Southern Nevada Water Authority
Clark, Lincoln,
and White Pine Counties
Groundwater Development Project

DRAFT
Conceptual Plan of Development

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LIST OF ACRONYMS

afy	acre-feet per year
BLM	U.S. Department of Interior, Bureau of Land Management
cfs	cubic feet per second
GWD Project	Clark, Lincoln, and White Pine Counties Groundwater Development Project
kV	kilovolt
LCCRDA	Lincoln County Conservation, Recreation, and Development Act of 2004
LCWD	Lincoln County Water District
MW	megawatts
NDOT	Nevada Department of Transportation
Nevada State Engineer	Nevada Division of Water Resources, Office of the State Engineer
rebar	reinforcing steel bars
ROW	Right(s)-of-Way
SNWA	Southern Nevada Water Authority
SR	State Route
US	United States Highway
WTF	Water Treatment Facility

1.0 PURPOSE OF PROJECT

The Southern Nevada Water Authority (SNWA) currently holds groundwater rights and applications in hydrographic basins in Clark, Lincoln, and White Pine Counties. SNWA has purchased, been permitted, or applied for approximately 134,000 acre-feet per year (afy) in Spring, Snake, Cave, Dry Lake, and Delamar Valleys. SNWA also has cooperative agreements with Lincoln County and the Lincoln County Water District to provide capacity in water conveyance infrastructure in Lincoln County.

SNWA has submitted a right-of-way (ROW) application to the U. S. Bureau of Land Management (BLM) for the Clark, Lincoln, and White Pine Counties Groundwater Development (GWD) Project. The ROW currently requested for the GWD Project includes pipelines, pumping stations, storage facilities, a treatment facility, pressure reducing stations, power lines, and electrical substations. The GWD Project would convey approximately 170,000 afy of water, including approximately 134,000 afy of groundwater developed by SNWA and the remaining capacity provided for Lincoln County.

1.1 PURPOSE AND NEED

SNWA's purpose in applying for ROW for the GWD Project is:

1. To develop and convey water rights that have been purchased by, permitted to or that may be permitted to SNWA in Spring, Snake, Cave, Dry Lake, and Delamar Valleys for use by SNWA's member agencies in Clark County; and
2. To fulfill its contractual obligation to provide capacity for potential future use by the Lincoln County Water District (LCWD), to transport as yet not fully specified water resources to its customers in Lincoln County.

SNWA's need for the GWD Project is due to the current reliance on the Colorado River to meet nearly all of southern Nevada's water resource needs. Colorado River water is subject to drought conditions which may be intensified by climate change and increasing demands of other states. SNWA needs to diversify its water resources to ensure it can continue to meet water supply obligations. The GWD Project will also help to meet projected future water demands of the Las Vegas Valley.

1.2 PROPOSED PROJECT

The GWD Project consists of the construction and operation of groundwater production, conveyance, and treatment facilities, and power conveyance facilities. The regional location of the GWD Project is shown on Figure 1-1.

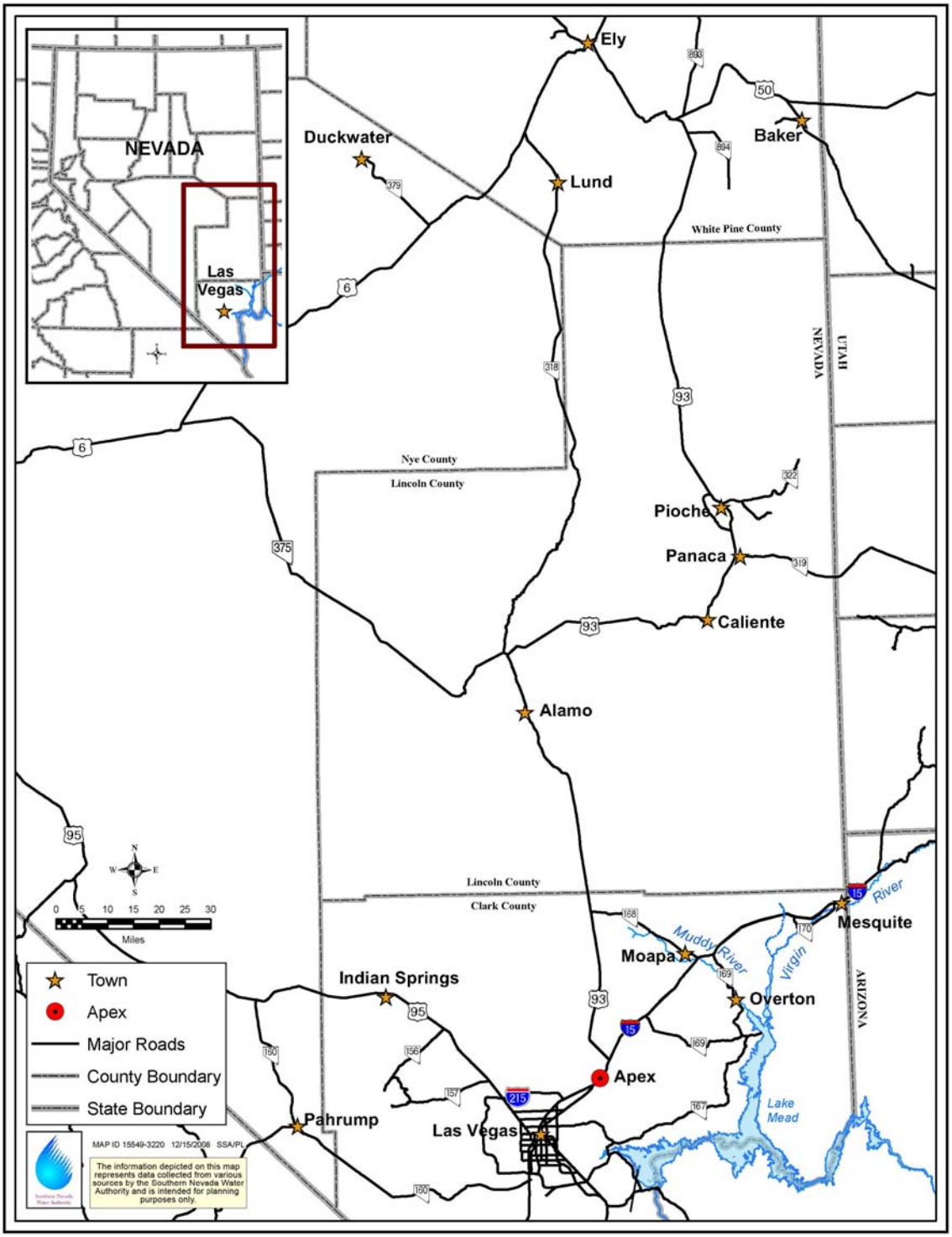


Figure 1-1 Regional Location Map

The SNWA has applied to the BLM for ROW to construct and operate the GWD Project. SNWA has currently requested ROW for the Project's primary water and power conveyance facilities, including:

- Main and Lateral Pipelines – approximately 306 miles of buried water pipelines, between 16 and 84 inches in diameter
- Pumping Stations – 5 pumping station facilities
- Regulating Tanks – 6 regulating tanks, each approximately 3 to 10 million gallons in capacity
- Pressure Reducing Stations – 3 facilities
- Buried Storage Reservoir – a 40 million gallon buried storage reservoir
- Water Treatment Facility (WTF) – up to 150 million gallon per day facility
- Power Facilities – approximately 323 miles of 230 kilovolt (kV), 69 kV, and 25 kV overhead power lines, 2 primary electrical substations (230 to 69 kV), and 5 secondary substations (69 to 25 kV)

These facilities are generally displayed on Figure 1-2, and described in more detail in Chapter 2 of this document. These facilities are located predominantly on public lands managed by the BLM and are primarily within designated utility corridors.

Future facilities will be required to develop permitted groundwater rights and convey them to the primary conveyance facilities. The final locations of the groundwater production wells and associated facilities to convey water into the primary system have not yet been determined. The wells will be located based on several factors, which include but are not limited to geology, hydrology, well interference studies, environmental issues, existing senior water rights, and proximity to main and lateral pipelines. Production well locations are also subject to approval by the Nevada Division of Water Resources, Office of the State Engineer (Nevada State Engineer). Since the specific location of these facilities cannot currently be identified, SNWA has not yet requested ROW for them from the BLM. However, assumptions regarding the number of wells, length of collector pipelines, and other needed facilities have been made by SNWA so that BLM can conduct a programmatic-level environmental impact analysis of construction and operation of future facilities in addition to the site-specific analysis of proposed rights-of-way for primary facilities. SNWA anticipates that future facilities will include:

- Groundwater Production wells – estimated between 110 and 130 wells
- Collector Pipelines – estimated between 110 and 260 miles, 10 to 30 inches in diameter
- Pumping Stations – 2 facilities
- Power Facilities – estimated between 110 and 260 miles of 25kV overhead distribution power lines (along collector pipeline alignments), 2 secondary substations, and hydroturbine energy generation (located at the pressure reducing sites).

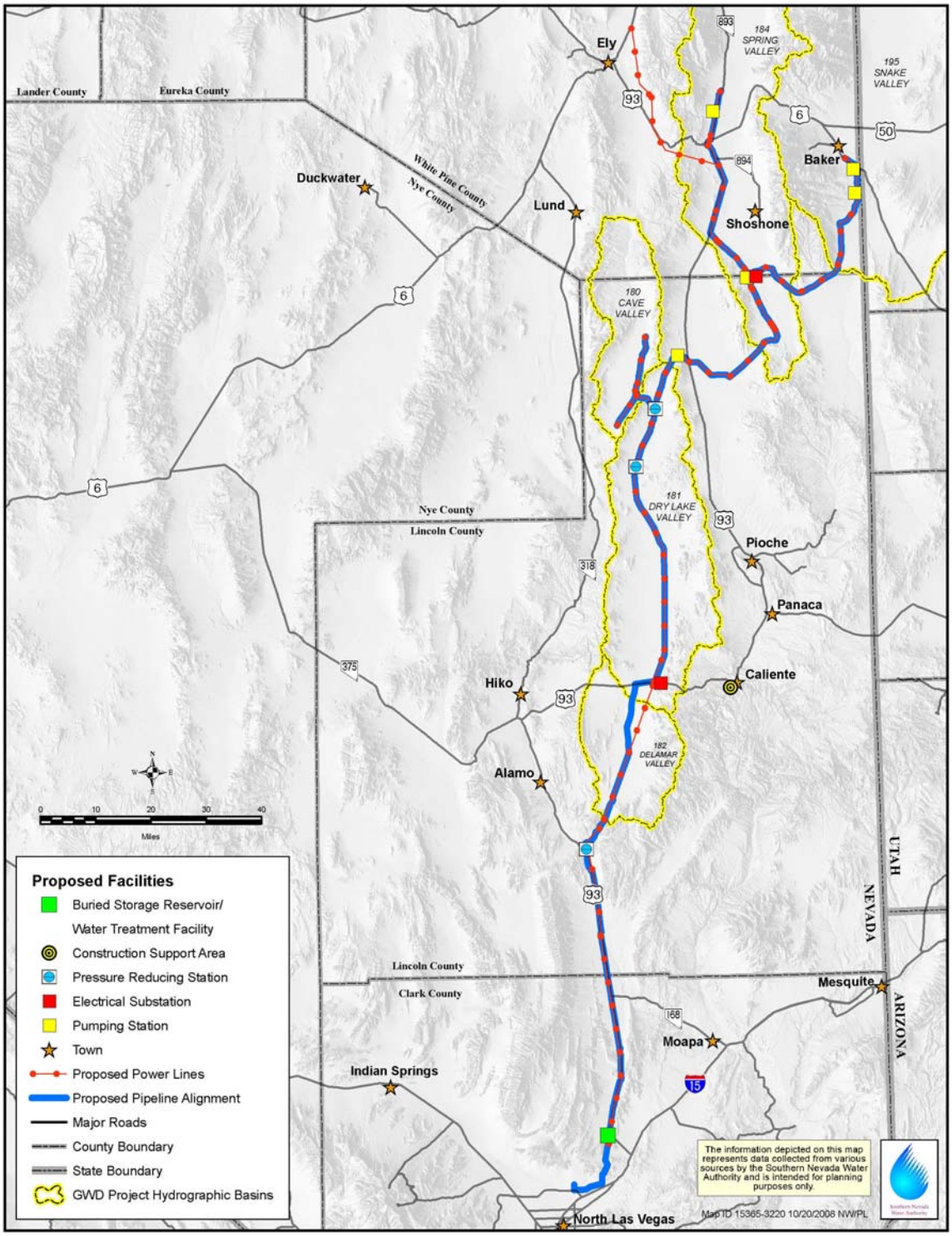


Figure 1-2 Proposed Clark, Lincoln, and White Pine Counties Groundwater Development Project

1.3 WATER RIGHTS

The Nevada State Engineer is responsible for granting water rights in the State of Nevada. The BLM is responsible for land management and protection of federal water-related resources in Nevada, but does not have authority to grant water rights or allocate water resources. Any water that would be developed for conveyance through the GWD Project would have to first be permitted by the Nevada State Engineer.

