

ES.0 Executive Summary

The Bureau of Reclamation, Lower Colorado Region (Reclamation) and the National Park Service (NPS), Lake Mead National Recreation Area, propose to prepare an Environmental Impact Statement (EIS). Reclamation and the NPS are preparing the EIS as joint-lead federal agencies to evaluate the potential impacts associated with the construction, operation, and maintenance of the Systems Conveyance and Operations Program (SCOP).

The Clean Water Coalition (CWC) is comprised of the three agencies currently responsible for wastewater treatment in the Las Vegas Valley: the City of Las Vegas (CLV), the City of Henderson (COH), and the Clark County Water Reclamation District (CCWRD). The CWC proposes to implement the SCOP, which would include an Effluent Interceptor (EI) pipeline plus one or a combination of alternatives to discharge the highly treated effluent into the Lower Colorado River System via Lake Mead, while minimizing the impacts to water quality and other natural resources. The SCOP would provide an alternate discharge point for the effluent, which is currently discharged to Lake Mead through the Las Vegas Wash. The SCOP includes activities and infrastructure that would be located on lands owned or managed by private entities, the CLV, the COH, Clark County, Reclamation, NPS, and the U.S. Bureau of Land Management (BLM), all within Clark County, Nevada.

Compliance with the National Environmental Policy Act (NEPA) is required because the project would be located on lands being managed by federal agencies (42 USC 4321 et seq.; PL 91-190). This EIS was prepared in compliance with NEPA and the *Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA* (40 Code of Federal Regulations 1500-1508, 1993). The NEPA requires federal agencies to consider the environmental consequences of proposed actions in their decision-making process.

This EIS evaluates effects of the four project alternatives, including the No Action Alternative, on a number of resource issues including, but not limited to: surface water hydrology, groundwater, water quality, biological resources/endangered species, cultural resources, recreation, land use, air quality, noise, socioeconomics, and other appropriate resource issues identified during the scoping process. An impairment analysis was also conducted for the portion of the project located on land administered by the NPS. To assist the public and decision makers review, this EIS is organized as follows:

- Chapter 1 discusses the purpose and need for the proposed project.
- Chapter 2 describes the four alternatives including the No Action Alternative. Alternatives considered but eliminated are also discussed in this section.
- Chapter 3 provides an overview of the existing (baseline) environmental conditions within the project area and the potentially affected environment.
- Chapter 4 addresses the potential environmental consequences of implementing the alternatives described in Chapter 2 when compared to baseline conditions presented in Chapter 3. Mitigation measures associated with the alternatives are also discussed in

Chapter 4. In addition, as required by NPS management policy, the results of impairment analyses are presented in Chapter 4.

- Chapter 5 discusses the cumulative effects of implementing the alternatives in addition to other past, present, and reasonably foreseeable actions that may occur in the area.
- Chapter 6 addresses the potential irreversible and irretrievable affects associated with the two action alternatives.
- Chapters 7, 8, 9, 10, 11, and 12 presents Consultation and Coordination, List of Preparers, References, Distribution List, Glossary, and Index, respectively.
- Appendices provide additional technical support data.

ES.1 Purpose and Need

The purpose of implementing one of the action alternatives is to maintain water-quality standards and NPS recreational and resource values by operating a conveyance system that would allow for flexible management of wastewater flow from the Las Vegas Valley to Lake Mead. Clark County, Nevada is one of the fastest growing counties in the U.S. It is projected that the population in the area will be approximately 3,130,000 by 2035 (UNLV 2004). The quantity of effluent treated and discharged in the Las Vegas Valley (Valley) will increase as the population of the Valley increases. Forecasts indicate that a combined maximum month flow of approximately 453 million gallons per day (mgd) of municipal wastewater will need to be treated and managed in the Las Vegas Valley by 2050 (Black & Veatch 2004a). The treatment and conveyance facilities must accommodate the additional flows while continuing to meet current or future water quality standards for the Las Vegas Wash, Las Vegas Bay, and Lake Mead.

The CWC needs a system that provides maximum flexibility for management of treated effluent to:

- Meet current and future water quality standards for known pollutants, and as yet unknown standards for additional contaminants that may be regulated in the future.
- Protect and enhance the Lake Mead National Recreation Area (LMNRA) by continuing to meet beneficial uses and recreational and resource values of the LMNRA, while more than doubling the treated effluent flows discharged to Lake Mead.
- Accommodate Lake Mead's lowering water levels, which are important because the amount of mixing and dilution available in the inner Las Vegas Bay are also decreasing as the Lake level decreases.
- Avoid possible impacts to source-water quality at the Southern Nevada Water System intake structures.

