construction machinery, disruption of color and

texture of the existing soil and the removal of vegetation. Since the majority of the intake pumping station site would be a permanent building or graveled or paved yard, the amount of ground disturbance for construction would be minimal. Construction activities would temporarily affect the night scene by introducing artificial outdoor lighting into the night landscape. The effects to aesthetics during construction would not be readily apparent and would not result in substantial, noticeable effects on a regional scale, as the effect will be limited to a small sheltered area of the Boulder Basin. Therefore minor aesthetic effects from construction of the intake pumping station would be expected (TTF-EIS, section 4.1-2).

The intake pumping station would be located within a low-use area of the LMNRA with no adjacent recreational development, and no future recreational facilities are planned for the area. The proposed project area cannot be seen from the following LMNRA viewpoints: Sunset Overlook, Longview Overlook, Lake Mead Marina upper parking lot and dock entry, Lake Mead Lodge, and Lakeshore Road south of the Lake Mead Lodge (see **Figure 7**).

During excavated material placement activities, effects are primarily caused by disturbing the existing landscape, disruption of color and texture of the existing soil, removal of vegetation and the presence of construction machinery. In addition, the excavated material placement activities would create aesthetic effects by creating dust. This latter effect is addressed in more detail in the Air Quality section. A topsoil management program and restoration of the affected areas are addressed in the Geology and Soils section.

Construction drilling barge operations would temporarily affect the scenic vista of the Boulder Basin of Lake Mead. The presence of the drilling barges could potentially disrupt traditional navigation and personal watercrafting in the area. The effects on aesthetics would be perceptible but would not have an appreciable effect, as the barge will not prominently stand out against the larger vista of the Boulder Basin and surrounding landscape. Therefore, minor effects to the aesthetics of the Boulder Basin from the anchored construction barge are anticipated.

Haul trucks transporting excavated material through and out of the LMNRA would temporarily affect the scenic vista along Lakeshore Road. The primary effect of the presence of haul trucks is potential traffic congestion. The number of haul trucks per day would be very small compared to normal traffic volumes on Lakeshore Road. Therefore, it is anticipated this effect would be minor. This effect is addressed in more detail in the Transportation and Traffic section.

Operation of the intake pumping station would result in an altered public viewshed within the LMNRA. This effect would occur by placing the intake pumping station within the existing landscape of Saddle Island. The facility would be located adjacent to existing SNWS facilities on Saddle Island, and as a result would affect localized conditions rather than distant views or vistas. The location of the intake pumping station has low public visibility from Lakeshore Road and the presence of the existing SNWS structures and improvements allow some absorption of the facility into the setting. Visual effects are associated with the lines and colors of the intake pumping station contrasting with the natural topography and colors of Saddle Island. The intake pumping station would introduce night lighting into the landscape, which would cause a permanent effect (TTF-EIS, section 4.1-4).

The overall effect during construction and operation of the facility would be readily apparent and result in substantial, noticeable effects to aesthetics on a local scale. It is determined that minor to moderate, temporary and permanent adverse effects to aesthetics would occur during construction and operation of the facility. Implementation of project design features and mitigation measures

would be required to minimize the effects to aesthetics in and around the Saddle Island and Boulder Basin area during design and construction.

CUMULATIVE IMPACTS

The proposed project's intake pumping station construction and excavated material placement areas, in conjunction with the SCOP project's tunnel portal construction, would be visible for a short stretch along Lakeshore Road in the vicinity of the entrance to the Lake Mead Marina. Each individual project has a minor to moderate, temporary effect on aesthetics. The effects of the SCOP project would occur only during non-peak visitor periods (Reclamation and LMNRA, 2005). Neither project's effects are considered individually significant, based on the analysis of effect contained in each environmental analysis. Therefore, the proposed project, when considered in combination with the effects of the SCOP project, would result in only minor, temporary, and adverse cumulative effects to aesthetics.

MITIGATION

Implementation of project design features and mitigation measures would reduce and minimize minor to moderate adverse effects to Boulder Basin and Saddle Island and would include all or some of the following measures:

- Intake Pumping Station
    - Design the coloration and shape of intake pumping station building to blend with the natural surroundings through the use of materials that blend with the existing environment, use of coloring techniques such as surface painting and concrete varnishing and/or coloring, and shaping of building walls, corners and angles to minimize intrusion in the visual landscape. (PDF)
    - Design the intake pumping station to minimize the total area of disturbance. (PDF)
    - Implement a topsoil management plan to encourage re-growth of native plant species on the viewshed berm(s). (PDF)
    - Restore disturbed areas surrounding the intake pumping station site back to the original contours of the area where possible. (MM)
    - Construct viewshed berms adjacent to the intake pumping station and AMSWTF to screen the view of these facilities from recreation area users in Saddle Cove. (MM)
    - Limit lighting to necessary safety and security requirements during both construction and operation, and use downshielded lighting to minimize intrusion to distant recreation users when possible. (MM)

- Excavated Material Placement
    - Design the excavated material placement areas adjacent to the causeway such that the fill is lower than the 1221-foot elevation to minimize the visual effect. (MM)
    - Construction contractor will follow the Clark County Department of Air Quality and Environmental Management Air Quality Regulations to control dust. (PDF)

- Construction Barge
    - Limit construction to the shortest practical duration. (PDF)

SNWA and the construction contractor would be responsible for the implementation of the mitigation measures. The LMNRA would be the recipient of any required monitoring reports. These measures and any associated reports would be required during the duration of construction activities. No reporting requirements are anticipated during the operation period.

CONCLUSION

With the mitigation measures detailed above, the proposed project is anticipated to reduce to a "minor" level any temporary and permanent adverse effects on aesthetics. The proposed project, when considered in combination with the effects of the SCOP project, would result in minor, temporary and adverse cumulative effects to aesthetics. A summary of potential project effects and recommended mitigation measures for aesthetics was presented in **Tables 2 and 3**.

IMPAIRMENT OF PARK RESOURCES AND VALUES

The construction and operation of the proposed project would not contribute substantially to the deterioration of the park's aesthetic appeal and value. The proposed project will not permanently change the aesthetic elements of a large portion of the overall acreage of the park as the proposed project would occupy approximately 50 acres of the LMNRA's 1.5 million acres. The temporary localized effects of the proposed project would not affect the LMNRA to the point that the park's purpose could not be fulfilled, and the resource would not be degraded to the point of precluding the enjoyment of future generations (see **Table 4**). Therefore, the proposed project would cause no impairment to the LMNRA's aesthetic appeal and value.

B. Air Quality

No-Action Alternative

EFFECTS ASSESSMENT

There would be no new effects to air quality as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CUMULATIVE IMPACTS

There would be no cumulative impacts on air quality as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

MITIGATION

There would be no mitigation requirements for air quality as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CONCLUSION

There would be no effects to the existing air quality in the Lake Mead Marina area, as result of the no-action alternative. Because there are no new effects to air quality, there would be no cumulative impacts.

IMPAIRMENT OF PARK RESOURCES AND VALUES

There would be no impairment of park resources and values as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

Proposed Project

EFFECTS ASSESSMENT

The operation of construction equipment and a batch plant would temporarily affect air quality by increasing the amount of dust, vehicle and equipment emissions in the Saddle Island area. Dust created during construction would increase airborne particulate concentrations intermittently, but airborne dust is not expected to be appreciable. The proposed project would disturb approximately 84 acres of land, which are broken down in the following summary (see **Table 1**):

Project Component	Acres Disturbed
Intake pumping station site, pipelines, and power	28
Excavated material placement areas, including berms	32
Staging areas	21
Access roads	3

Moderate, temporary, and adverse effects to air quality would occur only during construction activities. Implementation of the proposed project would result in readily apparent changes to air quality with measurable consequences during construction. Best management practices would be required to minimize the effects to air quality in and around the Saddle Island area during construction.

CUMULATIVE IMPACTS

The construction of the proposed project and the SCOP project would have several elements that would overlap in time. Due to the close proximity of the construction sites, cumulative effects on air quality from PM10 generation in disturbed areas and during excavated material placement, emissions from construction equipment and construction traffic trips are anticipated. Each of the potential SCOP alternatives are expected to exceed the thresholds for controlled fugitive dust emissions and thus would exceed the thresholds when combined with other projects (Reclamation and LMNRA, 2005). Therefore, the proposed project, when considered in combination with the effects of the SCOP project, would result in moderate, temporary, and adverse cumulative effects to air quality.

MITIGATION

Best management practices would be implemented during construction to minimize moderate adverse effects to air quality in the Saddle Island area, and would include all or some of the following measures:

- The construction contractor would obtain and comply with all required Clark County permits (Dust Control Permit, Various Locations Permit, Authority to Construct Permit, etc.). (PDF)
- The construction contractor would comply with all control measures as required by the Clark County Department of Air Quality and Environmental Management's regulations, which would include but are not limited to the following:
    - Employ "Best Available Control Measures" in all phases of construction activities. (PDF)
    - The construction contractor would ensure the disturbed soil on the construction site, access roads and staging areas are maintained in a sufficiently damp condition to avoid blowing dust. (MM)
    - The construction contractor would reduce traffic speed limit to 15 mph or less on the work site and unpaved access roads. (MM)
    - The construction contractor would limit idling of construction equipment to limit emissions. (MM)

SNWA and the construction contractor would be responsible for the implementation of the best management practices. The LMNRA would be the recipient of any required monitoring reports. These measures and any associated reports would be required during the duration of construction activities. No reporting requirements are anticipated during the operational period.

CONCLUSION

With air quality mitigation measures, the proposed project is anticipated to reduce to a "minor" level any temporary adverse effects on air quality. The proposed project, when considered in combination with the effects of the SCOP project, would affect air quality, but the change would be slight and localized with few measurable consequences resulting in minor, temporary cumulative effects. A summary of potential project effects and recommended mitigation measures for air quality was presented in **Tables 2 and 3**.