SNWA water rights and pending water right applications that would be developed and conveyed through the GWD Project are discussed below, as well as reasonably foreseeable water resources that may be conveyed on behalf of Lincoln County.

1.3.1 SNWA Water

SNWA holds water rights and applications for approximately 137,000 afy in Spring, Snake, Cave, Dry Lake, and Delamar Valleys (Table 1-1 and Figure 1-3), which it is planning to develop and convey through the GWD Project. Under the terms of a 2003 agreement between SNWA and Lincoln County, Lincoln County is entitled to 3,000 afy of water rights granted to SNWA in specified basins within Lincoln County (SNWA, 2008). This 3,000 afy of water rights committed to Lincoln County is accounted for and included within the 137,00 afy total identified above.

Approximately 36,000 afy of capacity in the GWD Project is being provided for Lincoln County, which includes the 3,000 afy of SNWA water rights committed to Lincoln County. This document assumes that such 3,000 afy would be conveyed through the GWD Project for use by Lincoln County. The balance of Lincoln County's planned conveyance capacity, approximately 33,000 afy, may come from a variety of sources, as described further in Chapter 1.3.2, below.

A brief summary of the SNWA water rights that would be developed and conveyed by SNWA from each basin is provided below.

Spring Valley: The Nevada State Engineer issued Ruling 5726 on April 16, 2007 permitting SNWA up to 60,000 afy of groundwater, subject to a monitoring and mitigation program and an initial staged development period.

SNWA has purchased private property and water rights in Spring Valley. As part of the GWD Project, SNWA plans to develop approximately 8,000 afy of groundwater rights associated with these properties. These groundwater rights are currently used for agricultural operations in Spring Valley. Approval from the Nevada State Engineer to convert the type of use and allow export from the basin would be required prior to conveyance of these water rights through the GWD Project.

Cave, Dry Lake, and Delamar Valleys: The Nevada State Engineer issued Ruling 5875 on July 9, 2008 permitting SNWA 18,755 afy in these three valleys (4,678 afy in Cave Valley, 11,584 afy in Dry Lake Valley, and 2,493 afy in Delamar Valley). It is assumed that 1,500 afy of SNWA's rights in Dry Lake and 1,500 afy of SNWA's water rights in Delamar Valleys would be transferred to Lincoln County on the basis of the agreement referenced above, and that this water would be conveyed through the GWD Project.

Table 1-1 Groundwater Rights and Applications Planned to be Conveyed through the GWD Project

Hydrographic Basin	Existing Groundwater Rights (afy)	Existing Agricultural Groundwater Rights (afy)	Groundwater Applications (afy)
SNWA			
Spring Valley	60,000	8,000	
Snake Valley			50,679
Cave Valley	4,678		
Dry Lake Valley [a]	10,084		
Delamar Valley [a]	993		
Subtotal	**75,755**	**8,000**	**50,679**
Lincoln County			
Dry Lake Valley [a]	1,500		1,009 [b]
Delamar Valley [a]	1,500		
Lake Valley		11,300	
to be determined		approx. 20,700	
Subtotal	**3,000**	**approx. 33,000**	
TOTAL			**approx. 170,434**

afy: acre-feet per year

[a] These numbers reflect SNWA's commitment to transfer 3,000 afy of water rights in these basins to Lincoln County.

[b] Remaining quantity of unappropriated water available for export, based on Ruling 5875.

Snake Valley: SNWA holds applications for approximately 50,679 afy in Snake Valley. The Nevada State Engineer began administrative hearings on SNWA's applications on July 15, 2008. The Nevada State Engineer has scheduled evidentiary hearings for September 2009.

The Lincoln County Conservation, Recreation, and Development Act of 2004 (LCCRDA; Public Law 108-424) requires that the State of Nevada and State of Utah reach an agreement regarding the division of water resources from shared groundwater basins such as Snake Valley, prior to any transbasin diversions. The States have been meeting since 2006, but have not yet reached agreement. LCCRDA does not preclude the Nevada State Engineer from ruling on applications, nor the construction of facilities before such agreement is finalized.

1.3.2 Lincoln County Water

Dry Lake and Delamar Valleys: As previously discussed, 1,500 afy of SNWA's rights in Dry Lake and 1,500 afy of SNWA's water rights in Delamar Valleys are expected to be transferred to Lincoln County under an existing agreement. This water is expected to be conveyed through the GWD Project for use by Lincoln County.

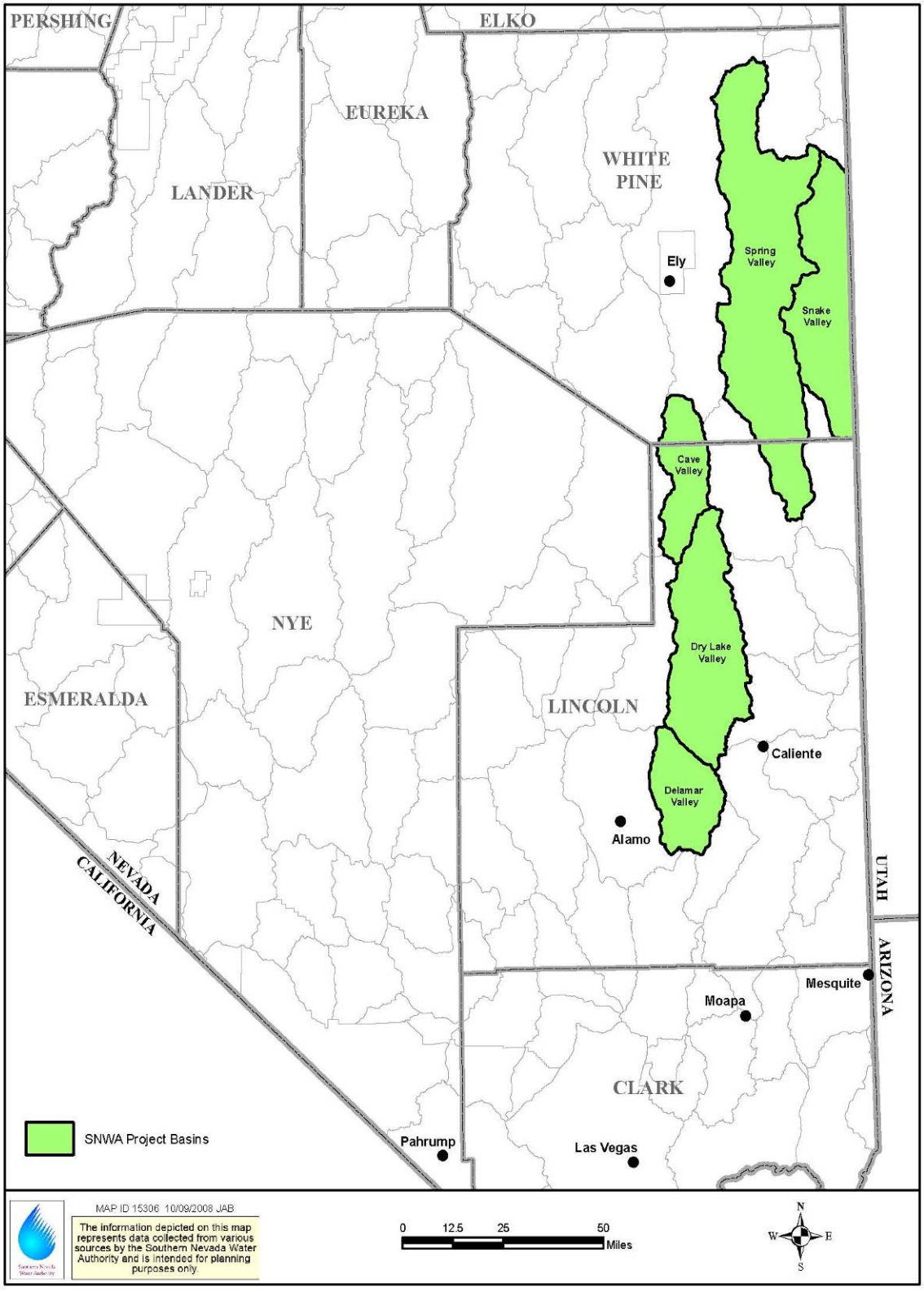


Figure 1-3 Hydrographic Basins of the GWD Project

An additional 1,009 afy may be permitted to Lincoln County in Dry Lake Valley and may be conveyed through the GWD Project. In Ruling 5875, the Nevada State Engineer identified the total quantity of unappropriated water available for export from each of these three basins. SNWA was permitted all of the water available for export from Cave and Delamar Valleys. In Dry Lake Valley, 12,593 afy were identified as available, but only 11,584 afy were permitted to SNWA. Lincoln County holds the next applications in this basin, and it is assumed that the remaining 1,009 afy will be permitted to Lincoln County and conveyed through the GWD Project.

Lake Valley: Tuffy Ranch Properties, LLC holds existing agricultural water rights in Lake Valley. The Nevada State Engineer issued Ruling 5918 on December 3, 2008 allowing export of up to 11,300 afy of existing agricultural water rights for municipal use in Coyote Spring Valley. The Nevada State Engineer determined that this quantity was the consumptively used portion of the existing water right, and there would be no increase in water use with export of the consumptive use portion from the basin.

Other Lincoln County rights and applications: Approximately 20,700 afy of capacity (assuming conveyance of 4,009 afy from Dry Lake and Delamar Valleys and 11,300 afy from Lake Valley) remains available to Lincoln County in the GWD Project for which no water source has been identified. Water sources may include potential transfer of existing agricultural rights or new appropriations in other groundwater basins in the area. Such transfers or new appropriations have not yet been requested, and the specific quantity and source basins cannot be reasonably forecast at this time. Additional federal action associated with ROW across federal lands would be required to develop and/or convey these future water supplies.

1.3.3 Other SNWA Groundwater Applications not Part of GWD Project

SNWA holds other groundwater rights and applications in the region which are not planned for development through the GWD Project. These include water rights in Coyote Spring, Tikaboo, Three Lakes, Railroad, Hidden, and Garnet Valleys, which are more fully described in SNWA's Resource Plan (2008).

In Coyote Spring Valley, SNWA holds pending applications for approximately 27,500 afy. In March 2002, the Nevada State Engineer issued Order 1169, requiring additional study on the effects of pumping existing permitted water rights in Coyote Spring Valley. SNWA is currently constructing facilities to allow for the required pumping test, which is expected to be completed in 2011. Subsequent to submitting information obtained from the pumping test, the Nevada State Engineer will determine if he has sufficient information to proceed with ruling on those applications. Since the Nevada State Engineer determined that he did not have sufficient information to make a determination on these water right applications based on currently available information, and it cannot be known whether results of the pumping test would be sufficient for the Nevada State Engineer to permit these applications, the potential future use of groundwater pursuant to such applications is not considered reasonably foreseeable. Additionally, under the terms of a 2002 agreement if less than the full quantity of the applications were granted, Moapa Valley Water District would receive the first 3,750 afy with any remainder divided on a percentage basis. Depending upon the quantity that might be available to SNWA, SNWA may seek to transfer that water through its other Coyote Spring Valley facilities.

Thus, SNWA's pending Coyote Spring Valley applications are not identified for conveyance as part of the GWD Project.