ES.2 Summary of Proposed Alternatives

This EIS evaluates the potential environmental impacts associated with three action (pipeline) alternatives and the No Action (or no pipeline) Alternative. The three action alternatives include,

the Boulder Islands North Alternative, the Boulder Islands South Alternative, and the Las Vegas Bay Alternative. The three action alternatives analyzed have a common element, the EI. However, the EI alignment for the Boulder Islands North Alternative is slightly different than the EI alignment for the Boulder Islands South and Las Vegas Bay alternatives. Therefore, the designations of EI-Alignment A and EI-Alignment B are used throughout the EIS to describe the EI portion of the alternatives. Regardless of the EI alignment, the EI would collect and convey the highly treated effluent from the three treatment facilities to Lake Mead via the Lake Conveyance System (LCS).

The alternatives in this EIS include expansions at the three treatment plants and the continued discharge of current and projected effluent flows to the Las Vegas Wash, with the use of conventional treatment processes to meet water quality standards (no action alternative); and construction and operation of a pipeline that would transport highly treated effluent from the three treatment facilities to a receiving area underwater, within the Colorado River system (three action alternatives).

The action alternatives would allow for flexible management of the highly treated effluent. A controlled amount of effluent would continue to be discharged to the Las Vegas Wash at each facility or at the EI Terminus. The discharge amount, velocity, and direction from the LCS diffuser would also be flexibly operated depending on the conditions of the Lake and the objectives identified in the SCOP Adaptive Management Plan (AMP).

ES.2.1 No Action Alternative

Under the No Action Alternative the CWC would not construct pipelines to transport effluent from the treatment facilities. Current, conventional treatment processes and plant optimization would be used to meet the requirements set by the Nevada Division of Environmental Protection (NDEP) through the National Pollutant Discharge Elimination System (NPDES) permitting program. Total phosphorus from the combined effluent of the treatment facilities would continue to be treated to 0.2 mg/L, and optimization of the plants would continue to be implemented when current treatment processes alone could not treat wastewater to levels needed to meet water quality objectives. Combined total phosphorus would be treated to levels below 0.2 mg/L during plant optimization. Additions or modifications to treatment facilities would be implemented at the existing levels of treatment while accommodating the anticipated increase in effluent quantity. Facility expansions and modifications would occur on lands currently owned by the CLV, Clark County, and COH.

ES.2.2 Boulder Islands North Alternative

The three treatment agencies would expand their facilities to handle the increasing quantities of wastewater through 2050, while using current, conventional treatment processes to meet water quality requirements. Plant optimization would be implemented when current treatment processes alone could not treat wastewater to levels needed to meet water quality objectives. A pipeline to convey highly treated effluent from the three treatment facilities to an alternate discharge location in Lake Mead would be constructed. The first segment of the pipeline,

EI-Alignment A, extends from the CLV treatment facility to the EI Terminus site west of Lake Las Vegas. The effluent discharged from the CLV and CCWRD's treatment facilities would bypass the lower Las Vegas Wash via the EI. The treated effluent from the COH Water Reclamation Facility would be introduced to the EI via the COH Forcemain, which crosses beneath the Las Vegas Wash in the vicinity of the Pabco Road Erosion Control Structure (ECS). The three flows would be combined north of the Pabco Road ECS and be transported to the vicinity of the Boulder Islands in Lake Mead via the LCS. The majority of the Boulder Islands North LCS would be installed in a tunnel through the River Mountains.

ES.2.3 Boulder Islands South Alternative

The three treatment agencies would expand their facilities to handle the increasing quantities of wastewater through 2050, while using current, conventional treatment processes to meet water quality requirements. Plant optimization would be implemented when current treatment processes alone could not treat wastewater to levels needed to meet water quality objectives. A pipeline to convey highly treated effluent from the three treatment facilities to an alternate discharge location in Lake Mead would be constructed. The first segment of the pipeline, EI-Alignment B, extends from the CLV treatment facility to the EI Terminus location west of Lake Las Vegas. The effluent discharged from the CLV and CCWRD's treatment facilities would bypass the upper Las Vegas Wash via the EI. The South Lateral Pipeline would convey the treated effluent from the COH Water Reclamation Facility. The three flows would be combined at the EI Terminus and be either returned to the Las Vegas Wash at a point upstream of Lake Las Vegas, or be transported to the vicinity of the Boulder Islands in Lake Mead via the LCS. The majority of the Boulder Islands LCS would be installed in a tunnel through the River Mountains.

ES.2.4 Las Vegas Bay Alternative

The three treatment agencies would expand their facilities to handle the increasing quantities of wastewater through 2050, while using current, conventional treatment processes to meet water quality requirements. Plant optimization would be implemented when current treatment processes alone could not treat wastewater to levels needed to meet water quality objectives. In addition, EI-Alignment B, including the South Lateral Pipeline as described for the Boulder Islands South Alternative, is included in the Las Vegas Bay Alternative. The three flows would be combined at the EI Terminus and be either returned to the Las Vegas Wash at a point upstream of Lake Las Vegas, or be transported to the Las Vegas Bay in Lake Mead via the LCS. The majority of the Las Vegas Bay LCS would be installed in a tunnel through the River Mountains.