IMPAIRMENT OF PARK RESOURCES AND VALUES

The construction and operation of the proposed project would not degrade air quality to the point that the LMNRA's purpose could not be fulfilled (see **Table 4**). No impairment of air quality is anticipated; therefore, permanent negative effects to the visitor's experience due to poor air quality would not occur.

C. Biotic Communities

No-Action Alternative

EFFECTS ASSESSMENT

There would be no new effects to biotic communities as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CUMULATIVE IMPACTS

There would be no cumulative impacts on biotic communities as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

MITIGATION

There would be no mitigation requirements for biotic communities as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CONCLUSION

There would be no effects to existing biotic communities in the Saddle Island and Lake Mead areas as a result of the no-action alternative. Because there are no new effects to biotic communities, there would be no cumulative impacts.

IMPAIRMENT OF PARK RESOURCES AND VALUES

There would be no impairment of park resources and values as a result of the no-action alternative, as no effects to biotic communities would occur.

Proposed Project

EFFECTS ASSESSMENT

Construction of the proposed project would disturb a total of 24.5 acres of existing habitat, two of which have been previously disturbed and have since naturally revegetated. A total of 8.5 acres would be only temporarily affected during construction, and 14 acres of habitat would be permanently removed for project-related facilities. Permanent effects would result from the presence of above ground facilities, including the intake pumping station and access road and because a permanent access route would be maintained over the pipeline from the new intake pumping station to the AMSWTF. The project would also affect 59 acres of currently-disturbed areas in the vicinity of existing facilities, of which 54.5 acres would be permanent effects (SNWA, 2006). These currently-disturbed areas would be affected primarily by excavated material placement in Saddle Cove and Boulder Basin in areas below the MHWM, and in the staging area southeast of the main AMSWTF viewshed berm (see **Table 1**). A topsoil management program and restoration of the affected areas are addressed in the Geology and Soils section. To prevent the introduction of and to minimize the spread of non-native vegetation and noxious weeds, a Weed Management Plan would be developed by SNWA. This measure is also addressed in detail in the Geology and Soils section.

Construction activities of the proposed project would have temporary effects on the wildlife in the area. Clearing and grading activities would result in the destruction of wildlife habitat and possible injury or temporary displacement of wildlife, particularly to small mammals and reptiles that are not mobile enough to avoid construction operations. Larger, more mobile wildlife species would avoid the construction activities and move into adjacent areas. Some animals would be dispersed outside the construction limits and would be susceptible to predators or competitive stress, but following completion and successful restoration, wildlife would reoccupy the restored portions of the project area. Effects would be detectable, and could be outside the natural range of variability for short periods of time; however, permanent effects on native species, their habitats, or the natural process sustaining them are not expected. Therefore, effects to wildlife would be moderate and temporary (SNWA, 2006).

Desert tortoises have been documented in the proposed project area, but the habitat is believed to represent marginal desert tortoise habitat because it is immediately adjacent to existing water treatment facilities and in an area frequented by recreational visitors with ongoing human use. The proposed project area is considered low desert tortoise density and is not within or adjacent to critical habitat for desert tortoise (SNWA, 2006). Although construction of the project has a low potential to affect the desert tortoise, extensive measures for desert tortoise protection would be included in the project design. Activity outside the project boundaries would be prohibited. A large portion of the proposed project area would be located in the former lakebed, which is a less-favorable type of habitat not showing evidence of tortoise use (SNWA, 2006). The proposed project is not expected to result in substantial direct, indirect, temporary, or permanent adverse effects to desert tortoise because of the general low quality of the habitat in the area and the extensive conservation measures that are included in the project design (SNWA, 2006).

Haul trucks transporting excavated material will be traveling through and out of the LMNRA along Lakeshore Road from AMSWTF. At this time, tortoise fencing exists along the portion of Lakeshore Road north of AMSWTF to the Lake Mead Parkway entrance. The area south of AMSWTF to the Boulder City/Highway 93 entrance is less suitable habitat for desert tortoise due to more extensive development of recreation facilities, concentrations of visitor activities and vehicles, and other park uses. As a result, effects to the desert tortoise of hauling excavated material are expected to be negligible. This effect is discussed in more detail in the Transportation and Traffic section.

The proposed intake would operate at a depth of about 300 feet below the current lake surface, and would be designed with a lip that would be elevated several feet above the bottom of the lakebed. The depth of the intake is well below the level (typically at depths between 3 and 50 feet) at which razorback sucker spawning occurs. The lake bottom in the project area is generally covered by a 4- to 10-inch layer of fines and sediments that would preclude its use for razorback sucker spawning (SNWA, 1995). Due to the lack of spawning habitat at the intake site, the presence of larval razorback suckers is highly unlikely. Adult suckers could use the deep water areas near the intake, but the flows at the intake are so low that they are not expected to result in impingement or entrainment. Velocities at the intake are expected to be between 1.4 and 3 feet per second. In the unlikely event that razorback suckers encounter the intake structure, the flow is not expected to entrain adult razorback suckers into the intake. The species has evolved in a swift, riverine environment, and individuals as small as 2 to 3 inches in length would be expected to be able to escape flows of this velocity (SNWA, 1995). If smaller suckers were to occur in the vicinity of the intake structure, they would unlikely be affected by the intake because of their bottom-dwelling behavior and the elevated position of the intake lip. Construction and operation of the intake is thus not expected to have adverse effects on razorback sucker (SNWA, 2006).

The proposed project area is currently used by humans, and does not contain high cliffs or other suitable perching areas for bald eagles. Construction activities within the LMNRA would not be expected to have an adverse effect on fish in the lake, so indirect effects on the eagle's food source would also not be expected. Construction and operational activities are not expected to have adverse effects on bald eagles in the project area (SNWA, 2006).

Moderate, temporary, and adverse effects to biotic communities would occur only during construction activities. Implementation of the proposed project would result in impacts on native species, their habitats, or the natural processes sustaining them; these impacts could be outside the natural range of variability for short periods of time. Best management practices and mitigation measures would be required to minimize the effects to biotic communities on and around the Saddle Island area during construction.

CUMULATIVE IMPACTS

The duration of construction of the proposed project and the SCOP project would likely overlap to some degree. Construction of each individual project would disturb vegetation; disperse wildlife from construction areas and effect desert tortoise habitat. Aquatic based construction of each individual project would cause turbidity that may affect the razorback sucker and its habitat. Effects would be detectable, but they would not be expected to be outside the natural range of variability and would not be expected to have any permanent effects on native species, their habitats, or the natural processes sustaining them. With implementation of the recommended mitigation measures, cumulative effects to biotic communities are expected to be minor, temporary, and adverse.

MITIGATION

Mitigation measures would be implemented during construction to minimize moderate, temporary adverse effects to the biotic communities, which would include the following measures:

- Minimize the area of disturbance to the smallest practical extent. (PDF)
- Conduct pre-construction clearance surveys to relocate any tortoises out of the affected area. (PDF)
- Construction contractor will install approved tortoise fencing around the work areas. (PDF)
- If a tortoise is found in the work area, temporarily halt ground-disturbing activity that could endanger the tortoise until the tortoise is relocated. (MM)
- A qualified biologist will conduct pre-construction surveys within 30 days prior to construction activities to identify potential bald eagle night roosts within a 0.5-mile radius of the proposed construction site. (PDF)
- No nighttime surface construction or surface blasting will occur within 0.5 miles of active night roosts during the bald eagle wintering season (November through April). Nighttime surface construction and blasting would be prohibited from one hour before sunset until 9:00 am local time. (PDF)
- Construction contractor will obtain and comply with a NDEP permit to minimize potential effects to lake water quality. (PDF)
- Construction contractor will choose excavation and placement methods to minimize dispersion of fine materials through the water column. (PDF)
- Design and construction contractors will comply with all applicable conservation measures contained in the Biological Opinion issued for the project. (MM)

SNWA and the construction contractor would be responsible for the implementation of the mitigation measures. The LMNRA would be the recipient of any required monitoring reports. These measures and any associated reports would be required during the duration of construction activities. No reporting requirements are anticipated during the operational period.

CONCLUSION

No designated critical habitat for the desert tortoise or bald eagle would be affected by the implementation of the proposed project. The potential for adverse effects to critical habitat for the razorback sucker is considered negligible. With the proposed mitigation measures, the proposed project is anticipated to reduce to a "minor" level any temporary and adverse effects on biotic communities. A summary of potential project effects and recommended mitigation measures for biotic communities was presented in **Tables 2 and 3**.

IMPAIRMENT OF PARK RESOURCES AND VALUES

The implementation of the proposed project would not contribute substantially to the deterioration of natural resources to the extent that the park's wildlife and habitat would no longer function as a natural system (see **Table 4**). The proposed temporary localized effects of the project would not affect the LMNRA to the point that the park's purpose could not be fulfilled and the resource would not be degraded to the point of precluding the enjoyment of future generations. Therefore, the proposed project would cause no impairment to biotic communities.

D. Cultural Resources

No-Action Alternative

EFFECTS ASSESSMENT

There would be no new effects to cultural resources as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CUMULATIVE IMPACTS

There would be no cumulative impacts to cultural resources as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

MITIGATION

There would be no mitigation requirements for cultural resources as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CONCLUSION

There would be no effects to existing cultural resources in the Saddle Island and Lake Mead areas as a result of the no-action alternative. Because there are no new effects to cultural resources, there would be no cumulative impacts.

IMPAIRMENT OF PARK RESOURCES AND VALUES

There would be no impairment of park resources and values as a result of the no-action alternative, as no effects to cultural resources would occur.