In Tikaboo (North and South) and Three Lakes (North and South) Valleys, SNWA holds approximately 10,605 afy of water rights, permitted under Ruling 5465 and 5533. SNWA is working on options for the development of these groundwater permits through a separate project with delivery into the northwestern Las Vegas Valley (Three Lakes Valley Water Development Project). There are no plans to convey these water rights through the GWD Project.

SNWA holds groundwater applications for approximately 110,000 afy in Railroad Valley (North and South), which were originally filed in 1989. SNWA has not requested hearing on these applications, and has not identified a project for development of these applications. Railroad Valley is located three basins west from the main pipeline of the GWD Project, and there are no plans for conveyance of this water through the GWD Project.

In Hidden and Garnet Valleys, a combined total of 2,200 afy of water rights were permitted to the Las Vegas Valley Water District. The majority of these rights have been leased to dry-cooled power plants located in Garnet Valley. None of these rights are planned for conveyance through the GWD Project.

1.4 GOVERNMENT AGENCIES INVOLVED

Federal and state permits potentially required to construct and operate the GWD Project, in addition to the ROW already requested from the BLM, are listed in Table 1-2.

Table 1-2 Potentially Required Federal and State Permits and Reviews

Agency	Permit/Approval
Federal	
Federal Highway Administration	Permit for construction, operation, and abandonment of transmission lines across or within highway rights-of-way Permit to cross Federal Aid highway
U.S. Army Corps of Engineers	Section 404 permit
U.S. Bureau of Land Management	Temporary and permanent rights-of-way grants Conformity with Las Vegas and Ely Field Offices Resource Management Plans
U.S. Fish and Wildlife Service	Section 7 Consultation and Biological Opinion
State	
Nevada Department of Cultural Affairs, State Historic Preservation Office	Section 106 review and concurrence
Nevada Division of Environmental Protection, Bureau of Water Pollution Control	401 Water Quality Certification General storm water permit for construction (National Pollutant Discharge Elimination System permit) Temporary discharge permit Temporary groundwater discharge permit Working in waterways permit Underground injection control permit
Nevada Division of Environmental Protection, Bureau of Safe Drinking Water	Letter of approval to construct
Nevada Department of Transportation	Encroachment into State Highway rights-of-way Rights-of-way occupancy permits
Nevada Department of Wildlife	Handling permit for desert tortoise, Gila monster, and other sensitive species
Nevada Division of Forestry	Collection permit for state-listed plants
Nevada Division of Water Resources	Water right permits Well driller's permit Dam safety permit Recharge, storage, and recovery of underground water permit
Public Utility Commission of Nevada	Permit to construct power facilities

2.0 PROPOSED FACILITIES

The proposed GWD Project primary water and power conveyance facilities, including pipelines, power lines, and ancillary facilities, are described below and generally displayed on Figures 2-1 through 2-5. Specific facility locations are displayed on the project maps, attached as Map Volumes I and II which display the facilities and ROW on topographic and aerial photo backgrounds, respectively.

2.1 PIPELINES

The final sizes of the GWD Project main and lateral pipelines will be determined during facility design based on hydraulics, potential operational strategies, the need for operational flexibility, and the final locations of groundwater production well fields. However, final pipe sizes are not anticipated to require additional ROW. The main pipeline may be between 66 and 84 inches in diameter, extending between southern Spring Valley and the Las Vegas Valley. Lateral pipelines may be between 16 and 54 inches in diameter and would extend into northern Spring, Snake, and Cave Valleys. Figure 2-6 displays the anticipated general areas of different pipeline diameters. Table Table 2-1 lists the specific pipeline distances by valley and anticipated pipe diameter. Detailed descriptions of the pipeline routes are provided below.

Table 2-1 GWD Project Pipelines

Pipeline	Valley	Pipe Diameter (inches in diameter)	Pipe Length* (miles)
Main Pipeline	Spring	66 - 72	17
	Lake	66 - 72	21
	Dry Lake	66 - 84	66
	Delamar	72 - 84	23
	Pahranagat	52 - 72	7
	Coyote Spring	52 - 84	41
	Hidden	72 - 84	12
	Garnet	72 - 84	7
	Las Vegas	72 - 78	9
Spring Lateral	Spring	42 - 54	38
Snake Lateral	Snake	42 - 54	24
	Hamlin	42 - 54	10
	Spring	42 - 54	9
Cave Lateral	Cave	16 - 30	19
	Dry Lake	16 - 30	3
		TOTAL	**306**

* Pipe lengths are rounded to the nearest mile.

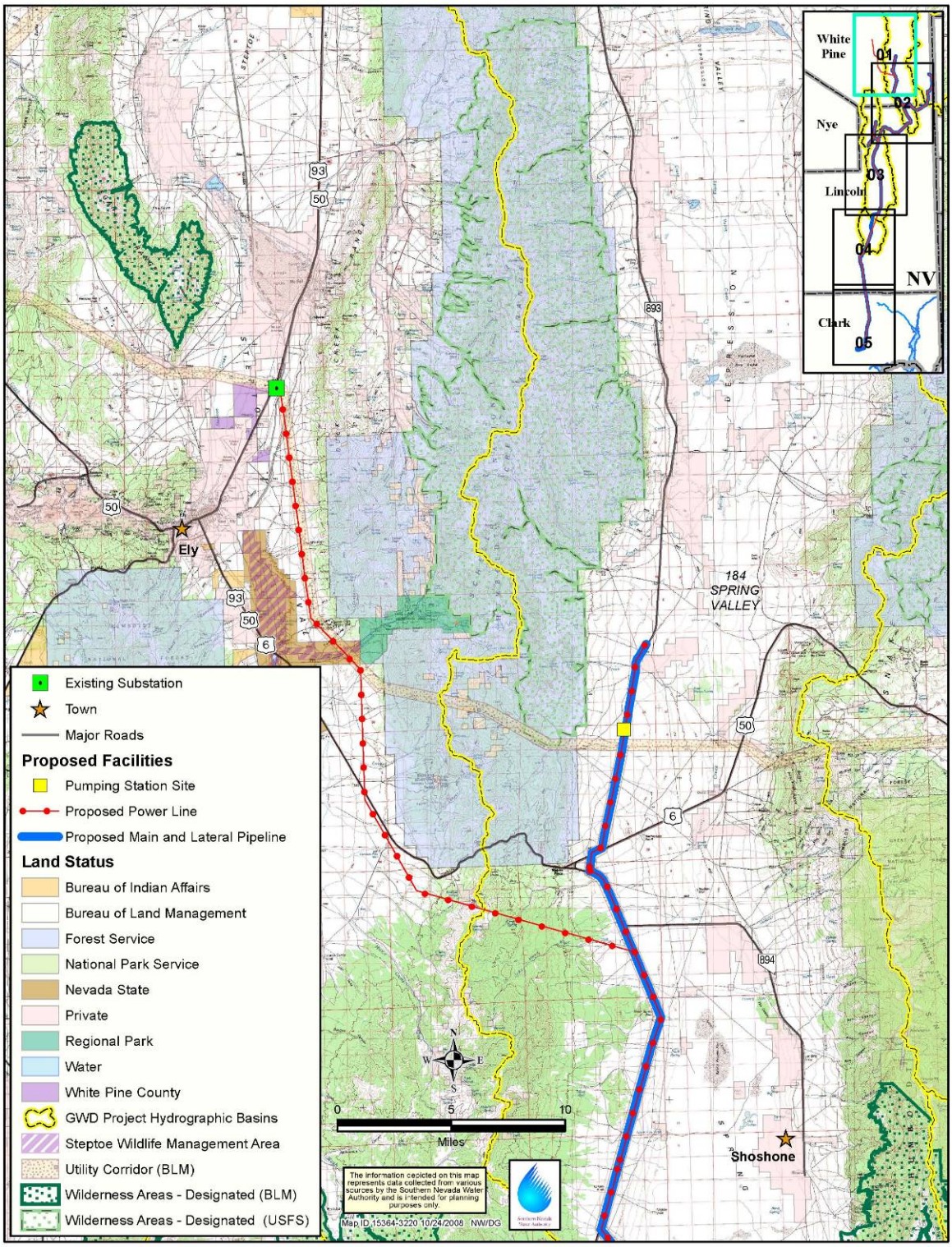


Figure 2-1 GWD Facilities – Steptoe, Spring, and Snake Valleys

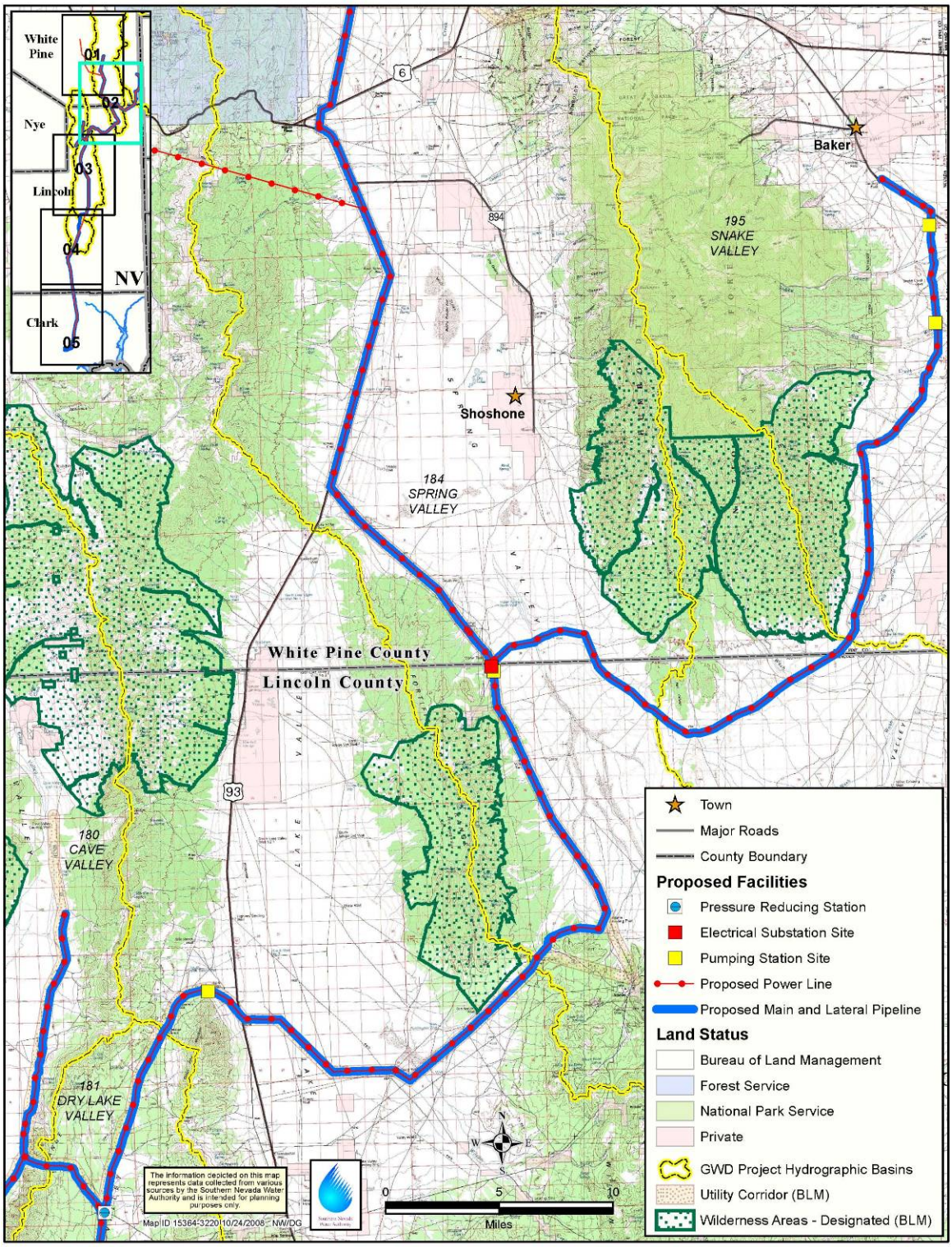


Figure 2-2 GWD Facilities – Spring, Snake, Hamlin, Lake, Cave, and Dry Lake Valleys