ES.3 Environmental Consequences

A brief summary of the potential impacts associated with the three action alternatives is presented in the following paragraphs. The No Action (or no pipeline) is also discussed in the following paragraphs. The environmental consequences resulting from the construction, maintenance, and operation of EI-Alignment B, including the South Lateral Pipeline, would be the same for each resource under the Boulder Islands South and Las Vegas Bay alternatives. The analysis of the

alternatives focuses on identifying types of impacts and estimating their potential significance. A brief summary of the potential impacts is presented in the following paragraphs.

ES.3.1 Water Resources

ES.3.1.1 No Action Alternative

Under the No Action Alternative, an increase in the volume of water conveyed in the Las Vegas Wash during dry-weather flows would not significantly increase erosion and channel degradation. The Southern Nevada Water Authority's (SNWA) ongoing construction of ECSs and bank protection reduces the potential for future erosion in the Las Vegas Wash. Therefore, significant impacts related to erosion in the Las Vegas Wash resulting from the discharge of increased quantities of effluent are not expected.

Under the No Action Alternative, there would be an increase in effluent flows, but no expected increase in base flows in the Las Vegas Wash. There would be increased dilution of groundwater and urban runoff constituents such as perchlorate, total dissolved solids (TDS), and selenium, because effluent flows would increase. The concentrations of these non-effluent related constituents would be less than baseline concentrations.

The combined total phosphorus (TP) loading for these model runs was 334 pounds per day (lbs/day), which is the waste load allocation (WLA) for the Las Vegas Wash. It is important to note that increases in the TP that would result from flow increases were not modeled for the No Action Alternative because the WLA in the Las Vegas Wash cannot be exceeded. Using current, conventional treatment processes, flows of 300 mgd (462 cfs) would have a TP loading of 467 lbs/day, which exceed the TMDL. Therefore, the 2030 effluent flows in the Las Vegas Wash would exceed regulatory limits for TP.

Most of the parameters modeled in Lake Mead for 2030 effluent flows and a Lake level of 1,178 feet (ft) (359 meters [m]) are not significantly affected by the No Action Alternative. However, the No Action Alternative does not improve existing elevated chlorophyll concentrations in the inner Las Vegas Bay. Phosphorus loadings entering Lake Mead through the Las Vegas Wash would continue to flow into the epilimnion, as they are under baseline conditions, and would continue to produce elevated chlorophyll concentrations in the inner Las Vegas Bay. In addition, total inorganic nitrogen (TIN) would continue to exceed water-quality standards in the Las Vegas Bay near the Las Vegas Wash.

With 2050 effluent flows and a Lake level of 1,000 ft (305 m), chlorophyll levels in Boulder Basin would be at the water-quality standard of 5 micrograms per liter ($\mu\text{g/L}$), and chlorophyll levels at Boulder Beach would exceed the 5 $\mu\text{g/L}$ water-quality standard for open water.

Overall, impacts to Lake Mead (in 2030 with a modeled Lake level of 1,178 ft [359 m]) from the No Action Alternative would be insignificant and minor. However, impacts to the Las Vegas Bay and Boulder Basin (in 2050 with a modeled Lake level of 1,000 ft [305 m]) from the No Action Alternative would be significant and major. Exceedances of water-quality standards would not necessarily result in impairment of LMNRA resources. However, continued exceedances for extended periods of time may result in impairment.

ES.3.1.2 Boulder Islands North Alternative

The impacts of EI-Alignment A on surface water associated with construction activities would be temporary. The EI-Alignment A would cross perpendicular to several existing ephemeral washes. During a major rainfall runoff event, the open trench could act as a diversion channel.

Impacts of constructing EI-Alignment A would not significantly impact erosion in the Las Vegas Wash, because erosion would be controlled by the SNWA ECSs and bank protection activities.

It is likely that groundwater would be encountered and intercepted during excavation, especially along the COH Forcemain. The construction of the tunnel and pipeline may inadvertently form a permeable pathway along which groundwater may flow. Additionally, perchlorate-contaminated groundwater may be encountered during construction activities. If contaminated groundwater is exposed, it would be handled according to NDEP requirements.

During dredging, higher turbidity and suspended solids concentration would be produced in the area being dredged. This would result in a short-term reduction in water quality. A sediment curtain would be installed around the dredging area to contain the sediments and minimize the impact. Dredging is a regulated activity controlled by a permit review process administered by the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers. All dredging operations would be conducted in compliance with the stipulations of the SCOP Section 404 Permit.