Proposed Project

EFFECTS ASSESSMENT

Numerous rock shelters and caves are known on Saddle Island, but to date archeologists have not found remains in those areas. The nature of the topography and lack of prehistoric water sources in the immediate area suggest that few significant prehistoric sites would occur (TTF-EIS, section 4.4-2). Cultural resources field surveys conducted on Saddle Island in the area of the proposed intake pumping station and other project facilities indicated no significant resources. The research potential of items encountered was determined to be "minimal" (HRA & PBS&J, 2006). Due to the lack of material noted during previous and current field surveys in the area, a low probability exists to uncover previously-unknown cultural resources during construction-related ground disturbance resulting from construction of the intake pumping station, tunnel, and intake structure, and at the excavated material placement site.

The existing SNWS causeway road to Saddle Island and construction of a proposed access road would be used for access to the new intake pumping station. Access across undisturbed areas would be prohibited. As a result, potential indirect effects to cultural resources associated with increased vehicle access and traffic during operation are not expected.

Effects from the implementation of the proposed project would be slight and would not appreciably alter resource conditions, such as traditional access or site preservation. Cultural resource mitigation measures would be required to minimize minor, temporary, and adverse effects to any unknown potential cultural resources in the project area during construction.

CUMULATIVE IMPACTS

Ground-disturbing activities required for construction of new facilities have the potential to affect cultural resources. However, with implementation of the recommended mitigation measures, effects to cultural resources would be reduced to a negligible, adverse effect and cumulative effects are not expected. The cumulative effects of past, present, and reasonably foreseeable future actions under the proposed project would have no cumulative effects on cultural resources.

MITIGATION

Cultural resource mitigation measures would be implemented during construction to minimize minor, temporary, and adverse effects to cultural resources, which may be discovered in the area, which would include all or some of the following measures, as applicable:

- Conduct cultural resource surveys and SHPO consultation in land areas designated by LMNRA and not previously surveyed prior to construction. (PDF)
- Conduct cultural resource surveys and SHPO consultation prior to construction if the intake location is outside of the previously surveyed area in Lake Mead. (PDF)

- If resources are encountered, temporarily halt or redirect all ground-disturbing activities in the area of a find, contact the NPS, and complete any required mitigation activities before allowing construction in the area to proceed. (MM)

SNWA and the construction contractor are responsible for the implementation of the mitigation measures. The LMNRA is the recipient of any required monitoring reports. These measures and any associated reports are required during the duration of construction activities. No reporting requirements are anticipated during the operational period.

CONCLUSION

With the cultural resource mitigation measures listed above, the proposed project is anticipated to reduce to a "negligible" level any effects on cultural resources. The effects would be barely perceptible and would not alter resource conditions or site preservation. The cumulative effects of past, present, and reasonably foreseeable future actions under the proposed project would have no cumulative effects on cultural resources. A summary of potential project effects and recommended mitigation measures for cultural resources are presented in **Tables 2 and 3**.

IMPAIRMENT OF PARK RESOURCES AND VALUES

The construction and operation of the proposed project would not result in the loss, destruction or degradation of a cultural property, resource or value to the point that it would negatively affect the park's purpose and visitor experience (see **Table 4**). Impairment of park resources and values is not anticipated, as no effects to cultural resources would occur.

E. Geology and Soils

No-Action Alternative

EFFECTS ASSESSMENT

No new effects to geology and soils are anticipated as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CUMULATIVE IMPACTS

No cumulative impacts on geology and soils are anticipated as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

MITIGATION

No mitigation requirements for geology and soils are anticipated as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CONCLUSION

No effects to the existing geology and soils in the Saddle Island and Lake Mead areas are anticipated as result of the no-action alternative. Because there are no new effects to geology and soils, there would be no cumulative impacts.

IMPAIRMENT OF PARK RESOURCES AND VALUES

No impairment of park resources and values are anticipated as a result of the no-action alternative, as no effects to geology and soils would occur.

Proposed Project

EFFECTS ASSESSMENT

The intake structure would be tunneled through the rock beneath Saddle Island. Excavated material from the tunneling would be removed and placed in the designated placement areas within the LMNRA (see **Figure 4**). As a result, there would be no substantial alteration of topography from the intake tunneling. Construction of the intake pumping station would require clearing and grading. The terrain on Saddle Island is moderately rugged, and substantial excavation and grading would be required to place the new intake pumping station on Saddle Island. This alteration of topography is unavoidable given the existing constraints of the required site size and island topography.

The earthwork required to construct the intake pumping station on Saddle Island would uncover and disturb soils and increase potential for wind and water erosion on these exposed soils. Ground disturbance activities from the construction of the intake pumping station would cause loss of topsoil. Ground disturbance activities from the construction of the intake pumping station would cause soil erosion by altering existing drainage patterns and from storm event runoff.

Erosion may occur during or after construction in the event of heavy rains. The proposed project would be permitted under the National Pollutant Discharge Elimination System General Permit for construction projects and implement a Storm Water Pollution Prevention Plan. The Storm Water Pollution Prevention Plan would identify best management practices for installation to minimize erosion due to runoff during construction activities. With the implementation of the Storm Water Pollution Prevention Plan, impacts to water quality due to erosion would be reduced.

The design and implementation of project facilities may need to deal with a range of specific soil conditions – expansive soils, areas of potential subsidence, unstable soils, collapsible soils, and other site-specific conditions. A pre-construction geotechnical survey and soil sampling program will determine soil conditions in detail, with the resulting requirements and approaches incorporated into the detailed project design and construction plans.

Minor to moderate, temporary and adverse effects to geology and soils would occur only during the construction activities. The effect on the geology and soils would be readily apparent and result in a change to the geology and soil character over a relatively wide area. No effects to geology and soils are anticipated from the operation of the intake facilities. Best management practices would be required to minimize the effects to geology and soils in and around the Saddle Island area during construction, and to restore, as much as possible, the pre-project landscape, soil, and biotic community conditions that existed in the undisturbed portions of the project area prior to project construction.

For much of the project site, restoration work would be unnecessary because construction activities would occur in already-disturbed areas (in parking areas, along existing roadways, or below the lake high water level), or in areas that will be covered with permanent project facilities. In other areas affected by project construction activities, an iterative restoration approach in consultation with LMNRA staff would be applied to address effects to topsoil and vegetation, and to prevent the introduction of invasive plant and weed species.

An approved Topsoil Management Plan will be developed in consultation with LMNRA to address the salvage, stockpiling, and future reuse of surface soils at the project site. Desert soil from the areas to be cleared for project construction activities would be stored, where appropriate, as close to its original location as possible to retain the local seed bank and soil type. These soil stockpiles would be maintained using methods applied in consultation with LMNRA staff to ensure continued soil and seedbed viability. Soil stockpiles will be fenced and signed to insure that they are not disturbed during construction. Replacement of desert soil after the completion of construction would include spreading the soil over areas to be restored, and recontouring and dragging the area to mimic the pre-project character of these areas, as much as possible. As necessary, soil replacement techniques would be used to re-establish desert crust surface and minimize impacts from invasive plant species such as Russian thistle (*Salsola tragus*), which often occur on disturbed sites (LMNRA, 2003b).

In addition to the respreading of stockpiled topsoil, LMNRA may decide that supplemental seeding and/or the planting of species native to the immediate area is required to better move the character of the project area back toward its pre-project state. As required, an approved Supplemental Seeding and Revegetation Plan will be developed in consultation with LMNRA to address the restoration of the biotic communities at the project site. Areas that are nearly devoid of vegetation and that are subject to natural disturbance would not be revegetated. Revegetation would use desert topsoil (conserved in the project site, where appropriate, as discussed above) and seeds from native species (with genetic stocks originating in and provided by LMNRA). If native plantings are determined to be necessary, revegetation efforts would attempt to mimic the natural spacing, abundance, and diversity of native plant species, where appropriate. No imported topsoil or hay bales would be used during revegetation in an effort to avoid introduction of weeds or non-native plant species. Undesirable species would be monitored and control strategies initiated if these species occur (see below). In consultation with LMNRA, SNWA would monitor the success of any revegetation efforts for two years following construction.

An approved Weed Management Plan will be developed in consultation with LMNRA to address the potential to introduce non-native plant species in the park. Previous revegetation efforts in LMNRA indicate that certain non-native species may grow from newly-replaced desert soils for the first two years of vegetation re-establishment (LMNRA 2003b). Weed and exotic plant species can also be inadvertently introduced by equipment entering the park from other areas. To prevent the introduction of and to minimize the spread of non-native vegetation and noxious weeds, the following measures would be implemented:

- Minimize the area of soil disturbance associated with project construction.
- Pressure-wash all construction equipment before it is brought into LMNRA.
- Limit vehicle parking to existing roads, parking lots, and construction staging areas.
- Obtain all fill, rock, or topsoil from the project area (no imported topsoil or imported hay bales would be used during revegetation).

- Initiate revegetation of disturbed sites, where appropriate, immediately following construction activities by spreading stockpiled topsoil with its associated seed bank (discussed above).
- Monitor disturbed areas annually for two years following construction to identify noxious weeds or exotic vegetation. The treatment of exotic vegetation would be completed in accordance with NPS' Integrated Pest Management Guidelines (NPS, n.d.).

LMNRA is currently developing a non-native vegetation management plan to address specifics and analyze alternatives related to the control of noxious weeds and non-native vegetation in the LMNRA. This plan should be completed and available as a guidance document during construction of the Intake No. 3 project.

CUMULATIVE IMPACTS

Ground-disturbing activities required for the construction of new facilities have the potential to affect geology and soils. Loss of such resources would cumulatively add to losses resulting from increased development in the region. However, with implementation of the recommended mitigation measures, effects to geology and soils would be minor, temporary, and adverse, and cumulative effects are not expected.