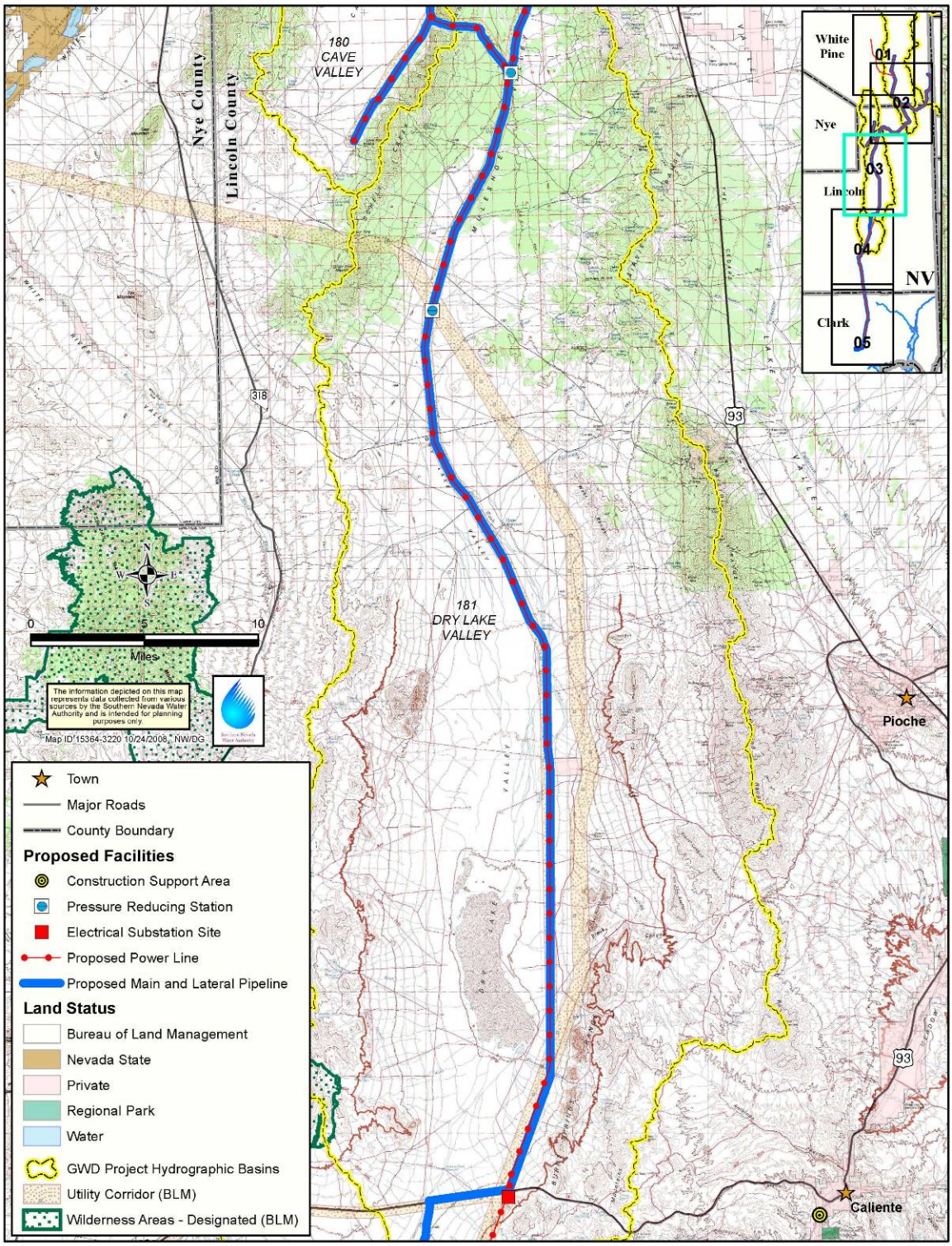


Figure 2-3 GWD Facilities – Cave and Dry Lake Valleys

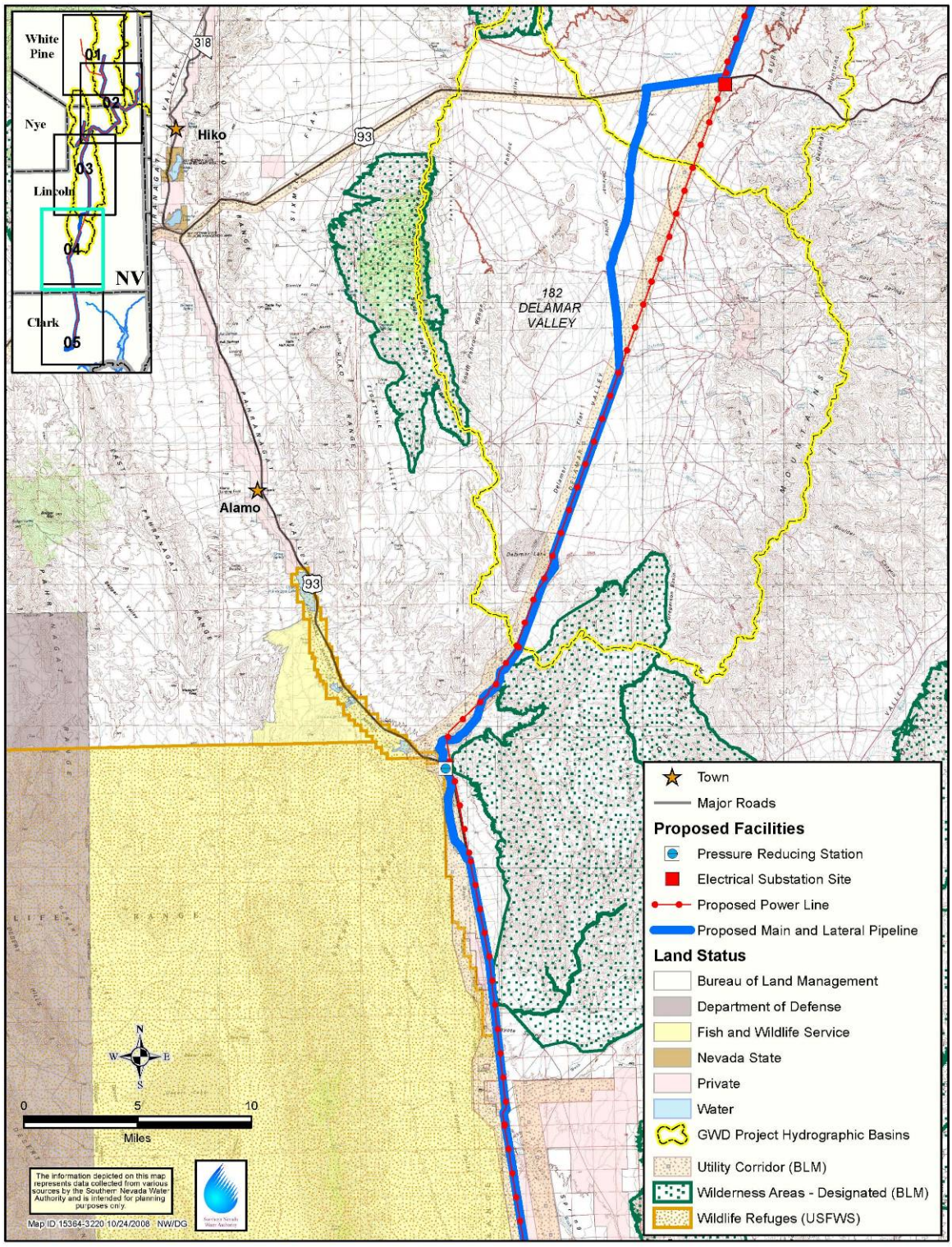


Figure 2-4 GWD Facilities – Dry Lake, Delamar, and Coyote Spring Valleys

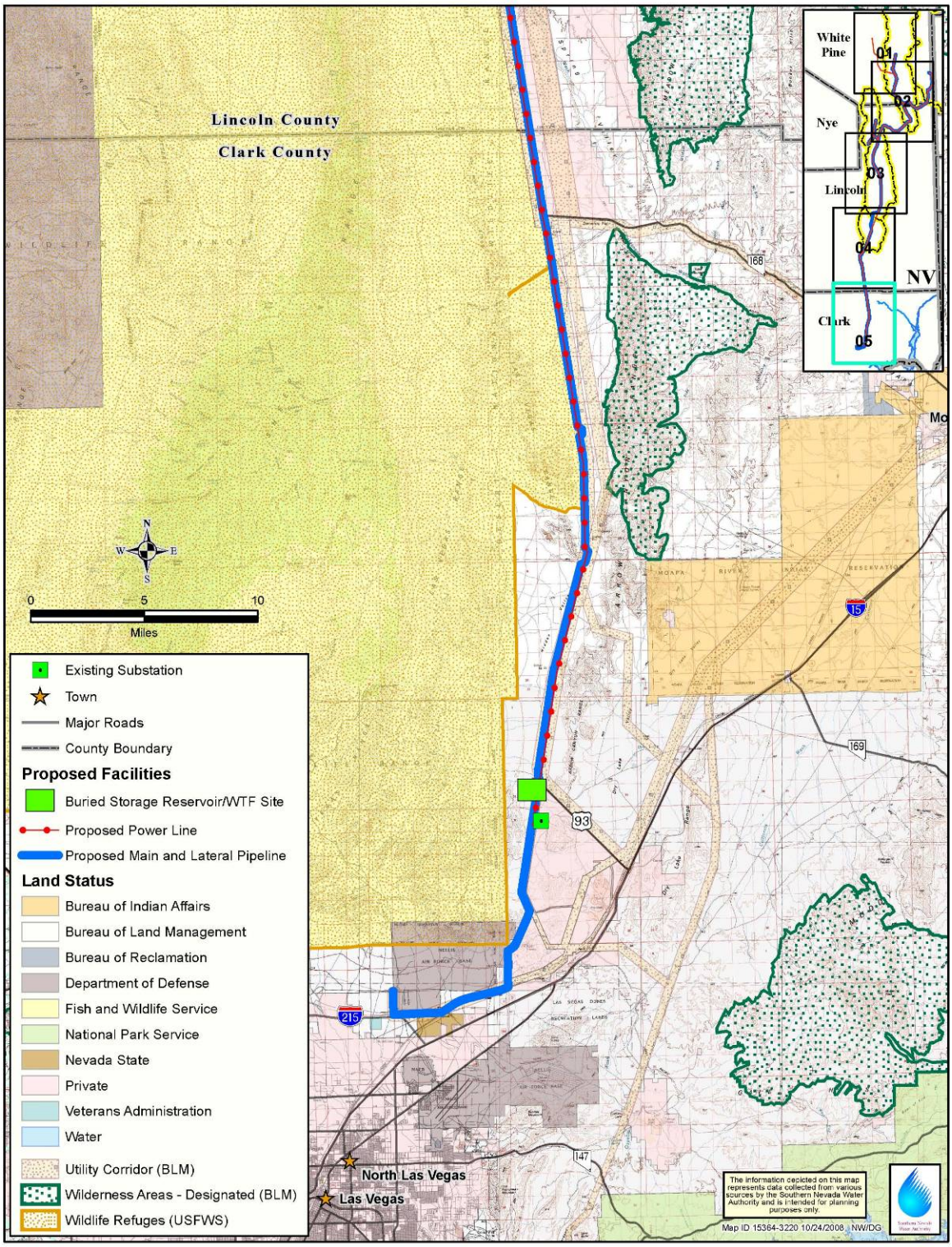


Figure 2-5 GWD Facilities – Coyote Spring, Hidden, Garnet, and Las Vegas Valleys

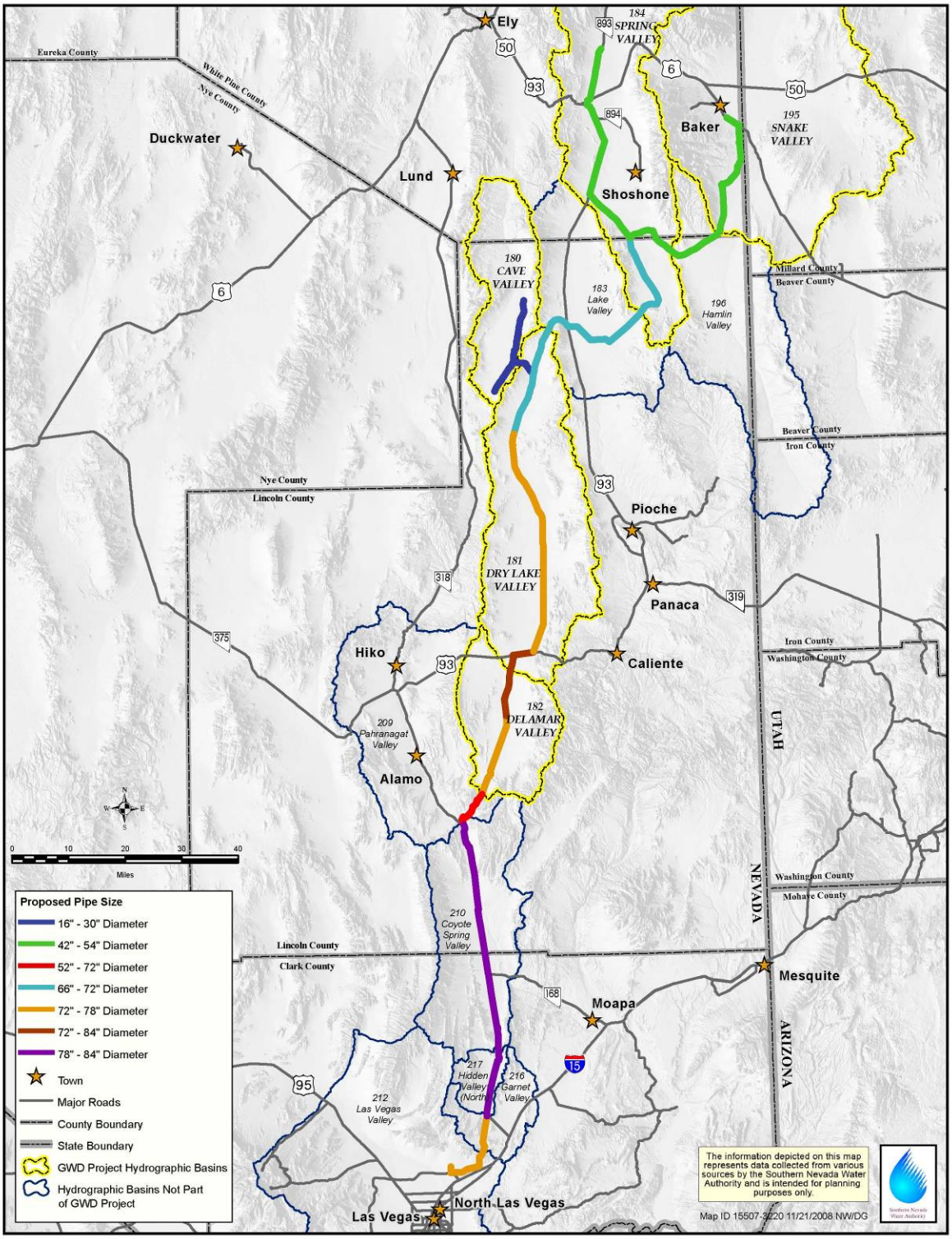


Figure 2-6 GWD Project Pipeline Diameters

A ground surface profile of the GWD Project is displayed in Figure 2-7. The estimated maximum elevation is approximately 6,500 feet at Muleshoe Summit in northern Dry Lake Valley. The minimum elevation is approximately 2,100 feet near the pipeline terminus in the Las Vegas Valley.

All pipelines would be completely buried, with the exception of structures for air/vacuum valves, and isolation and drain valves, which may be partially buried or have vents extending above ground (Chapter 2.1.5). No permanent security fencing or other access restrictions on the permanent pipeline ROW are proposed. Fencing around temporary and permanent facilities is discussed under each facility type, below.

2.1.1 Main Pipeline

The main pipeline would begin in southern Spring Valley, on the east side of the Fortification Range, just south of the Lincoln and White Pine County border (Sheet 1). This is also the location of the Spring Valley South Pumping Station (Chapter 2.3). The pipeline is estimated to be up to 72 inches in diameter. It would extend south towards the town of Atlanta, following an existing unpaved road (Indian Springs Road). Prior to reaching Atlanta, the alignment turns to the west (Sheet 5). It continues to follow an existing road and then crosses Horse Corral Pass into Lake Valley (Sheet 5).

In Lake Valley, the pipeline would follow existing dirt roads to the southwest, around the southern end of the Fortification Range, and then turn westward along existing roads across the valley floor. The main pipeline would cross U.S. Highway (US) 93 in the vicinity of Dutch John Well (Sheet 8), enter Muleshoe Pass, and turn south towards Dry Lake Valley (Sheets 8-10).