Reducing the flow in the Las Vegas Wash to 50 mgd (77 cfs) would result in higher concentrations of substances associated with groundwater and urban runoff such as perchlorate, TDS, and selenium, because of less dilution by effluent flows. Effluent flows would continue to enter the inner Las Vegas Bay from the Las Vegas Wash. Therefore, the constituents in effluent that provide a nutrient source for aquatic life would be present, but at reduced levels. Similarly, because less effluent is entering the inner Las Vegas Bay, the presence of constituents such as endocrine-disrupting compounds and other emerging compounds of concern that are associated with effluent would also be reduced.

Under the Boulder Islands North Alternative, effluent-related constituents would undergo more dilution than under existing conditions or the No Action Alternative. Chlorophyll levels in the inner Las Vegas Bay would be reduced because of lowered phosphorus loadings. Water quality would remain the same or improve in the Las Vegas Bay and Boulder Basin, and standards for Lake Mead would continue to be met using current, conventional treatment processes or, if necessary, plant optimization. Implementation of the SCOP AMP would ensure that the existing high water quality in Boulder Basin is maintained. Therefore, impacts to Lake Mead (in 2050 at a Lake elevation of 1,000 ft) from the Boulder Islands North Alternative would be insignificant and minor.

ES.3.1.3 Boulder Islands South and Las Vegas Bay Alternatives

The impacts of EI-Alignment B on surface water associated with construction activities would be temporary. The EI-Alignment B would cross perpendicular to several existing ephemeral washes. During a major rainfall runoff event, the open trench could act as a diversion channel.

Impacts of constructing EI-Alignment B would not significantly impact erosion in the Las Vegas Wash, because erosion would be controlled by the SNWA ECSs and bank protection activities.

It is likely that groundwater would be encountered and intercepted during excavation, especially along the western segment of the South Lateral Pipeline. The construction of tunnels and pipelines inadvertently forms permeable pathways along which groundwater may flow. Additionally, perchlorate-contaminated groundwater may be encountered during construction activities. If contaminated groundwater is exposed, it would be handled according to NDEP requirements.

For the Boulder Islands South LCS, if the trench was left open during a flood event, the flow from the upstream channel would potentially be diverted through the open trench and discharge into the downstream channel. This increases the flows in the downstream channel causing flooding at the Boulder Beach Campground area and the proposed Pressure Regulating Station (PRS) site near the shore. During dredging, higher turbidity and suspended solids concentration would be produced in the area being dredged. This would result in a short-term reduction in water quality. A sediment curtain would be installed around the dredging area to contain the sediments and minimize the impact. Dredging is a regulated activity controlled by a permit review process administered by the EPA and the U.S. Army Corps of Engineers. All dredging operations would be conducted in compliance with the stipulations of the SCOP Section 404 Permit.

Under the Boulder Islands South and Las Vegas Bay alternatives, reducing the flow in the Las Vegas Wash to 50 mgd (77 cfs) would result in the same impacts described for the Boulder Islands North Alternative in Section ES.3.1.2.

Under the Boulder Islands South and Las Vegas Bay alternatives, effluent-related constituents would undergo more dilution than under existing conditions or the No Action Alternative. Chlorophyll levels in the inner Las Vegas Bay would be reduced because of lowered TP loadings. Water quality would remain the same or improve in the Las Vegas Bay and Boulder Basin, and standards for Lake Mead would continue to be met using current, conventional treatment processes and, if necessary, plant optimization. Implementation of the SCOP AMP would ensure that the existing high water quality in Boulder Basin is maintained. Therefore, impacts to Lake Mead (in 2050, at a lake elevation of 1,000 ft) from the Boulder Islands South and Las Vegas Bay alternatives would be insignificant and minor.

ES.3.2 Biological Resources

ES.3.2.1 No Action Alternative

Under the No Action Alternative effluent flows to the Las Vegas Wash would increase over time as the wastewater treatment facilities expand in response to urbanization in the region. This would encourage the expansion of riparian plant and wetlands communities. It is possible that these communities would steadily expand in area as effluent flows to the Las Vegas Wash increase. An increase in water surface area correspondingly would increase habitat for birds such

as the southwestern willow flycatcher (*Empidonax traillii extimus*) and Yuma clapper rail (*Rallus longirostris yumanensis*).

Under the No Action Alternative additional littoral (bank or shoreline) vegetation resulting from increasing effluent flows may increase forage and cover for aquatic larvae when Lake Mead levels rise and cover this vegetative source, creating an indirect benefit. This would create additional habitat for aquatic fauna such as the razorback sucker (*Xyrauchen texanus*), provide a forage base, and provide a protective layer for larvae that may increase species survival.

Water-quality monitoring in the Las Vegas Bay concludes that the current rate of nutrient loading has not caused adverse environmental conditions. However, the nutrient loading in conjunction with the lowering water levels in Lake Mead may create less than favorable conditions for aquatic fauna because dilution of effluent-related constituents would be reduced.