MITIGATION

Best management practices would be implemented during construction to minimize adverse effects to geology and soils in the Saddle Island area and would include all or some of the following measures:

- Design and construct the intake pumping station site, access road, and excavated material placement area to accommodate existing drainage patterns and maintain historic runoff patterns and rates. (PDF)
- Construction contractor will be required to develop and implement an approved Topsoil Management Plan.
- Respread saved topsoil on viewshed berms to encourage regrowth of native vegetation. (MM)
- SNWA will develop a Supplemental Seeding and Revegetation Plan and Weed Management Plan, and implement the plans in consultation with LMNRA in response to field conditions. (PDF)
- Construction contractor would obtain a NDEP General Stormwater Discharge permit and implement a stormwater pollution prevention plan. (PDF)
- Construction contractor would implement Best Management Practices (berms, silt fences, straw bales, etc.) to keep stormwater runoff sediments from entering Lake Mead from the land-based portion of the construction area. All erosion control materials (straw bales, wattles, etc.) must be certified as 'weed-free' by LMNRA. (PDF)
- Soil conditions in detail by a pre-construction geotechnical survey and soil sampling program, with the resulting requirements and approaches incorporated into the detailed project design and construction plans. (PDF)

SNWA and the construction contractor would be responsible for the implementation of the best management practices. The LMNRA would be the recipient of any required monitoring reports. These measures and any associated reports would be required during the duration of construction activities. No reporting requirements are anticipated during the operational period.

CONCLUSION

With geology and soils mitigation measures, the preferred alternative is anticipated to reduce to a "minor" level any temporary, adverse effects on geology and soils, and cumulative effects are not anticipated. The effects to the geology and soils would be detectable, but small. A summary of potential project effects and recommended mitigation measures for geology and soils is presented in **Tables 2 and 3**.

IMPAIRMENT OF PARK RESOURCES AND VALUES

The construction and operation of the proposed project would not result in a permanent change to a large portion of the overall acreage of the LMNRA. The proposed project would occupy approximately 50 acres of the LMNRA's 1.5 million acres. The proposed temporary localized effects of the project would not affect the LMNRA to the point that the park's purpose could not be fulfilled and the resource would not be degraded to the point of precluding the enjoyment of future generations (see **Table 4**). The effect would not contribute substantially to the deterioration of the park's soils. Therefore, the proposed project would cause no impairment to geology and soils.

F. Hydrology and Water Quality

No-Action Alternative

EFFECTS ASSESSMENT

No new direct effects to hydrology or water quality are anticipated as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

The no-action alternative would risk the adverse effect of substantially reduced water system capacity. SNWA would have less flexibility to provide reliable water service to the community in Southern Nevada, and to preserve the water delivery system capacity of SNWA's Lake Mead water intake system. This would represent a major, permanent, and adverse effect for the capacity and reliability of the community water system.

Under the no-action alternative, the effect of water withdrawals above the thermocline would be a reduced level of water quality provided to the community water system, or increased costs for constructing and operating additional water treatment processes, or both. This would be a major, permanent, and adverse effect on water quality in the SNWA system.

CUMULATIVE IMPACTS

No cumulative impacts on hydrology or water quality are anticipated as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

MITIGATION

No mitigation requirements for hydrology and water quality are anticipated as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CONCLUSION

With no water quality mitigation measures available, the no-action alternative is anticipated to result in a major, permanent, and adverse effect on water quality. Cumulative effects are not anticipated. Effects to water quality would be detectable, but could be well below water quality standards or criteria and within historical or desired water quality conditions. A summary of potential effects of the no-action alternative for hydrology and water quality is presented in **Table 3**.

IMPAIRMENT OF PARK RESOURCES AND VALUES

No impairment of park resources and values is anticipated as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

Proposed Project

EFFECTS ASSESSMENT

Water quality would be temporarily affected from drilling and intake construction activities in Lake Mead. The intake components for the proposed project would be constructed by a combination of land- and lake-based underground mining using drill and blast methods, shaft drilling equipment, and a tunnel boring machine for the tunnel connecting the intake shaft and the intake pumping station. The intake would be drilled from a lake-staged operation. This operation includes an anchored drill barge with supporting work barges and miscellaneous water support equipment. The drilling fluids and solids would be handled in accordance with NPS and Nevada State requirements. Implementation of best management practices would minimize increases in turbidity and suspended solids during drilling.

Tunnel drilling activities require groundwater discharge, which would affect water quality in Lake Mead. Groundwater that enters the tunnel would be pumped out to the ground surface for disposal in accordance with NDEP dewatering requirements. Compliance with NDEP requirements would reduce potential effects to water quality in Lake Mead.

Construction within Lake Mead would be conducted using appropriate methods to control the dispersion of suspended solids and turbidity in the water column generated by construction activities, depending on the rock conditions encountered during construction of the intake riser and tunnel connection. If the excavated material from the intake shaft is primarily rock, without the presence of fine particulate materials, no turbidity control measures would be required. As the potential for encountering materials with sand or clay-based matrices increased, other approaches to handling of these excavated materials would be considered. Other potential approaches to handling the material from the intake shaft would include using a tremie (pumping the broken material through a pipe or hose to the placement area), or keeping the excavation bucket close to the lake bottom and depositing the excavated material close to the intake shaft. The use of a silt curtain during intake construction was evaluated, but determined not to be appropriate for the existing situation. Wind and swell conditions in Lake Mead make the use of silt curtains impractical.

A large amount of excavated material would result from the proposed project's construction. The excavated material would be placed in approved areas within the LMNRA (see **Figure 4**), some of which would be below the Mean High Water Mark of Lake Mead. The discharge of dredged or fill material into or the excavation in waters of the United States is regulated under Section 404 of the Clean Water Act. The placement of the excavated material would require a permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 from the United States Army Corps of Engineers (USACE).

The Section 404 permit requires that measures be taken to first avoid and second minimize impacts to waters of the United States. The 404 permit will include a discussion of potential effects on sensitive species and their habitat in the project area—the desert tortoise, the razorback sucker, and the bald eagle and their habitat, in addition to appropriate mitigation measures (SNWA, 2006).

Specific mitigation measures to protect water quality, consistent with the requirements and content of the Section 404 permit process and outcome, are presented later in this subsection, including:

- Construction contractor will choose excavation and placement methods to minimize dispersion of fine materials through the water column.
- The barge operations would be conducted to minimize risk of water pollution with an approved emergency pollution control plan.
- Spill containment booms surrounding the barge work area would be required.

In the 404 permit, conservation measures and a mitigation and monitoring plan will be developed in coordination with appropriate resource agencies, and the USACE will approve a final plan. The application will be submitted, reviewed and approved prior to the start of construction. By complying with the NDEP and Section 404 and Section 10 permit requirements, effects to water quality are expected to be minor. Construction of the intake pumping station would involve ground excavation, grading, paving, and building construction. These ground-disturbing activities would alter existing drainage patterns, and stormwater runoff would temporarily affect water quality in Lake Mead. This effect is addressed in more detail in the geology and soils section.

Consistent with the original purpose of the SNWS, and in response to SNWA's mission to provide reliable water service to the community in Southern Nevada, implementation of the proposed Intake No. 3 project would preserve the water delivery system capacity of SNWA's Lake Mead water intake system. The proposed project also would provide water system back-up capability in the event of the need for service and maintenance to existing system components. Implementation of the Intake No. 3 project would represent a major, permanent, and beneficial effect for the capacity and reliability of the community water system.

Continued access to high quality Lake Mead water also would be a beneficial effect of the implementation of the proposed Intake No. 3 project because it would avoid the need for implementing additional water treatment processes in the SNWA system to compensate for reduced water quality at low lake levels. SNWA has historically been able to rely on drawing water from below the lake thermocline, where water quality is typically substantially better than above the thermocline. With the prospect of future Lake Mead water levels falling lower than ever before experienced, SNWA's existing intake system configuration would draw water from above the thermocline. The proposed project would result in a major, permanent and beneficial effect on water quality in the SNWA system.

Minor to moderate, temporary and adverse effects to water quality would occur only during the construction activities. Effects to water quality would be detectable but would be at or below water quality standards or criteria; however historical baseline or desired water quality conditions would be altered on a temporary basis. Best management practices would be required to minimize the effects to water quality in Lake Mead during construction. Major, permanent, and beneficial effects to water system capacity and water quality would be realized as a result of implementation of the proposed project.

CUMULATIVE IMPACTS

The duration of construction of the proposed project and the eastern tunnel portal of the SCOP project likely overlap to some degree. However, the proposed project would be constructed approximately 5,000 feet away from the SCOP construction and the drainages would be in different directions. In addition, the barges for the water-based activities would be approximately 3.5 miles apart. With implementation of the recommended mitigation measures, effects to hydrology and water quality would be reduced and cumulative effects would be negligible to minor and adverse.

MITIGATION

Best management practices would minimize minor to moderate, temporary and adverse effects to water quality in Lake Mead resulting from construction activities, and would include all or some of the following measures:

- The construction contractor would obtain and comply with NDEP Temporary Working in Waterways and Temporary Groundwater Discharge Permits. (PDF)
- The underwater operations would be conducted in a manner to minimize localized movement of fine particles into the base of the water column. (PDF)
- The barge operations would be conducted to minimize the risk of water pollution and with an approved emergency pollution control plan. (PDF)
- All construction materials and fuels will be stored in a designated area that has spill containment. (PDF)
- Only as-needed amounts of construction materials and fuels would be stored onboard barges during work on Lake Mead. (PDF)
- Spill containment booms surrounding the barge work area would be required. (PDF)
- The construction contractor would utilize settling tanks to remove sediment and meet NDEP water quality requirements prior to any groundwater discharge. (PDF)
- SNWA would obtain permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 from the U.S. Army Corps of Engineers. Contractors would implement the requirements of these permits during construction. (PDF)

SNWA and the construction contractor would be responsible for the implementation of the best management practices. The LMNRA and the USACE would be the recipient of any required monitoring reports. These measures and any associated reports would be required during the duration of construction activities. No reporting requirements are anticipated during the operational period.