The main pipeline route extends south along existing roads through the center of Dry Lake Valley. With the addition of water in northern Dry Lake Valley, the main pipeline may increase to up to 78 inches in diameter. It would pass through the central part of the valley and around the eastern side of the dry lakebed until reaching US 93 (Sheet 25). By the southern portion of Dry Lake Valley, the pipeline may increase to up to 84 inches in diameter. The pipeline would extend west along the northern side of US 93 for approximately 3 miles before turning south along an existing dirt road near the old Delamar Landing Field. The main pipeline route continues south along the existing road before entering Delamar Valley (Sheets 25-26).

The main pipeline would extend south along existing dirt roads through the central part of Delamar Valley. It would follow the eastern side of the dry lakebed before entering Pahranagat Canyon in the southern end of Pahranagat Valley (Sheets 26-32).

The main pipeline would cross through the southern end of Pahranagat Valley, following an existing road and fiber optic cable alignment, before reaching US 93 and entering northern Coyote Spring Valley (Sheets 32-33).

The main pipeline would follow US 93 through Coyote Spring Valley where it is estimated to be 78 to 84 inches in diameter (Sheets 33-44). The alignment is on the west side of the highway through most of Coyote Spring Valley, but crosses to the east side near the northern end of the valley (Sheets 34-37). There are two rock outcrops near the Coyote Spring/Hidden Valley border that will be avoided by crossing to the east side of

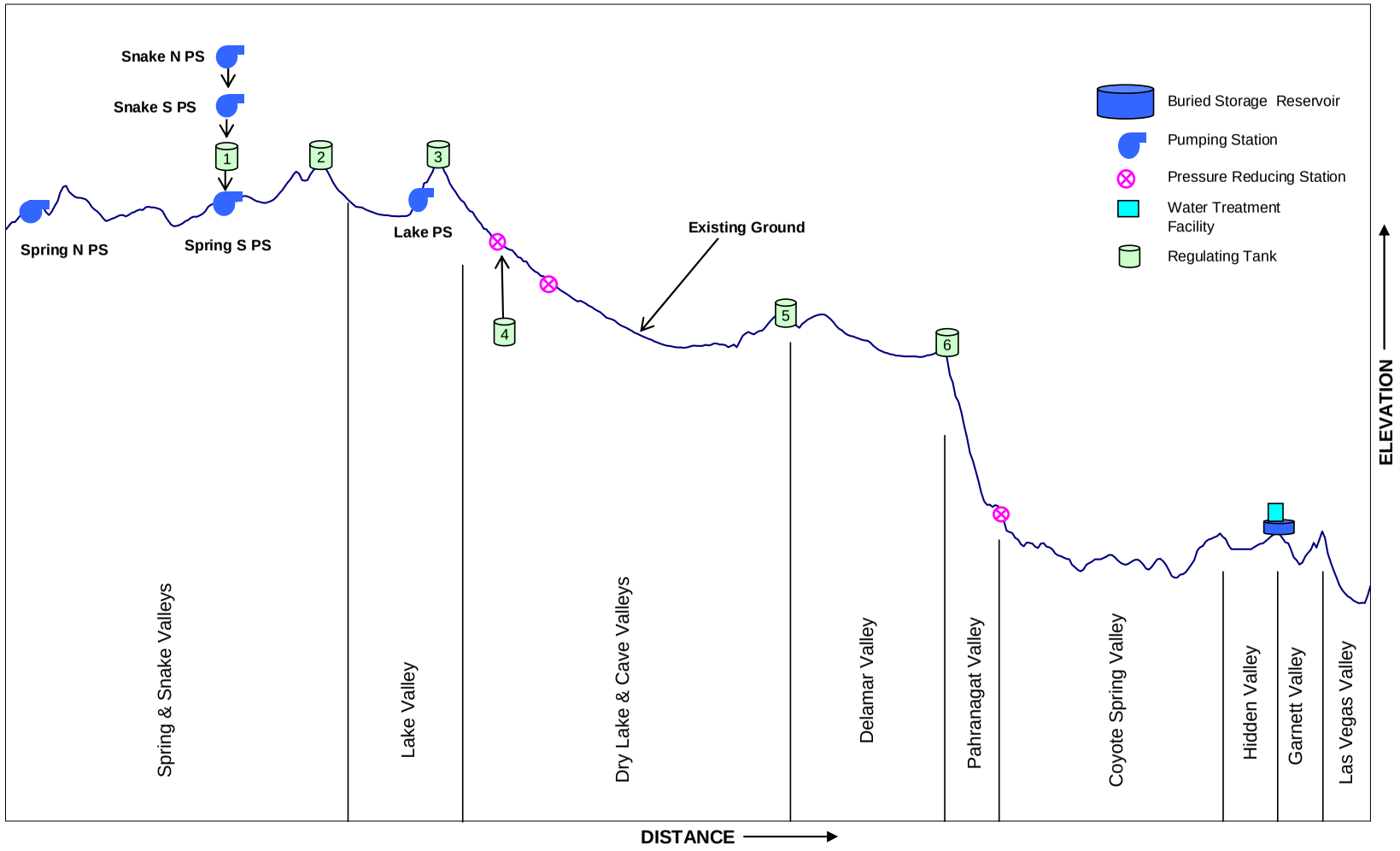


Figure 2-7 Preliminary GWD Project Ground Surface Profile

US 93 (Sheets 43-44). The pipeline would continue to follow US 93 southward into Hidden Valley (Sheet 45).

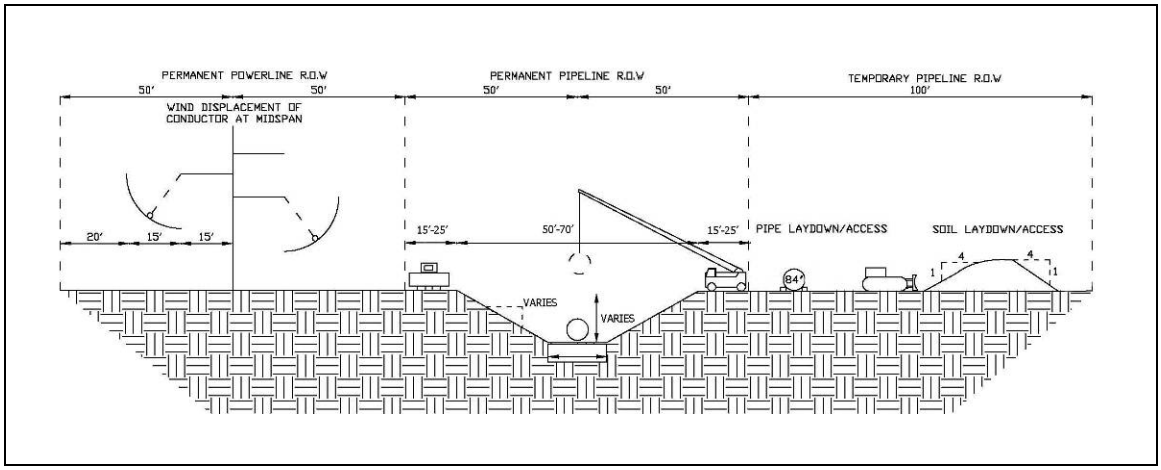
The pipeline would follow US 93 through Hidden Valley and enter Garnet Valley where US 93 turns east to Interstate 15 (Sheets 45-47). The pipeline would connect into the Water Treatment Facility and Buried Storage Reservoir approximately 0.5 mile south of US 93 (Chapter 2.5, Sheet 47). The pipeline would continue south from this location within an existing utility corridor to enter the Las Vegas Valley (Sheets 47-49). The alignment extends southerly in the vicinity of the existing Kern River gas line and NV Energy, Inc. power line alignments. In the Apex area, the pipeline would be constructed in an underground tunnel east of the Nellis Air Force Base Small Arms Range, on BLM and private land. Trenching of the pipeline would resume when it leaves the tunnel until it terminates into an existing SNWA water line on Lamb Boulevard and Grand Teton Drive (Sheets 49-50).