Flows from the Las Vegas Wash may create eutrophic conditions in the Las Vegas Bay that would not be ideal conditions for spawning razorback suckers or sucker larvae, because eutrophic conditions promote population outbreaks of scavenger and predator species that prey on razorback suckers and their larvae. However, the increased littoral and edge vegetation may benefit the razorback larvae survival by providing protective habitat. In addition, increased quantities of effluent in the Las Vegas Bay would increase the presence of constituents such as endocrine-disrupting compounds and other emerging compounds of concern that may impact the razorback sucker.

No special status plant species, desert tortoise (*Gopherus agasizii*), bald eagles (*Haliaeetus leucocephalus*), federal candidate species and species of concern, Nevada State-protected species, and Clark County Multiple Species Habitat Conservation Plan (MSHCP)-covered species would be directly affected by the No Action Alternative.

ES.3.2.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

The reduction of effluent flows in the Las Vegas Wash under the three action alternatives would likely decrease the saturated substrate, and may result in the transition of emergent wetland communities to drier riparian communities. A review of the estimated water budget for the Las Vegas Wash indicates that riparian and wetlands vegetation communities would be supported at their current level, but the composition and diversity of those communities would likely change.

No federally listed threatened or endangered plants were observed in the project area. Low population densities of cactus species and no yucca species were observed in the study area during spring 2003 and 2004.

Construction of EI-Alignment A under the Boulder Islands North Alternative would result in the temporary disturbance of approximately 202 acres (82 hectares) of potential desert tortoise habitat. Approximately 53 acres (21 hectares) would be permanent disturbance. Construction of EI-Alignment B under the Boulder Islands South and Las Vegas Bay alternatives would result in the temporary disturbance of approximately 224 acres (91 hectares) of potential desert tortoise

habitat. Approximately 82 acres (33 hectares) would be permanent disturbance. However, much of this area is already disturbed from previous unrelated construction activities or public use. Following project construction and site restoration, desert tortoises would likely reoccupy restored portions of the project area.

Any disturbance near the Las Vegas Wash during the breeding and nesting seasons for the southwestern willow flycatcher and Yuma clapper rail would cause impacts to nesting or foraging birds.

Ground-disturbing activities have the potential to directly affect the southwestern toad (*Bufo microscaphus*) through direct mortality or displacement. The physical disturbance associated with pipe installation into Lake Mead may impact razorback sucker populations dispersal, migration, and ability to forage.

Under the three action alternatives, dredging would disturb the benthic and littoral habitat in Lake Mead. Aquatic vegetation and habitat would be destroyed in the construction areas. Invertebrate species with limited home ranges would be lost due to direct mortality. Common fish and amphibian species are not likely to be impacted through mortality because of their ability to move away from the dredging operations.

The reduction of effluent flows to the Las Vegas Wash would reduce the dilution of non-effluent related constituents such as TDS, selenium, and perchlorate. These constituents would enter the Las Vegas Bay and may affect the razorback sucker. The impacts to aquatic species in the Las Vegas Wash and Las Vegas Bay from exposure to these constituents is not known. It is expected that the abundance of some species may be slightly reduced, but the populations would continue to inhabit the Las Vegas Wash. A group of agencies are monitoring the concentrations of substances associated with groundwater and urban runoff in the Las Vegas Wash, and will address the issue as needed.

No direct impacts to the razorback sucker would result from construction of EI-alignment A or B because the razorback sucker is not present in the Las Vegas Wash.

Construction of the LCS would directly impact aquatic habitat and fauna starting with the riparian corridor on the edges of Lake Mead. Fish species are not likely to be impacted through direct mortality because of their ability to move away from the dredging operations. Construction impacts would be temporary. However, the physical disturbance associated with pipe installation activities in Lake Mead may directly impact the razorback sucker population's dispersal, migration, and ability to forage. The razorback sucker may be displaced from its normal forage range and normal community behavior may be disrupted. These construction activities may interrupt dispersal corridors with physical barriers and may block seasonal migration to known breeding locations.

Impacts from construction activities of the LCS may indirectly affect the razorback sucker populations in the area of the diffuser. Indirect mortality to the razorback suckers created by stress-induced fitness reduction may occur. This reduced fitness condition may decrease the razorback suckers' natural immune system and invite secondary infections such as columnaris, fungus, and parasites. Under abnormal immunity conditions, the razorback sucker's ability to combat these infections may be reduced, thus lowering the ability for its survival.

The discharge of highly treated effluent into Lake Mead near the Boulder Islands or in the Las Vegas Bay may directly affect the razorback sucker populations by changing the water quality in the dispersal area and in the inner Las Vegas Bay. The effluent and base flows that would continue to enter the inner Las Vegas Bay from the Las Vegas Wash would still provide a nutrient source for the razorback sucker, but at reduced quantities. Similarly, because less effluent is entering the inner Las Vegas Bay, the presence of constituents such as endocrine-disrupting compounds and other emerging compounds of concern would also be reduced. In addition, water-quality modeling indicates that parameters such as conductivity, density, dissolved oxygen content, and temperature of the water near the diffuser would be within the ranges preferred by razorback suckers.