CONCLUSION

With water quality mitigation measures, the proposed project is anticipated to reduce to a "negligible to minor" level any temporary adverse effects on water quality during construction, and cumulative effects are not anticipated. Effects to water quality would be detectable, but would be well below water quality standards or criteria and within historical or desired water quality conditions. The proposed project activities would not impair any beneficial uses of the lake waters. Major, permanent, and beneficial effects to water system capacity and water quality would be realized as a result of implementation of the proposed project. A summary of potential project effects and mitigation measures for hydrology and water quality is presented in **Tables 2 and 3**.

IMPAIRMENT OF PARK RESOURCES AND VALUES

The construction and operation of the proposed project would not result in the deterioration of water quality to the extent that the park's aquatic life and habitat no longer functions as a natural system (see **Table 4**). Effects of the project will not alter baseline or desired water quality condition on a temporary or permanent basis. The proposed project would not affect water quality to the point that the park's purpose could not be fulfilled and the resource could not be experienced and enjoyed by future generations.

G. Noise and Vibration

No-Action Alternative

EFFECTS ASSESSMENT

There would be no new effects to noise and vibration levels as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CUMULATIVE IMPACTS

There would be no cumulative impacts on noise and vibration levels as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

MITIGATION

There would be no mitigation requirements for noise and vibration as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CONCLUSION

There would be no effects to existing noise and vibration levels in the Saddle Island and Lake Mead Marina areas as a result of the no-action alternative. Because there are no new effects to noise and vibration levels, there would be no cumulative impacts.

IMPAIRMENT OF PARK RESOURCES AND VALUES

No impairment of park resources and values is anticipated as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

Proposed Project

EFFECTS ASSESSMENT

Noise levels would be temporarily increased in the project vicinity should surface and below-ground blasting be required on Saddle Island during site preparation for the intake pumping station facilities, to sink the vertical shafts at the intake pumping station site, to drive a tunnel southward to connect to the existing Intake Pumping Station No. 2, and possibly to drive a part of the tunnel northward toward the new intake shaft in Lake Mead.

Noise and vibration from surface blasting activities for construction at the intake pumping station site would temporarily affect nearby boaters and recreation users. Saddle Cove is approximately 2,700 feet from the construction area and the Las Vegas Bay is approximately four miles from the construction area. The noise of the blast would likely be loud enough to catch the recreation user's attention, but not loud enough to be alarming. The ground vibration would also be detectable, but not alarming. Blasting activities below the ground surface would not yield a detectable ground vibration and would not affect noise levels.

Noise and vibration from blasting activities would temporarily affect wildlife in the Saddle Island area. It is expected that the mitigation measures that are adequate for the protection of humans would also be adequate for the protection of wildlife. This effect is addressed in more detail in the TTF-EIS, section 4.8-5.

During construction of the intake pumping station facilities heavy earth-moving equipment, such as bulldozers and other heavy tracked equipment, temporarily increase noise levels in the project vicinity. The distances to potentially-sensitive receptors in Saddle Cove are as little as 0.5 miles. No vibration effects caused by construction equipment are expected to occur (TTF-EIS, section 4.8-8).

Operation of a batch plant in staging area B (see **Figure 3**) south of the AMSWTF viewshed berm would temporarily increase noise levels in the Lake Mead Marina area during project construction. A batch plant is a series of bins, hoppers and conveyors that work together to mix cementitious material with sand, aggregate and water to produce products ranging from concrete to masonry grout. Noise-producing sources would include electric motors, running conveyor belts, shakers, and running trucks. Staging area B is approximately 5,000 feet from the Lake Mead Marina.

Operational noise from the intake pumping station would increase noise levels in and around the Saddle Island area; however, effects are expected to be minor. All pumps, motors, and control equipment would be completely housed inside the intake pumping station building, within cement block walls. The building would be cooled by evaporative coolers located outside the building and emanate less noise than an air conditioning compressor unit on a house or building. The intake pumping station would be located approximately 2,700 feet from Saddle Cove and 5,500 feet from the Lake Mead Marina.

Blast noise and vibration abatement measures would be required to minimize minor, temporary, and adverse effects to noise and vibration levels in the area during construction.

CUMULATIVE IMPACTS

To have a cumulative effect, the construction, operation, and blasting activities of projects in the vicinity would need to occur simultaneously. While this could conceivably occur in some areas, it is not expected to occur in areas where the cumulative effects of noise and vibration would affect recreation users. In the event that such instances do occur, the recommended mitigation measures and monitoring requirements would ensure compliance with applicable noise and vibration standards. The cumulative effects of past, present, and reasonably foreseeable future actions under the proposed project would have minor and adverse cumulative effects on noise and vibration levels.

MITIGATION

Noise and vibration abatement measures would be implemented during construction and operation to minimize minor, temporary, and adverse effects to noise and vibration levels in the Saddle Island area, which would include all or some of the following measures:

- The blasting contractor would comply with the Uniform Guidelines for Blasting Permits in Clark County (Fire Code Ordinance No. 2289). (PDF)
- The blasting contractor would be required to monitor all blasting noise levels to meet permit requirements. (PDF)
- The blasting contractor would be required to utilize appropriate noise control devices. (PDF)
- The blasting contractor would be required to post warning signs and sound a warning horn prior to all blasting activities. (PDF)
- Schedule surface blasting activities to non-peak visitor hours. (PDF)
- Contractors would be required to use state-of-the-art noise reduction technology on construction equipment to the maximum extent practicable. (PDF)
- Locate all major noise-producing equipment associated with the pumping station inside the building structure; design the pumping station building and all on-site noise-producing equipment to meet applicable noise ordinance requirements. (PDF)

SNWA and the construction contractor would be responsible for the implementation of the abatement measures. The LMNRA would be the recipient of any required monitoring reports. These measures and any associated reports would be required during the duration of construction activities. No reporting requirements are anticipated during the operational period.

CONCLUSION

With noise and vibration abatement measures, the proposed project is anticipated to maintain a “minor” level on any temporary and permanent adverse effects on noise levels. The noise levels resulting from the implementation of the proposed project would be slight with few measurable consequences. The cumulative effects of past, present, and reasonably foreseeable future actions under the proposed project would have no cumulative effects on noise and vibration levels. A summary of potential project effects and recommended mitigation measures for noise and vibration effects was presented in **Tables 2 and 3**.

IMPAIRMENT OF PARK RESOURCES AND VALUES

The construction and operation of the proposed project would not result in noise or vibration that adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified as being acceptable for visitor uses (see **Table 4**). Effects of the project will not alter natural soundscapes on a permanent basis. The proposed project would not affect soundscapes to the point that the park's purpose could not be fulfilled and the resource could not be experienced and enjoyed by future generations.

H. Transportation And Traffic

No-Action Alternative

EFFECTS ASSESSMENT

There would be no new effects on transportation and traffic as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CUMULATIVE IMPACTS

There would be no cumulative impacts on transportation and traffic as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

MITIGATION

There would be no mitigation requirements for transportation and traffic as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CONCLUSION

There would be no effects to existing transportation and traffic on Lakeshore Road as a result of the no-action alternative. Because there are no new effects to transportation and traffic, there would be no cumulative impacts.

IMPAIRMENT OF PARK RESOURCES AND VALUES

No evaluation of potential impairment of park resources was conducted for transportation and traffic, as LMNRA does not have impairment policies or criteria for this issue.

Proposed Project

EFFECTS ASSESSMENT

It is estimated that construction of the proposed project would take up to 48 months. Construction-related traffic (employee vehicles, equipment, and haul trucks) would access the site via an approved route to the AMSWTF entrance (see Figure 6). On a typical workday, approximately 200 to 300 employee vehicles would enter and exit the construction site and approximately 10 to

15 truckloads of material would be delivered. During removal of unsuitable material resulting from excavation of the tunnel, approximately 1,200 haul trucks would enter and exit the LMNRA within a six-month period to dispose of excavated material. This traffic would temporarily increase congestion on Lakeshore Road as a result of the proposed project. The number of workforce, delivery vehicles, and haul trucks represents a range of approximately 4 to 16 percent of the daily traffic load on Lakeshore Road, depending on the month of the year (LMNRA, unpublished data). In the months when construction traffic represents a higher percentage of the traffic load (November and December), the overall number of vehicles on Lakeshore Road is much lower than during peak summer visitor periods. Delays at all times of the year are anticipated to be minor. No park roads would be closed due to construction of the proposed project.

During operation of the proposed project, the number of employee vehicles would be approximately four trips per day; therefore, there would be no permanent effects to transportation and traffic from the proposed project.

Minor, temporary, and adverse effects to transportation and traffic would occur only during the construction activities. The effects during construction would result in readily apparent changes to traffic conditions, with temporary measurable consequences. SNWA and the construction contractor would work with LMNRA staff to implement mitigation measures to minimize the potential effects of construction vehicle traffic on Lakeshore Road, taking into account the scheduling and sequencing of project construction activities and the variations in LMNRA visitor use during the year to minimize potential effects.

CUMULATIVE IMPACTS

The duration of construction of the proposed project and the SCOP project would likely overlap to some degree. Cumulative effects on transportation and traffic during construction resulting from employee vehicles, construction equipment and material deliveries are expected. Therefore, the proposed project, when considered in combination with the effects of the SCOP project, would result in minor, temporary and adverse cumulative effects to traffic and transportation.