Permanent ROW of up to 100 feet in width and temporary construction ROW of an additional 100 feet are required for the main pipeline. In areas of level terrain and stable soil conditions, the amount of disturbance within the temporary ROW may be reduced, however any potential reductions would not be known until after design has been completed. Figure 2-8 shows a preliminary ROW cross section, which is representative of contiguous pipeline and power line ROW for most of the GWD Project, including typical maximum measurements. The 100-foot permanent ROW for the main pipeline accommodates a 60 to 70 foot wide trench, with a side slope from 0.75:1 to 2:1 (i.e., a slope that rises 1 foot vertically for every 0.75 to 2 feet horizontally) and a depth of at least 6 feet from the ground surface to the top of the pipe. This cross section may vary depending on soil conditions, surface topography, and pipe diameter. The remaining permanent and temporary ROW are used for excavated material storage, pipe storage before installation, movement of heavy equipment, and safe personnel work space.

The permanent ROW requested for the main pipeline totals approximately 2,455 acres. The main pipeline route crosses lands managed by the BLM (2,399 acres) and the State of Nevada (13 acres), and private land (43 acres). In Coyote Spring Valley and the vicinity of Apex, approximately 8 acres of temporary construction ROW are associated with the nursery areas and pipeline staging areas. Therefore, the area requested for temporary ROW totals approximately 2,463 acres, 8 acres greater than the permanent ROW. The main pipeline temporary ROW crosses lands managed by the BLM (2,416 acres) and the State of Nevada (13 acres), and private land (34 acres). A detailed list of ROW requirements is shown in Table 3-1.

2.1.2 Lateral Pipelines

Three primary lateral pipelines would branch off the main pipeline and extend into northern Spring Valley, Snake Valley, and Cave Valley. They are described in more detail below. Permanent and temporary ROW widths for the laterals are 100 feet each. The ROW cross section is the same as described for the main pipeline and shown on Figure 2-8. Because the pipe diameter of the lateral is not substantially smaller than the diameter of the main pipeline, and the work space needs for equipment, soil stockpiles, and material remain fairly constant, the width of temporary ROW required for construction of a lateral remains at 100 feet. As described for the main pipeline, the amount of disturbance within the temporary ROW may be reduced in areas of level



NESC – National Electrical Safety Code

Figure 2-8 Preliminary Pipeline and Power Line ROW Cross Section

terrain and stable soil conditions, however any potential reductions would not be known until after design has been completed.

Spring Valley Lateral

The Spring Valley Lateral would extend north from the Spring Valley South Pumping Station into central Spring Valley. This lateral may be up to 54 inches in diameter. From the Spring Valley South Pumping Station (Sheet 1), the lateral would extend northward to US 93 on the north side of an existing dirt road (Sheet 51). The lateral would continue north on the east side of US 93 to the junction of US 93, 6, and 50 (Sheets 52-56). At this location, the Spring Valley Lateral would cross to the north side of US 6 and 50, then turn northward along the west side of State Route (SR) 893. The lateral would continue northward on the west side of SR 893, terminating approximately 1 mile north of Bastian Creek (Sheets 56-59).

The Spring Valley Lateral would be located on land managed by the BLM. The permanent ROW needed is approximately 38 miles long and 100 feet wide, or 462 acres. The temporary ROW would be the same.

Snake Valley Lateral

The Snake Valley Lateral may be up to 54 inches in diameter, and would extend into Snake Valley from the Spring Valley South Pumping Station (Sheet 1). The lateral would extend east from the Spring Valley South Pumping Station on existing dirt roads around the southern end of the Snake Range (Sheets 60-61). The lateral pipeline would continue to follow existing dirt roads past "The Troughs," turn northeast and pass Big Spring Wash, where it would enter Snake Valley (Sheets 62-63). It would head north on existing dirt roads through the Nevada side of Snake Valley, passing several private properties. Near Chokecherry Creek, the lateral would turn northeast on existing dirt roads and extend cross-country (Sheets 65-66). The alignment would remain in Nevada, and cross the lower portions of Big Wash and Snake Creek before reaching Highway 487 (Sheets 68-69). Although this ROW would be on existing roads most of the way, there are stretches totaling approximately 3.5 miles near the terminus at Highway 487 where

there are no existing roads. The lateral would follow the highway before terminating south of the town of Baker (Sheet 69).

The Snake Valley lateral would be on land managed by the BLM. The permanent ROW needed is approximately 43 miles long and 100 feet wide, or 519 acres. The temporary ROW would be the same.

Cave Valley Lateral

The Cave Valley Lateral may be up to 30 inches in diameter, and would connect Cave Valley into the main pipeline. The lateral would have both north and south segments located on the existing Cave Valley Road, on the eastern side of Cave Valley. The Cave Valley Lateral would begin at the main line in northern Dry Lake Valley at Sidehill Pass (Sheet 11), and extend over Sidehill Pass to Cave Valley Road on the valley floor, a distance of approximately 5 miles (Sheet 71). From the intersection of Sidehill Pass Road and Cave Valley Road, the north segment of the lateral would extend approximately 11 miles on Cave Valley Road, and terminate approximately 5 miles south of Patterson Pass Road (Sheets 71-74). The south segment would extend approximately 7 miles to the vicinity of the Silver King Mine (Sheets 70-71).

The Cave Valley Lateral would be located on land managed by the BLM. The permanent ROW requested is approximately 22 miles long and 100 feet wide, or 272 acres. The temporary ROW would be the same.

2.1.3 Temporary Construction Areas

Pipeline Staging Areas

Temporary construction staging areas are required for pipeline construction. These staging areas would be used for equipment and materials storage, construction office trailers, fuel storage, plant nurseries, equipment maintenance, and temporary stockpiling and handling of excavated material. Not every staging area would include all of these uses. Temporary security fencing may be used to enclose staging areas during project construction; this fencing would be removed at the completion of construction activities.

Staging areas are planned to be placed approximately 3 miles apart immediately adjacent to the pipeline ROW. In total, ninety-seven 3-acre staging areas are proposed next to the main and lateral pipelines. The locations of the staging areas are displayed in Map Volumes I and II. All of the ROW for the staging areas would be temporary, which total 291 acres.

Caliente Construction Support Area

A potential site for construction support has been identified on private land in the Caliente area (Sheet 83). This site may be used during construction for pipe fabrication, pipe and equipment storage, temporary construction management offices, and other construction support activities. The private lands encompass approximately 121 acres, about half of which may be used for pipe storage. A drainage along the northeast portion of the site and the floodplain of Meadow Valley Wash near the southeast border would not be disturbed by the temporary construction use.

Pipe fabrication for some or all of the pipe required for construction of the project may be conducted at the site. Pipe may also be fabricated at one or more existing manufacturing

plants in the western U.S. and delivered to the project area by rail and/or truck. If manufactured on-site, steel coils would be delivered to the Caliente site from an existing railroad line. Processes that would occur on-site include electrical welding, cleaning, grinding, hydrostatic testing of the cylinders, and lining and coating. Lining and coating processes have yet to be determined, but materials may consist of either cement mortar or polyurethane. The processes will all comply with applicable environmental standards. Required resources include electrical feeds for the welding processes and typical building heating and cooling systems. Water may also be required for curing and maintenance of pipe linings, depending on the type of lining/coating selected.

Temporary Nursery Sites

Temporary plant nursery sites are required for storing cacti, yuccas, and other plants that would be salvaged within the ROW for subsequent use in restoration activities. While some of the pipeline staging areas may also be used for plant storage, an additional 19 nursery sites have been sited along the pipeline ROW. The nurseries would occupy approximately 249 acres of temporary ROW. The size and location of the individual nursery sites vary depending on the density of vegetation anticipated for salvage in adjacent ROW. Each nursery site would be secured from theft or vandalism by installing temporary security fencing around the entire perimeter with gates for ingress and egress. The nursery sites in the Mojave Desert would also have tortoise exclusion fencing installed onto the security fencing.

Temporary Construction Camps

Temporary construction worker camps may be needed, depending upon the availability of lodging and support services available in nearby communities. The size, number, location, and amenities required can not be determined until facilities have been designed and a detailed construction schedule determined. SNWA would coordinate with local communities in advance of construction, to encourage local development of necessary services.

If temporary construction camps are still determined to be needed, it is anticipated that they would be located on private lands in and near communities in the vicinity of the project, such as Alamo, Caliente, Pioche, Ely, and Baker. No federal ROWs are anticipated. Construction personnel would be transported daily from the camps to the construction sites by vans or buses to minimize traffic.

2.1.4 Borrow Pits

Soil materials used for bedding and backfilling of the pipelines must meet specified engineering standards. Preliminary geotechnical borings were conducted along the main pipeline alignment in 2006, and indicated that existing soils in some areas may be unsuitable for bedding and backfill. Therefore, imported soil material is anticipated to be required. Some of the needed material could be supplied from surplus trench excavation. However, it is anticipated that borrow pits would be required to supply backfill for pipeline construction in some areas.

A total of eight sites potentially suitable for borrow pits have been identified:

- Borrow Pit 1 in northern Spring Valley, where the Spring Lateral pipeline crosses US 6 and 50 (Sheet 56)

- Borrow Pit 2 in Snake Valley, near Big Spring Wash (Sheet 63)
- Borrow Pits 3 and 4 in Lake Valley, where the main pipeline crosses US 93 (Sheet 8)
- Borrow Pits 5 and 6 in southern Cave Valley, approximately 3 miles south of Sidehill Pass (Sheet 71)
- Borrow Pits 7 and 8 in Dry Lake Valley, approximately 20 miles north of US 93 in the vicinity of the Fissures (Sheet 20)

Each borrow pit site is approximately 7 acres in size. Approximately half of the space would be used for the borrow pit, and the other half for processing equipment, stockpiles for processed material, and transport equipment. Each borrow pit may be excavated up to a depth of approximately 15 feet. Approximately 18 million cubic feet of borrow material is anticipated to be removed from all eight pits combined if they were excavated to maximum proposed capacity. The borrow pits would be re-filled with excess soils from the excavated pipe trenches that are unsuitable for pipeline backfill. It is not anticipated that additional soil disposal sites would be needed.

All of the borrow pits would be on land managed by the BLM. Each borrow pit site is approximately 552 feet long and 552 feet wide, or 7 acres. The temporary ROW requested for all eight borrow pits is approximately 56 acre

2.1.5 Pipeline Valves

Air release, air/vacuum, drain, and isolation valves would be installed along the pipeline for system operation. The locations of these valves are dependant upon elevation, and the final sites would be determined during pipeline design after detailed topographic surveys have been completed.

Air release valves are used to release air within the pipeline, and would be located at or near all high points, grade breaks on steep slopes, and long downward sloping pipe segments. Air/vacuum valves both discharge air and allow air to enter the pipeline, and would be located generally at significant high points and near isolation valves. The air vent connects directly to the top of the water pipeline through check valves so air can pass aboveground. Air release and air vacuum valves are housed in either below-ground or partially buried structures, with a 12- to 24-inch gooseneck pipe extending approximately 2 to 3 feet above ground level. Locations would be determined during design, but several hundred air release and air/vacuum valves are anticipated along the main and lateral pipelines.

Drain valves would be located at the lowest pipeline elevations in any pipe segment. Drain valves are used if necessary to drain the pipeline. This may be done during the hydrostatic testing of the pipeline conducted at the completion of construction, and if needed to allow emergency repairs. Drain valve piping is connected to the bottom of the pipeline at a low point and extends to a discharge location which is generally a dry wash channel. The water is passed through an energy dissipater if required before being discharged, and the wash channel is typically lined with rip rap at and immediately below the discharge location to avoid the potential for erosion. A detailed hydrologic analysis would be conducted during facility design for each discharge point to provide sufficient erosion control and prevent scouring, however, it is currently anticipated that discharge

flow rates and volumes would not be allowed to exceed the two to five year storm event for the individual drainages. Although locations cannot yet be determined, drain valves may be placed approximately 1 to 10 miles apart.