ES.3.3 Cultural Resources

ES.3.3.1 No Action Alternative

Under the No Action Alternative, no direct or indirect disturbance to any cultural resources would occur. There would be no impacts to identified National Register of Historic Places (NRHP) sites.

ES.3.3.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

Portions of both the proposed EI alignments would follow the south edge of the road that is part of Site 26CK6150 (Telephone Line Road). The existing powerline and associated poles are considered contributing elements to the overall eligibility of the site to the NRHP. Construction of the EI would not affect the integrity of location or setting for the eligible powerline. The historic value of the powerline would not be diminished by EI construction activities.

The proposed pipeline would be located within 100 ft (30 m) of three identified sites along the EI alignment. However, this portion of the pipeline would be constructed using tunneling techniques, which would minimize surface disturbance. Therefore, direct and indirect impacts to the sites are not expected.

No cultural resources were located within the proposed Boulder Islands North LCS terrestrial area of potential effect (APE). The underwater segment of the Boulder Islands North Diffuser Pipeline would intersect with three contributing elements of Site 26CK4046B, the Six Companies Inc. Railroad (SCIRR). The three contributing elements include track sidings, raw aggregate storage piles, and unpaved service roads.

The South River Mountains Tunnel #3 (SRMT3) East working shaft, which is part of the Boulder Islands South LCS, would potentially impact three elements of Site 26CK7115. Site 26CK7115 is recommended to be eligible for the National Register of Historic Places (NRHP) under Criterion A, association with events or broad patterns important in history (HRA, Inc. 2005). Avoidance of these site elements would minimize the potential for impacts.

The use of the alternate access route to the SRMT3-East working shaft would have significant impacts to Site 26CK6247, the remains of Hemenway Wash Road (or Old Lake Highway). Use of the existing pavement would result in extensive damage and remove the only intact section of this site. The alternate access route to the SRMT3-East working shaft would not be used during construction activities.

The submerged sections of the Boulder Islands Diffuser Pipeline would cross the SCIRR within areas not previously evaluated for their eligibility to NRHP (HRA Inc. 2005). Five contributing elements of Site 26CK4046B are located within the BISDP APE.

No archaeological sites were identified during the survey of the Lake Conveyance System portion of the Las Vegas Bay Alternative.

ES.3.4 Recreation

ES.3.4.1 No Action Alternative

The expansion of riparian and wetlands communities would increase habitat for birds and bats along the Las Vegas Wash. This would have a beneficial effect on recreation because there would be increased opportunities for nature observation, such as bird watching, which is a primary recreational activity in the Clark County Wetlands Park (Wetlands Park).

However, water quality modeling indicates that the No Action Alternative would result in exceedances of the water quality standard for chlorophyll and TIN in the Las Vegas Bay and would also increase chlorophyll levels in the open waters of Boulder Basin at lower Lake levels. An increase of chlorophyll increases the potential for algae growth, which may discourage recreational visitors in those areas. Exceedances of water quality standards would not necessarily result in impairment of LMNRA resources. However, continued exceedances for extended periods of time may result in impairment.

ES.3.4.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

Under the three action alternatives, visitors to the area may experience minor inconveniences during construction activities such as increased noise, dust, localized traffic, and altered scenic or aesthetic values of the landscape. These impacts would be temporary.

Recreational activities at the LMNRA would be temporarily unavailable in construction areas. However, construction would be limited to October through March, which is considered the low-tourist season. Therefore, the impacts would be temporary and minor.

Water quality modeling indicates that under the three action alternatives, water quality standards would continue to be met for 2050 flows using conventional treatment processes. Therefore, long term recreation would not be impacted by these alternatives.

Under the Boulder Islands North Alternative dredging activities would occur in close proximity to the Lake Mead Resort Marina. Access to the Marina may be impacted during construction

activities. However, construction would occur during the winter (October through March) when boating use is lower. To minimize the impacts to Marina and Lake users, Notices to Mariners will be published and posted prior to construction activities. Aids to Navigation for Inland Waterways will be implemented, and a minimum-width construction corridor will be used to ensure that at least one-way boat traffic is maintained throughout the construction period.

Under the Boulder Islands South and Las Vegas Bay alternatives, trail improvements and the pedestrian bridge across the C-1 Channel within the Wetlands Park would be beneficial impacts to Wetlands Park visitors.

ES.3.5 Hazardous Materials

ES.3.5.1 No Action Alternative

Under the No Action alternative, hazardous materials used for wastewater treatment would continue to be handled, stored, and disposed of properly. Therefore, no impacts would occur.