MITIGATION

Mitigation measures would be implemented during construction to minimize minor to moderate, temporary, and adverse effects to transportation and traffic on Lakeshore Road, which may include, but are not limited to the following measures:

- The construction contractor would restrict contractor's personal, delivery and haul vehicles to an approved roadway route. (PDF)
- Employee carpooling to the work site would be encouraged. (MM)
- The construction contractor would schedule the transport of excavated material to avoid LMNRA's busier season (Memorial Day through Labor Day). (MM)
- The construction contractor would schedule the transport of excavated material to avoid Fridays and weekends. (MM)
- The construction contractor would schedule the transport of excavated material to avoid daytime traffic. (MM)
- Material deliveries would be scheduled during off-peak periods when possible. (MM)
- The construction contractor would limit truck trips per day. (MM)

- The construction contractor would improve and make effective use of signage around the entrance to the work site to make visitor vehicles aware of the trucking activity in the vicinity of AMSWTF. (MM)
- The construction contractor would implement the use flagmen as necessary to slow or detour visitor vehicle traffic to minimize delays and maximize vehicle safety during trucking events. (MM)
- Any damage to park roads caused by project traffic would be repaired in agreement with LMNRA. (MM)

SNWA and the construction contractor would be responsible for the implementation of the abatement measures. The LMNRA would be the report recipient. The LMNRA would be the recipient of any required monitoring reports. These measures and any associated reports would be required during the duration of construction activities. No reporting requirements are anticipated during the operational period.

CONCLUSION

With traffic mitigation measures, the preferred alternative is anticipated to reduce to a "negligible to minor" level any temporary adverse effects on transportation and traffic. The change to traffic conditions would be slight and localized with few temporary measurable consequences. A summary of potential project effects and recommended mitigation measures for transportation and traffic was presented in **Tables 2 and 3**.

IMPAIRMENT OF PARK RESOURCES AND VALUES

No evaluation of potential impairment of park resources was conducted for transportation and traffic, as LMNRA does not have impairment policies or criteria for this issue.

I. Visitor Use and Experience

No-Action Alternative

EFFECTS ASSESSMENT

There would be no new effects to visitor use and experience as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CUMULATIVE IMPACTS

There would be no cumulative impacts on visitor use and experience as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

MITIGATION

There would be no mitigation requirements for visitor use and experience as a result of the no-action alternative, as no construction or operation activities for the proposed project would occur.

CONCLUSION

There would be no effects to the existing visitor use and experience, as result of the no-action alternative. Because there are no new effects to the visitor use and experience, there would be no cumulative impacts.

IMPAIRMENT OF PARK RESOURCES AND VALUES

No evaluation of potential impairment of park resources and values was conducted for visitor use and experience, as NPS does not have impairment policies or criteria for this issue.

Proposed Project

EFFECTS ASSESSMENT

Excavated material placement and staging area activities may affect the RMLT in the vicinity of AMSWTF (see **Figure 8**). Minor, temporary effects to visitor use and experience would only occur during construction activities. Changes in visitor use and experience would be detectable, although changes would be slight and likely temporary. Avoidance of the RMLT area by construction activities, or the provision of trail detours and safety provisions, in consultation with LMNRA, to maintain user access to the RMLT, would be required to minimize the temporary adverse effects to visitor use and experience during construction activities. No effects to the RMLT are anticipated during the operation of the intake facilities.

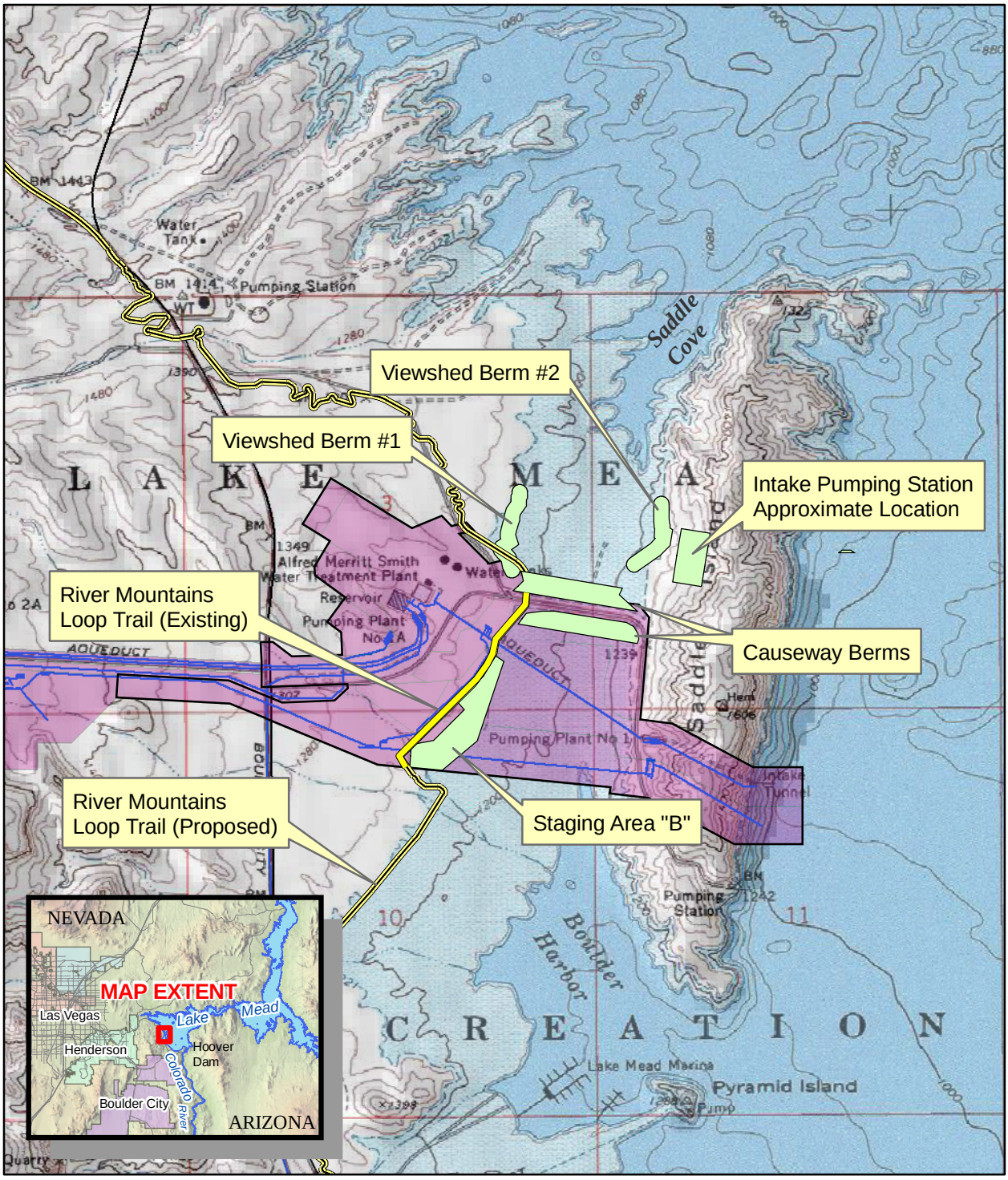
Construction of the intake pumping station and excavated material placement activities may temporarily affect the existing scenic vista of Saddle Island for recreation users in the Las Vegas Bay and Saddle Cove. Construction of the intake would occur off the northeastern shore of Saddle Island and would temporarily affect the scenic vista of Lake Mead for recreation users in the northern Boulder Basin. This effect is discussed in more detail in the Aesthetics section.

Blasting activities during the construction of the intake pumping station and the intake may temporarily affect noise levels in the project vicinity. In addition, the operation of a batch plant would temporarily affect noise levels in the project vicinity. Visitor use effects related to the operation of the intake facilities are not expected for the proposed project since operation would not lead to the discontinuance of any recreational activities or intrude upon any existing recreational facilities. This effect is discussed in more detail in the Noise and Vibration section.

Haul trucks transporting excavated material along Lakeshore Road may temporarily increase congestion and cause delays, which may affect the visitor use and experience. The amount of haul trucks per day would be relatively small. Therefore, it is anticipated that this effect would be minor. This effect is discussed in more detail in the Transportation and Traffic section.

CUMULATIVE IMPACTS

The duration of construction of the proposed project and the SCOP project would likely overlap to some degree. Excavated material placement and staging area activities of the proposed project in conjunction with the construction of the SCOP pipeline may affect the RMLT. With implementation of the recommended mitigation measures, effects to visitor use and experience would be negligible, temporary, and adverse, and cumulative effects are not expected.



Southern Nevada Water Authority

Figure 8

Lake Mead Intake No. 3

Location of River Mountains Loop Trail In Relation to Proposed Project Components

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

RM Loop Trail
SNWA Pipelines
Spoils Locations
SNWA ROW

Map produced by SNWA-Eng., KTM, Mapping & Analysis.
ROW gen. ref. only, not to scale.
Base layer USGS 1:24K Quad.
Map Author: EN
MAP-ID: LMI3-028
DATE: 12 OCT 2006

MITIGATION

Avoidance of designated recreation facilities would minimize minor adverse effects to visitor use and experience in Lake Mead and would include all or some of the following measures:

- Design and operate the excavated material placement and staging areas so that use of the River Mountains Loop Trail is maintained, by use of temporary detours of the trail, or, if use cannot be continuously maintained, to minimize disruptions to use. (PDF)

In consultation with LMNRA staff, this measure would include potential approaches such as creating an accessible temporary detour route for trail users through the construction staging area, including appropriate signage and access to and from the primary trail route, screening or the use of security fencing to protect trail users from ongoing construction activities, and rehabilitation of the trail along the primary route at the completion of construction. SNWA and the construction contractor would be responsible for the implementation of the measures. The LMNRA would be the recipient of any required monitoring reports. These measures and any associated reports would be required during the duration of construction activities. No reporting requirements are anticipated during the operational period.