Isolation valves are belowground or partially buried appurtenances that are remotely monitored and controlled. Rapid closing of valves, even in an emergency, can result in excessive and dangerous pressures within the pipeline. The closing time for each valve would be identified during project design based upon a detailed hydraulic analysis, but is estimated to be approximately 15-25 minutes. Isolation valves are built in-line with the water pipeline and stop the flow of water through the pipeline when in the closed position. Isolation valves require an air/vacuum valve that equalizes the pressure inside the pipeline and avoids pipe collapse if the pipe is drained. They would also be constructed in conjunction with a drain valve in order to drain the pipeline for maintenance. Although locations cannot be determined until the pipeline design is complete, the isolation valves would be spaced to minimize water loss in case of emergency breaks. For the purposes of analysis, it can be assumed that valves would be located from 3 to 15 miles apart along the pipelines.

Valves are typically housed inside an underground, square or rectangular vault that is large enough for a person to access. The vault is built surrounding the water pipeline. The top of the vault contains a large, removable access hatch and one or more, smaller access ways large enough to accommodate a person. The vault vent extends a few feet aboveground.

All valves are located within the permanent ROW requested for the pipelines, and additional permanent or temporary ROW is not needed.

2.2 PRESSURE REDUCING STATIONS

Three pressure reducing stations are needed along the pipeline alignment to maintain internal pipeline pressures at manageable levels. Two are located in Dry Lake Valley (Sheets 11 and 14), and the other in northern Coyote Spring Valley (Sheet 33). These are also shown on the project ground surface profile shown on Figure 2-7. The locations for these facilities were determined based on anticipated maximum water pressure and pipe pressure rating.

The pressure reducing stations are needed on the main pipeline where water pressure exceeds the pipe pressure rating. These facilities would maintain water pressure within the limits for which the pipelines and facilities are designed. This would avoid damage to the pipelines and appurtenant facilities, and potential pipeline rupture caused by water pressure greater than the design limit.

The pressure reducing facilities would be located in partially buried vaults. The facilities at each site include isolation valves, pressure reducing valves, and an overflow basin. Additionally, because of the type of valves (sleeve valves) required to dissipate the high pressures, downstream storage tanks are also required for each site. These tanks provide a discharge point for the valves, and are also part of the overall system hydraulics providing regulation for valve closing/opening and surge protection. The Coyote Spring Valley site would also contain a secondary substation, a maintenance building, and three water storage tanks (Figure 2-9).

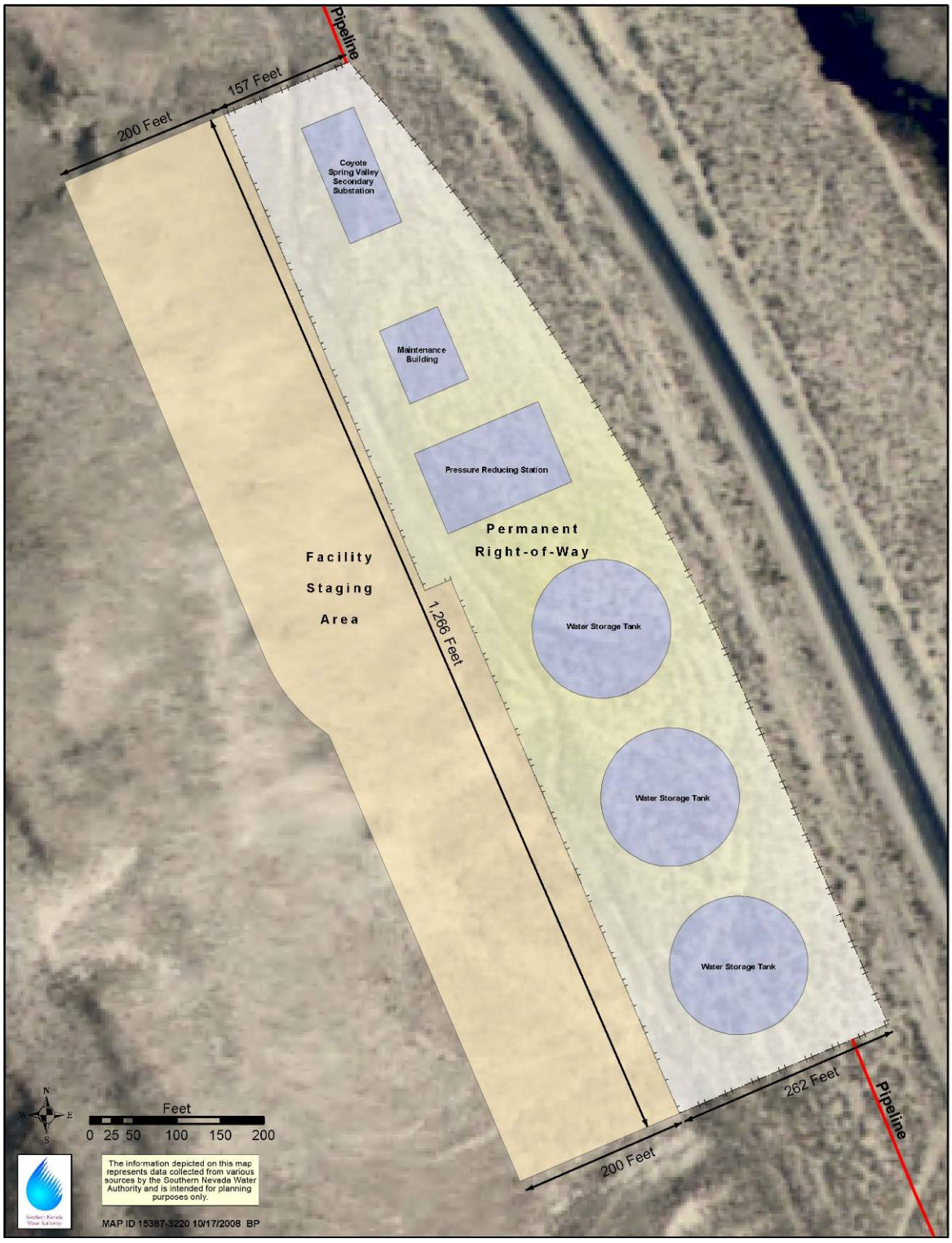


Figure 2-9 Coyote Spring Valley Pressure Reducing Station

The permanent ROW for the Dry Lake Valley North and South Pressure Reducing Stations is approximately 295 feet long and 295 feet wide per facility, or 2 acres each. The length of the permanent ROW for the Coyote Spring Valley Pressure Reducing Station is approximately 1,266 feet long; the width varies and averages approximately 242 feet wide. The site is approximately 7 acres. The temporary ROW required for construction of the Dry Lake Valley North and South Pressure Reducing Stations is approximately 466 long by 466 feet wide per facility, or 5 acres each. The temporary ROW required for construction of the Coyote Spring Valley Pressure Reducing Station is approximately 1,266 feet long; the width of the temporary ROW also varies and averages approximately 206 feet wide. The temporary ROW is approximately 6 acres.

2.3 PUMPING STATIONS

Five pumping stations are required to move water for the GWD Project. All of the pumping stations are located adjacent to a main or lateral pipeline. The location and size of each pumping station is described in more detail below. Facilities common to each pumping station include:

- Pumps and motors
- Forebay (surge facility or water storage tank for stabilization of system hydraulics)
- Surge control system
- Instrumentation and control systems
- Electrical facilities including switchgear, transformers, motor control centers, local control panels, lighting, and standby diesel generator with fuel storage tank
- Mechanical systems including heating, ventilation, air conditioning, plumbing, hoists, cranes, and compressors
- Chemical addition facilities, where needed
- Break room and restroom, with associated septic tank and leach field
- Site fencing and security provisions

Figures 2-10 and 2-11 respectively show a preliminary floor plan and cross section of a pumping station using horizontal split-case pumps. Pumping stations are contained in a concrete or concrete block building. The approximate heights of the pumping station buildings vary between 24 and 40 feet above grade, depending on conditions such as terrain, pump size, and other environmental and equipment requirements.

A facility electrical substation is included at each pumping station site to reduce the power voltage to the operational requirements. The sites may be partially paved, with remaining areas covered with crushed gravel, and have security fencing with a locked gate enclosing each site.

A diesel-powered standby generator would be included at each pumping station site. The generator needs to be large enough to operate one of the pumps in each pumping station, in order to maintain pressures in the pipeline in the event of a power outage. As a conservative scenario, a catastrophic power loss might take up to 72 hours to repair. Therefore, the diesel generators would be designed to be capable of operating up to 72