ES.3.5.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

During construction of the EI, the perchlorate contaminated groundwater may be encountered. Dewatering of contaminated groundwater may impact overall project costs during construction. Perchlorate-contaminated groundwater would be handled according to the requirements of the NDEP discharge permit.

Under the Boulder Islands South and Las Vegas Bay alternatives, portions of the South Lateral Pipeline would cross near the Henderson Landfill a known metal contamination area. The proposed project alignment does not enter the boundaries of the landfill. However, contaminated soils may be encountered during construction. If soils encountered during construction present an odor or visible contamination, sampling and further analysis would be required to determine the extent of contamination. Metal-contaminated soil encountered during construction would be handled and disposed of in accordance with EPA standards.

Potentially hazardous materials used for construction include diesel fuel, gasoline, lubricants, and coolants. The contractor would comply with applicable regulations relating to handling, storage, and disposal of hazardous substances.

Under the Boulder Islands South LCS, hazardous materials may occur in the vicinity of two historical recognizable environmental conditions (RECs,) the Three Kids Mine and Henderson Landfill. Construction of the SRMT3 would pass near the Three Kids Mine and the Henderson Landfill, which have known metal and petroleum contamination from historical mining and landfill operations respectively. The Boulder Islands North and Las Vegas Bay alternatives are located further from these two REC's; therefore the possibility of encountering contaminated soils would be lessened.

The proposed LCS alignments would not block the use of paved roadways, and thus, is not expected to interfere with adopted emergency response plans.

ES.3.6 Noise

ES.3.6.1 No Action Alternative

Under the No Action Alternative, construction activities during expansion of facilities at each wastewater treatment plant would have short-term noise effects on receptors in the immediate vicinity of the construction site. However, the area that would be subjected to construction noise would be relatively small.

ES.3.6.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

Under the action alternatives, construction activities would be subject to county statutes. It is anticipated that short-term sound levels from construction activities would be less than the “normal suburban residential” guidelines. During construction, it is not anticipated that heavy earth-moving equipment would operate within 100 ft (30 m) of residential or industrial structures. Therefore, construction noise and vibration from equipment is not expected to significantly impact residential communities near the proposed project.

The Hydroelectric and PRS facilities would be underground. A building would fully enclose all piping and electrical equipment thus creating a long-term noise barrier during regular operation. Therefore, long-term operational noise impacts would be minimal and not significantly impact residential communities.

Construction activities in the Wetlands Park would be temporary and would be at a distance such that visitor experiences would not be adversely impacted by noise.

Construction activities on Lake Mead in the vicinity of the Boulder Islands would involve barges and boats. Noise from these vessels is not anticipated to be greater than that already created from jet skis and motorboats. Noise on the beach from the construction boats and barges may impact LMNRA visitor experiences. However, construction would be done during the winter season when there are less LMNRA visitors and people on the beach and impacts would be temporary.

ES.3.7 Air Quality

ES.3.7.1 No Action Alternative

Under the No Action alternative there would be no construction emissions. No air quality impacts would result. Emissions associated with construction activities from the expansion of existing facilities would be subject to National Ambient Air Quality Standards (NAAQS) and would require a permit from the Clark County Department of Air Quality and Environmental Management.

ES.3.7.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

During construction, minor, short-term impacts to air quality resources are anticipated as a result of construction equipment exhaust emissions under all three action alternatives. Impacts are classified as minor because there would be a temporary, but detectable, change in ambient air pollutant concentrations. However, the change is not projected to cause or contribute to an exceedance of the NAAQS, would not produce objectionable odors, and would not exceed recommended exposure standards. The impact is also classified as a short-term impact because it would occur only during construction.

ES.3.8 Earth Resources

ES.3.8.1 No Action Alternative

Under the No Action alternative, new construction would occur on property owned by the CLV, CCWRD, or COH. Therefore, mineral resources would not be impacted. The treatment facilities are not located on lands that experience geologic hazards or expansive soils.

ES.3.8.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

Construction of the project components would have short-term environmental effects that are not considered significant. Short-term uses of the environment would not affect the maintenance and enhancement of long-term productivity. The project would not significantly affect the availability of mineral resources in the area because of the relatively small area that would be affected.

There would be no significant impacts on earth resources from the alternatives. Due to the relatively small size of the disturbance, the large size of the LMNRA, and the large amount of protected geologic resources and desert soils, no impairment to soils or geologic resources would occur from the impact resulting from this alternative. For this reason, there would be no impairment of earth resources located within the LMNRA.

ES.3.9 Land Use

ES.3.9.1 No Action Alternative

Under the No Action Alternative, no impacts to land use would occur.

ES.3.9.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

Overall, the potential impacts to land use that may result from the construction and operation of the three action alternatives would be short-term and limited to the immediate construction areas. There would be no conflicts with land use plans, community goals, established uses, existing utilities or public rights-of-way, mining claims or patents, or with access to public facilities or private businesses. The alternatives would not cause a disruption or division of an established community.