CONCLUSION

With the mitigation measure detailed above, the proposed project is anticipated to reduce to a "negligible" level any temporary adverse effects on visitor use and experience, and cumulative effects are not anticipated. Visitors would not be affected and changes in visitor use and experience would be below or at detection level. A summary of potential project effects and mitigation measures for visitor use and experience is presented in **Tables 2 and 3**.

IMPAIRMENT OF PARK RESOURCES AND VALUES

No evaluation of potential impairment of park resources and values was conducted for visitor use and experience, as NPS does not have impairment policies or criteria for this issue.

VI. REFERENCES

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VII. PREPARERS

Table 5 lists the persons involved in preparing the Environmental Assessment for the Lake Mead Intake No. 3 project.

Table 5 -
Preparers of the Environmental Assessment

Name	Degree and/or Certification	Project Role	Years Experience	Background
Lake Mead National Recreation Area				
Michael Boyles	M.S., Biological Sciences	Environmental Compliance Specialist; lead LMNRA contact for project compliance activities	12	NEPA compliance, resource management, and wildlife biology
Steve Daron	M.S., Anthropology	Park Archeologist	20	Archaeology and cultural resource management
Southern Nevada Water Authority (Project Proponent)				
Marcus Jensen	B.S., Civil Engineering; P.E.	Project Director	25	Water supply facilities planning, design, and construction
Charles George[a]	B.S., Civil Engineering; P.E.	Design Manager	32	Civil engineering for water resources projects
Michael Feroz[a]	M.S., Civil Engineering; P.E.	Construction Manager	35	Water and wastewater project site grading, pipeline and tunnel construction, and environmental compliance
David Connally[a]	M.S., Oceanography; CEP	Environmental Manager; preparation of the Environmental Assessment	28	Water resources and water quality environmental management
Dianja Duran[a]	B.A., Environmental Studies	Senior Planner; impact assessments and conservation measures	9	Environmental compliance and permitting for water supply infrastructure projects
Robin Cort[a]	Ph.D., Ecology	Task Manager - Biological Assessment	24	Water resources/wastewater program environmental analysis and management
Robin Anawalt[a]	MURP	Technical Editor	16	Environmental policy, urban planning, technical writing and project management
Heidi Roberts[b]	M.A., Anthropology; RPA	Task Manager – Cultural Resources Assessment (land sites)	25	Archaeology and cultural resource management
Robert Gearhart[c]	M.A., Anthropology	Task Manager – Cultural Resources Assessment (lake sites)	21	Archaeology of submerged sites; specializes in geophysical surveys
Montgomery Watson Harza/CH2M Hill (Engineering Design Team)				
James Lindell	Ph.D., Civil Engineering	Design Team Project Manager	37	Water resources, dams, tunnels and hydropower projects

[a] Parsons Water & Infrastructure, Inc.
[b] HRA, Inc. Conservation Archaeology; Las Vegas, NV
[c] PBS&J; Austin, TX

B.A. Bachelor of Arts
B.S. Bachelor of Science
CEP Certified Environmental Professional
M.A. Master of Arts
M.S. Master of Science
MURP. Master of Urban and Regional Planning
P.E. Professional Engineer
Ph.D. Doctor of Philosophy
RPA Registered Professional Archeologist

APPENDICES

A. Public Information Activities

- **National Park Service Press Release**
- **SNWA Presentations and Information**

B. National Park Service Letter to the U.S. Fish and Wildlife Service

C. National Park Service Letter to the Nevada Natural Heritage Program

D. State Historic Preservation Officer Consultation Letter

Appendix A
Public Information Activities
National Park Service Press Release
SNWA Presentations and Information

National Park Service
U.S. Department of the Interior

Lake Mead
National Recreation Area

601 Nevada Highway
Boulder City, NV 89005

702 293-8907
702 293-8936

Lake Mead NRA News Release

June 1, 2005
For Immediate Release
Roxanne Dey, (702) 293-8947
roxanne_dey@nps.gov
Release #: 05-030

Southern Nevada Water Authority Proposes Third Intake for Lake Mead

Officials at Lake Mead National Recreation Area have received a proposal from Southern Nevada Water Authority (SNWA) to construct a third water intake structure in Lake Mead. The need for this proposal is a result of the recent and persistent drought which has caused a significant drop in the lake level, from 1,210 feet above sea level to 1,130 feet above sea level between 1999 and 2004. SNWA currently operates and maintains two intakes in Lake Mead. Intake No. 1, which has a pumping capacity of 600 million gallons per day, requires a minimum lake level of 1,050 feet to operate. Intake No. 2 is 50 feet deeper than Intake No. 1 and will operate at lake levels as low as 1,000 feet above sea level. Continued drought could threaten the operation of Intake No. 1 within the next several years.

Construction of a new intake would ensure that SNWA could maintain full system capacity at lake levels as low as 1,000 feet above sea level. The intake would be located so that even at the 1,000-foot level, water would be drawn from below the thermocline, where water is of higher quality and requires less treatment. Water from the new intake would be conveyed to the existing Alfred Merritt Smith Water Treatment Facility on the western shore of Lake Mead near Saddle Island.

An environmental assessment will be prepared to identify and evaluate potential alternatives, including no action, for the new intake. Officials at Lake Mead National Recreation Area are seeking public input on alternatives and on potential issues and impacts to be addressed in the environmental assessment. Written comments, which must be received by July 1, 2005, should be sent to: Superintendent, Lake Mead National Recreation Area, Attention: Compliance Office, 601 Nevada Way, Boulder City, Nevada 89005.

Lake Mead National Recreation Area is a unit of the National Park Service.

-NPS-

Return to Lake Mead Announcements and Press Releases | Return to Front Page

Return to the referring page.

Las Vegas SUN

June 02, 2005

Comments sought on 'third straw' intake

By Launce Rake <lrake@lasvegassun.com>
LAS VEGAS SUN

The National Park Service is asking for comments on a recent proposal from the Southern Nevada Water Authority to build the $650 million "third straw" to bring more water from Lake Mead.

The Water Authority hopes to have the new water intake operating by 2011. The proposal comes as the agency fears that a return to drought conditions along the Colorado River basin could cause water levels in Lake Mead to drop precipitously.

Water authority officials believe that falling lake levels due to demand and drought threaten both the water quality and access to lake water.

The lake level has already dropped from 1,210 feet above sea level to 1,130 feet between 1999 and 2004. The existing intakes are at 1,050 feet and 1,000 feet. The third intake could be 150 feet or more lower than the second intake, completed just three years ago, and 200 feet deeper than the oldest intake closest to the lake surface.

The Park Service, which operates the Lake Mead National Recreation Area, is the lead federal agency with responsibility for issuing an environmental assessment on the effects of a third intake. By law, the federal government must evaluate several alternatives to construction of the third intake, including the option of not building the new intake.

The Park Service is inviting written comments on the new intake plan until July 1.

J.C. Davis, a Water Authority spokesman, said the Park Service may also schedule public meetings on the proposed third intake.

"My understanding is that they are going to have some sort of public meetings," he said. "That's normally the case."

Written comments should be sent to: Superintendent, Lake Mead National Recreation Area, Attention: Compliance Office, 601 Nevada Way, Boulder City, Nevada 89005.

Return to the referring page.
Las Vegas SUN main page

Questions or problems? Click here.

Southern Nevada
Water Authority

GINEERING DEPARTMENT
ESOURCES DEPARTMENT
1900 E. Flamingo Road
Las Vegas, NV 89119

Main 702/862-3400
Fax 702/862-3470

snwa.com

August 10, 2005

Mr. Michael J. Boyles
Environmental Compliance Specialist
National Park Service
601 Nevada Way
Boulder City, NV 89005

Re: Public Outreach for Proposed Lake Mead Intake No. 3 Project

Dear Michael:

The enclosed report summarizes some of the public scoping, notices and discussions that have occurred to date for the proposed Lake Mead Intake No. 3 project. This report demonstrates the Southern Nevada Water Authority's past and future commitment to public outreach on major initiatives and activities that impact our community.

Please call me at 862-3401 if you have questions about this report or would like to explore this issue any further.

Sincerely,

Marcus Jensen, P.E.
Director of Engineering

MRJ:djt
Enclosures

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WBS: 070F00A1
DES:045

Summary of Public Scoping, Notices and Discussions
Lake Mead Intake No. 3
August 9, 2005

Southern Nevada Water Authority (SNWA) resource managers and engineers began internal discussions about the potential need for a new water intake in Lake Mead and for modifications to existing SNWA intakes in mid-2003 as part of overall drought response planning. A severe and persistent drought in the Colorado River Basin and a continued rapid, five-year decline in Lake Mead levels caused concern for the future operational viability of the existing Lake Mead Intake No. 1. Also, lower lake levels were adversely affecting water quality because water is drawn from closer to the lake surface as the lake surface drops closer to the intake openings.

Discussions during 2003, 2004 and 2005 with the SNWA Board of Directors and other affected stakeholders in publicly attended meetings and committees focused on potential solutions for protecting the community's water supply from the adverse impacts of drought on the Colorado River. As the discussions developed, the proposed Lake Mead Intake No. 3 became a separate and specific topic of discussion, and ultimately became a defined project approved by the SNWA Board of Directors.

Below is a chronological listing of some of the scoping, notices and discussions about Lake Mead Intake No. 3 that took place in the public arena. Documentation for each discussion is available.