Boulder Beach is one of the most heavily visited portions of the LMNRA and supports a wide range of recreational uses. Construction in this area under the Boulder Islands South Alternative would occur during low-use periods, therefore, impacts to land use in the Boulder Beach area would be temporary and insignificant.

Under the Boulder Islands North Alternative, dredging activities would occur in close proximity to the Lake Mead Resort Marina. Access to the Marina may be impacted during construction activities. However, construction would occur during the winter (October through March) when boating use is lower. To minimize the impacts to Marina and Lake users, Notices to Mariners will be published and posted prior to construction activities. Aids to Navigation for Inland Waterways will be implemented, and a minimum-width construction corridor will be used to ensure that at least one-way boat traffic is maintained throughout the construction period.

ES.3.10 Visual Resources

ES.3.10.1 No Action Alternative

No impacts to visual resources would result from the No Action Alternative.

ES.3.10.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

The majority of the EI and ancillary facilities have been classified as Class IV Visual Resource Management (VRM) areas based on the type of user (commuter or work-related) and the dominance of numerous dirt roads throughout the area. Class IV VRM areas are considered the least in value in terms of visual resources, and major modifications to viewscales are acceptable.

The Wetlands Park has previously been designated as a Class III VRM area. The views within the Wetlands Park would be temporarily obstructed during construction activities, but the impact would be minor. No impacts associated with the operation of the pipeline would occur. The proposed chat trail and pedestrian bridge included as part of the Boulder Islands South and Las Vegas Bay alternatives would be consistent with management objectives of a Class III VRM area and are expected to be beneficial to the casual recreational viewer.

Visual resources at the LMNRA beaches have been classified as a Class II VRM, and activities should retain the existing character of the landscape. None of the LCS alternatives would significantly affect or cause impairment to visual resources in the LMNRA.

ES.3.11 Socioeconomics

ES.3.11.1 No Action Alternative

Employment increases as a result of the proposed treatment facilities' expansions would be less than 1 percent of total employment in Clark County during project construction. The treatment plant expansions that would be implemented under the No Action Alternative are included in existing plans for each plant. It is estimated that current, conventional treatment processes would cost approximately \$361 million. Optimization of the three treatment facilities would cost an additional \$29 million. In the future, when it becomes necessary to implement microfiltration/ultrafiltration to meet water-quality standards, the estimated cost of the No Action Alternative would be approximately \$979 million.

ES.3.11.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

The estimated construction cost for the Boulder Islands North Alternative is \$594 million. An additional 8,906 jobs would be generated. The jobs would be in the construction industry to work specifically on the proposed project, and in other industries that would provide services and/or products for the proposed project.

The estimated construction cost for the Boulder Islands South Alternative is \$590 million. An additional 6,299 jobs would be generated. The jobs would be in the construction industry to specifically work on the proposed project, and in other industries that would provide services and/or products for the proposed project.

The estimated construction cost for the Las Vegas Bay Alternative is \$540 million. An additional 5,870 jobs would be generated in Clark County.

ES.3.12 Environmental Justice

No environmental justice populations were found, and no disproportionately affected populations were identified that would be affected by any of the alternatives.

ES.3.13 Transportation and Traffic

ES.3.13.1 No Action Alternative

There would be no adverse impacts to transportation and traffic conditions under the No Action Alternative.

ES.3.13.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

Under the Boulder Islands South Alternative, Approved Road 76 may need to be closed during construction activities. Maintenance access to existing facilities would be allowed, but there may be temporary delays due to road use by heavy equipment. No other road closures are expected for the Boulder Islands North, Boulder Islands South, or Las Vegas Bay alternatives. However, short-term impacts may include periodic restrictions to one lane to allow access for construction vehicles. Traffic on roadways in the vicinity of the project may increase for short periods of time during construction activities. However, the number of vehicles using these roadways would not increase enough to change the level of service. Additional construction-related vehicles in the LMNRA may create short-term inconveniences. However, most of the construction activities within the LMNRA would occur during the winter months when Park visitation is low.

ES.3.14 Paleontological Resources

ES.3.14.1 No Action Alternative

Under the No Action Alternative, no direct or indirect impacts to any potential paleontological resources within the proposed project area would occur.

ES.3.14.2 Boulder Islands North, Boulder Islands South, and Las Vegas Bay Alternatives

The EI and ancillary facilities would be constructed primarily on lands that have been disturbed by previous activities. Paleontological resources that may have previously existed have presumably been destroyed through prior construction activities. In addition, only a small segment of the EI would cross areas of high paleontologic sensitivity.

None of the LCS alternatives are located in an area designated as having high paleontologic sensitivity. Therefore, no impacts to potential paleontological resources would occur from tunneling activities.

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