20 November 2003	**Clean Water Coalition Citizen Advisory Committee** Presentation titled, "Alternative SNWA Lake Mead Water Intake – An Investigation Into a Potential Project in Coordination with Wastewater Discharge Alternatives"
2 March 2004	**Lake Mead Water Quality Forum** (Sponsored by Desert Research Institute) **Presentation titled, "Alternative Lake Mead Water Intake Location Concept Development"**
27 September 2004	**SNWA Integrated Water Planning Advisory Committee** Presentation on the need for new intake to deal with drought
28 September 2004	**SNWS Work Group** Presentation on status of current and potential intake projects
17 February 2005	**Joint Clean Water Coalition and SNWA Board Meeting** Presentation on water quality and drought issues motivating proposed CWC SCOP and SNWA Intake No. 3 projects

18 May 2005	**Las Vegas Sun, reporter Launce Rake** Article titled, "Board to consider intake pipeline"
19 May 2005	**SNWA Board of Directors Meeting** Presentation titled, "Lake Mead Intake No. 3"
20 May 2005	**Las Vegas Review-Journal, reporter Henry Brean** Article titled, "Valley Supply: Water panel Oks third lake intake"
20 May 2005	**Las Vegas Sun, reporter Launce Rake** Article titled, "$650 million project OK'd to ensure water to LV"
1 June 2005	**National Park Service News Release** Lake Mead NRA – Southern Nevada Water Authority Proposes Third Intake for Lake Mead
2 June 2005	**Las Vegas Sun, reporter Launce Rake** Article titled, "Comments sought on 'third straw' intake
Summer 2005	**Water Wise – SNWA publication, circulation 630,000** Article titled, "SNWA board approves 'third straw'"
13 June 2005	**High Country News, reporter Matt Jenkins** Editorial titled, "How low will Vegas go for water?"
July 2005	**SNWA 2004 Annual Report** Write-up in Capital Improvements section, page 9 Distributed to over 250 state, federal and local organization representatives.

Future Public Information Efforts

Throughout design and construction, as appropriate, SNWA staff intends to implement various public information efforts, including:

- Media articles and news releases
- Updated project information in all SNWA publications including Water Wise, Water Ways and at snwa.com
- Board meeting presentations
- Presentations at community and special interest meetings
- Preparation and distribution of a fact sheet or brochure describing the project
- Contact phone number/pager information on all materials for easy access to project information staff
- Materials and displays at booths at airs or other informational displays
- Notices and letters to the boating community, including stores, marinas, rental locations, boating publications and dealerships

Appendix B
National Park Service Letter to the U.S. Fish and Wildlife Service

United States Department of the Interior

NATIONAL PARK SERVICE

LAKE MEAD NATIONAL RECREATION AREA
601 NEVADA WAY
BOULDER CITY, NEVADA 89005

IN REPLY REFER TO:
L3031 (LAME-RM)

July 15, 2005

Memorandum

To: Assistant Field Supervisor, U.S. Fish and Wildlife Service, Southern Nevada Field Office, 4701 North Torrey Pines Drive, Las Vegas, Nevada 89130

From: Superintendent, Lake Mead National Recreation Area

Subject: Notification of Upcoming Project and Future Consultation for Construction of a Third Water Intake Structure at Lake Mead, within Lake Mead National Recreation Area, Clark County, Nevada

The National Park Service (NPS) received a proposal from Southern Nevada Water Authority (SNWA) to construct a third water intake structure in Lake Mead, within Lake Mead National Recreation Area, in Clark County, Nevada. The need for this proposal is a result of the recent and persistent drought which has caused a significant drop in the lake level from 1,210 feet above sea level to 1,130 feet above sea level between 1999 and 2004. SNWA currently operates and maintains two intakes in Lake Mead. Intake No. 1, which has a pumping capacity of 600 million gallons per day, requires a minimum lake level of 1,050 feet to operate. Intake No. 2 is 50 feet deeper than Intake No. 1 and will operate at lake levels as low as 1,000 feet above sea level. Continued drought could threaten the operation of Intake No. 1 within the next several years.

Construction of a new intake would ensure that SNWA could maintain full system capacity at lake levels as low as 1,000 feet above sea level. The intake would be located so that even at the 1,000-foot level, water would be drawn from below the thermocline, where water is of higher quality and requires less treatment. Water from the new intake would be conveyed to the existing Alfred Merritt Smith Water Treatment Facility on the western shore of Lake Mead near Saddle Island. Project activities may involve constructing a new intake tunnel extending under the surface of Lake Mead from Saddle Island to deep water off of Black Island and constructing a surface pumping station on Saddle Island.

On July 14, 2005, the NPS consulted the most recent Listing of Threatened and Endangered

Species on the U.S. Fish and Wildlife Service website. After reviewing the listing, NPS biologists determined that desert tortoise, bald eagle, and razorback sucker may exist in the project area and could potentially be impacted by the proposed project. The NPS will consult with the State of Nevada's Natural Heritage Program for a list of sensitive species.

The purpose of this memorandum is to notify you that the NPS will prepare a biological assessment, including survey results, to evaluate the potential impacts to listed species from construction activities and to develop mitigation. We plan to submit the biological assessment and environmental assessment to your office in late 2005 or early 2006.

Please call Environmental Compliance Specialist Michael Boyles at (702) 293-8978 if you have any questions or require additional information. Thank you for your assistance.

Sincerely,

William K. Dickinson
Superintendent

Appendix C
National Park Service Letter to the Nevada Natural Heritage Program

United States Department of the Interior

NATIONAL PARK SERVICE

LAKE MEAD NATIONAL RECREATION AREA
601 NEVADA WAY
BOULDER CITY, NEVADA 89005

IN REPLY REFER TO:
L3031 (LAME-RM)

July 15, 2005

Glenn Clemmer, Program Manager
Nevada Natural Heritage Program
1550 East College Parkway, Suite 137
Carson City, Nevada 89706-7921

Dear Mr. Clemmer:

The National Park Service (NPS) received a proposal from Southern Nevada Water Authority (SNWA) to construct a third water intake structure in Lake Mead, within Lake Mead National Recreation Area, in Clark County, Nevada. The need for this proposal is a result of the recent and persistent drought which has caused a significant drop in the lake level from 1,210 feet above sea level to 1,130 feet above sea level between 1999 and 2004. SNWA currently operates and maintains two intakes in Lake Mead. Intake No. 1, which has a pumping capacity of 600 million gallons per day, requires a minimum lake level of 1,050 feet to operate. Intake No. 2 is 50 feet deeper than Intake No. 1 and will operate at lake levels as low as 1,000 feet above sea level. Continued drought could threaten the operation of Intake No. 1 within the next several years.

Construction of a new intake would ensure that SNWA could maintain full system capacity at lake levels as low as 1,000 feet above sea level. The intake would be located so that even at the 1,000-foot level, water would be drawn from below the thermocline, where water is of higher quality and requires less treatment. Water from the new intake would be conveyed to the existing Alfred Merritt Smith Water Treatment Facility on the western shore of Lake Mead near Saddle Island. Project activities may involve constructing a new intake tunnel extending under the surface of Lake Mead from Saddle Island to deep water off of Black Island and constructing a surface pumping station on Saddle Island.

On July 14, 2005, the NPS consulted the Listing of Threatened and Endangered Species on the U.S. Fish and Wildlife Service website. On July 14, 2005, the NPS consulted the Clark County Rare Species List on the State of Nevada Department of Conservation and Natural Resources Natural Heritage Program website. After reviewing both lists, an NPS biologist determined that

desert tortoise, bald eagle, and razorback sucker may exist in the project area and could potentially be impacted by the proposed project.

The NPS will initiate formal section 7 consultation under the Endangered Species Act of 1973, as amended, with the U.S. Fish and Wildlife Service. The NPS will prepare a biological assessment, including survey results, to evaluate the potential impacts to sensitive species from construction activities and to develop mitigation. To aid in the preparation of this assessment, we would like to request from your office a list of sensitive species known to occur in or near the project area.

Please call Environmental Compliance Specialist Michael Boyles at (702) 293-8978 if you have any questions or would like additional information. Thank you for your assistance.

Sincerely,

/s/Gary Warshefski

William K. Dickinson
Superintendent

RESMGMT:MBoyles:ak:07/15/05:snwa_nnhpscope.doc

Appendix D
State Historic Preservation Officer Consultation letter

STATE OF NEVADA
DEPARTMENT OF CULTURAL AFFAIRS
Nevada State Historic Preservation Office
100 N. Stewart Street
Carson City, Nevada 89701
(775) 684-3448 • Fax (775) 684-3442
www.nvshpo.org

KENNY C. GUINN
Governor

SCOTT K. SISCO
Interim Director

RONALD M. JAMES
State Historic Preservation Officer

August 8, 2006

William Dickinson
Superintendent
National Park Service
Lake Mead National Recreation Area
601 Nevada Highway
Boulder City NV 89005

RE: Lake Mead Intake No. 3, Southern Nevada Water Authority, Lake Mead, Clark County.

Dear Mr. Dickinson:

The Nevada State Historic Preservation Office (SHPO) reviewed the subject undertaking. The SHPO concurs with the National Park Service's determination that the following site is not eligible for the National Register of Historic Places under any of the Secretary's criteria:

26Ck7455.

This cultural resource inventory report was completed following an intensive archaeological and historic inventory of the project area. The SHPO concurs with the National Park Service's determination that no historic properties were found within the area of potential effects (APE) for the subject undertaking.

If you have any questions concerning this correspondence, please feel free to call Rebecca Lynn Palmer at (775) 684-3443 or by E-mail at rlpalmer@clan.lib.nv.us.

Sincerely,

Alice M. Baldrica

Alice M. Baldrica, Deputy
State Historic Preservation Officer