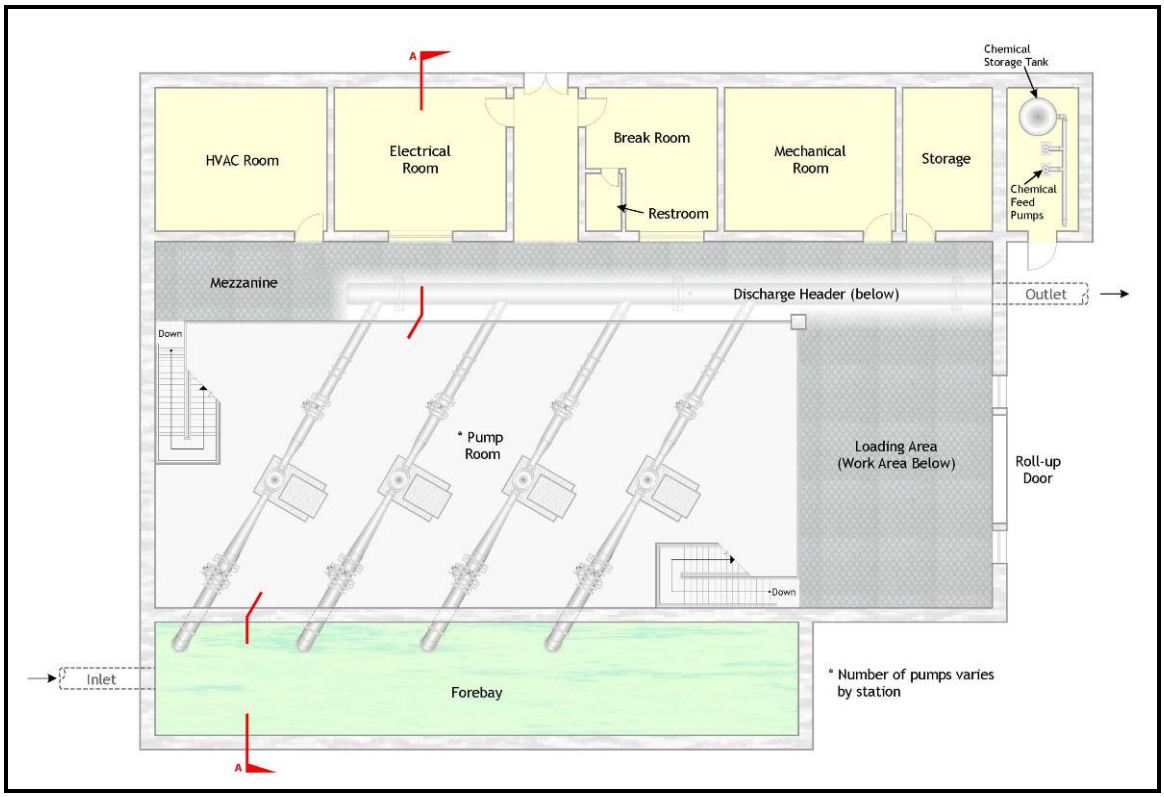


Figure 2-10 Pumping Station Layout, Preliminary Floor Plan

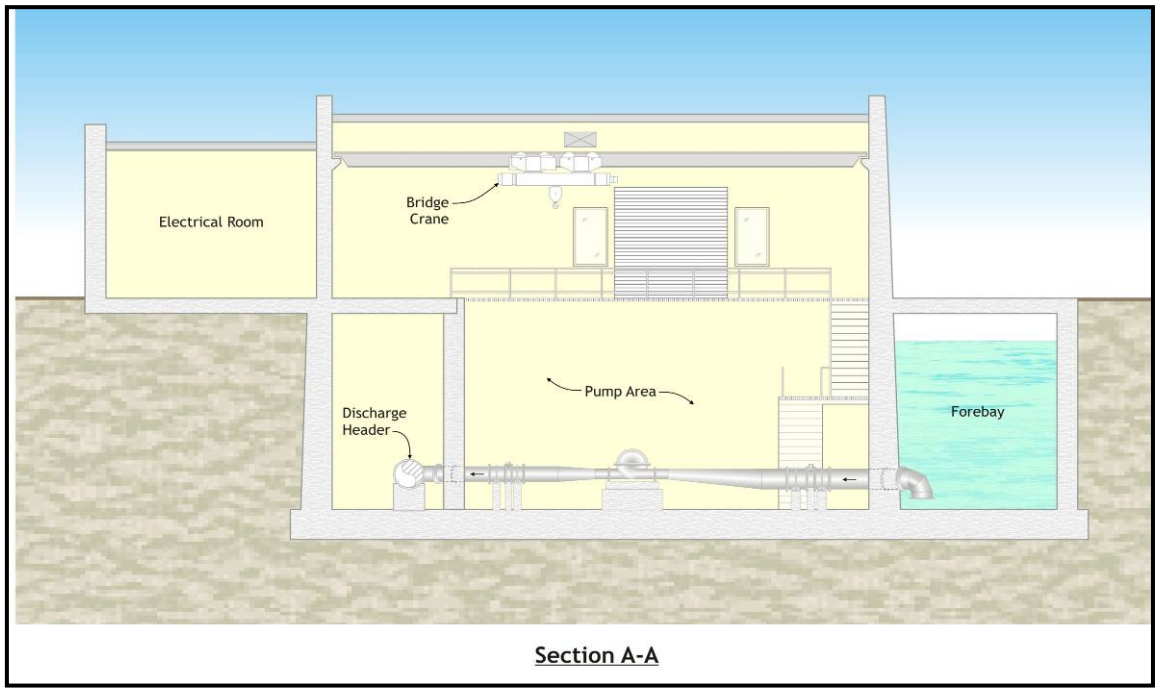


Figure 2-11 Pumping Station Layout, Preliminary Cross Section

hours continuously. A diesel storage tank for fuel storage to operate the generator would be located at each site. Each tank is anticipated to be up to 2,400 gallons in capacity, with a steel inner tank, outer reinforced concrete shell, and Styrofoam insulation in between. These tanks would meet current regulatory requirements for containment and be equipped with monitoring equipment for leak detection. The generator at each pumping station would be operated approximately once each month for 1 to 2 hours to ensure that it is in good working order. Diesel fuel would be hauled by tanker truck to the pumping station sites as needed to fill the fuel storage tanks, anticipated to be approximately once each year.

2.3.1 Spring Valley North Pumping Station

The Spring Valley North Pumping Station would be located along the Spring Valley Lateral pipeline alignment adjacent to SR 893, approximately 5 miles north of US 6 and 50 (Sheet 58).

As shown on Figure 2-12, the site includes the pumping station, a surge facility, a generator building to house the standby electrical generator, and a small electrical substation to serve the pumping station. The pumping station would lift the water in the Spring Valley Lateral over a high point located near the junction of US 93, 50, and 6, and into southern Spring Valley where the lateral ties into the main pipeline at the Spring Valley South Pumping Station. Although the number of pumps required at this pumping station cannot be determined until final facility design, for the purposes of analysis, 6 pumps at 500 horsepower each are anticipated.

The permanent ROW requested for the Spring Valley North Pumping Station is approximately 466 feet long and 466 feet wide, or 5 acres. Additionally, a temporary ROW (Facility Staging Area) 466 feet long and 466 feet wide, or 5 acres, is required for construction.

2.3.2 Spring Valley South Pumping Station

The Spring Valley South Pumping Station would be located on the west side of Indian Springs Road approximately 2 miles south of Indian Springs Knolls (Sheet 1). The pumping station would collect water from the Spring and Snake Laterals along with other groundwater in southern Spring Valley and move it over Horse Corral Pass. As shown in Figure 2-13, this site is larger than the other pumping station sites because, in addition to the pumping station, it accommodates a primary electrical substation (see Chapter 2.6.2, below), a warehouse, and an outdoor storage yard. Space is also allotted for possible water treatment, such as arsenic and chlorination, if determined to be needed.

The pumping station site includes a surge facility, a generator building to house the standby electrical generator, and a small facility electrical substation to serve the pumping station and maintenance yard. Although the number of pumps required at this pumping station cannot be determined until final facility design, for the purposes of analysis, 10 pumps at 1,250 horsepower each are anticipated.

The electrical substation is needed to reduce power levels down to operational levels. It is described in detail in Chapter 2.6.2. The warehouse and outdoor storage yard would be used for storage of parts and equipment, and facility and equipment maintenance activities. If biological organisms, such as protozoans or bacteria, are present in the

Figure 2-12 Preliminary Spring Valley North Pumping Station Site Plan

Figure 2-13 Preliminary Spring Valley South Pumping Station Site Plan

groundwater, chemicals for biological control, such as hypochlorite, may be stored and used at this facility.

The permanent ROW requested for the Spring Valley South Pumping Station is approximately 1,615 feet long and 1,615 feet wide, or 60 acres. A temporary ROW is not required for this site since the space allotted for the outdoor storage yard could be used during facility construction.

2.3.3 Snake Valley North Pumping Station

The Snake Valley North Pumping Station would be located along the Snake Valley Lateral pipeline alignment, approximately 5 miles southeast of the town of Baker (Sheet 68).

As shown on Figure 2-14, the site includes the pumping station, a surge facility, a generator building to house the standby electrical generator, and a small electrical substation to serve the pumping station. The pumping station would work in tandem with the Snake Valley South Pumping Station to lift the water in the Snake Valley Lateral over the south bench of the Snake Range, and into Spring Valley where the lateral ties into the main line at the Spring Valley South Pumping Station. Both this facility and the Snake Valley South Pumping Station are required in tandem because of physical limitations on pumping pressures associated with the elevation change around the Snake Range. Although the number of pumps required at this pumping station cannot be determined until final facility design, for the purposes of analysis, 5 pumps at 500 horsepower each are anticipated.

The permanent ROW needed for the Snake Valley North Pumping Station is approximately 466 feet long and 466 feet wide, or 5 acres. Additionally, a temporary ROW 466 feet long and 466 feet wide, or 5 acres, is required for construction.

2.3.4 Snake Valley South Pumping Station

The Snake Valley South Pumping Station would be located just north of Big Wash in southern Snake Valley (Sheet 67). As described above for the Snake Valley North Pumping Station, the Snake Valley North and South Pumping Stations would work in tandem to lift the water from Snake Valley over the south bench of the Snake Range and into Spring Valley where the lateral ties into the main line at the Spring Valley South Pumping Station. As shown in Figure 2-15, the site includes a pumping station, a surge facility, generator building to house the standby electrical generator, outdoor storage yard, and a small electrical substation to serve the pumping station. Adjacent to the north side of the pumping station site is the Snake Valley Secondary Substation, which is not part of the pumping station. The secondary substation is described in Chapter 2.6.2.

Although the number of pumps required at the Snake Valley Pumping Station cannot be determined until final facility design, for the purposes of analysis, 5 pumps at 1,000 horsepower each are anticipated.

The permanent ROW required for the Snake Valley Pumping Station is approximately 932 feet long and 466 feet wide, or 10 acres. A temporary ROW is not required for this site since the space allotted for the outdoor storage yard could be used during facility construction.

Figure 2-14 Preliminary Snake Valley North Pumping Station Site Plan

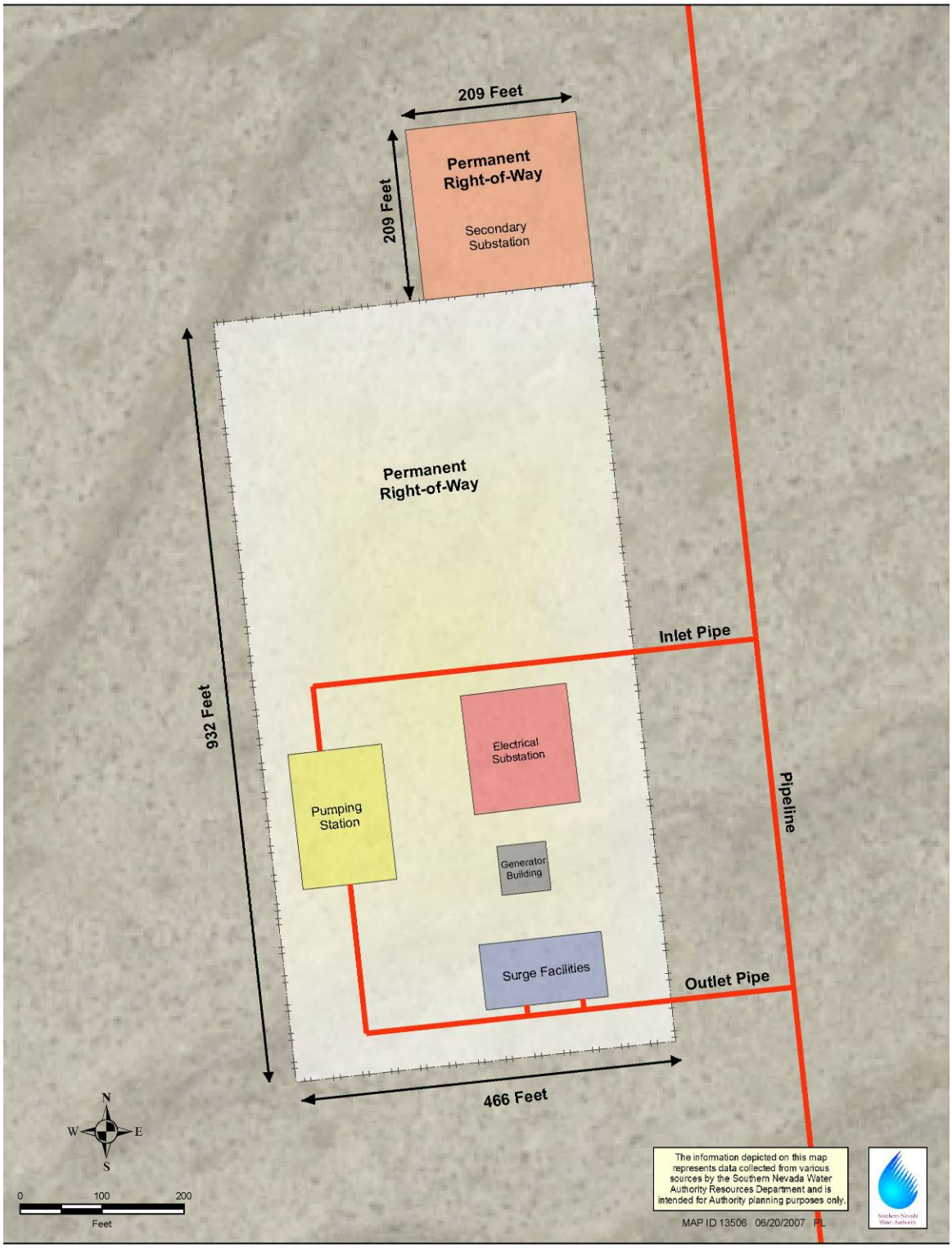


Figure 2-15 Preliminary Snake Valley South Pumping Station Site Plan

2.3.5 Lake Valley Pumping Station

The Lake Valley Pumping Station would be located along the main pipeline alignment, approximately 2 miles northwest of US 93 on Muleshoe Summit Road (Sheet 9). The pumping station would lift the water in the main line from Lake Valley, over Muleshoe Summit, and into Dry Lake Valley. As shown in Figure 2-16, the site includes a pumping station, a surge facility, a generator building to house the standby electrical generator, and a small electrical substation to serve the pumping station.

Although the number of pumps required at this pumping station cannot be determined until final facility design, for the purposes of analysis, 11 pumps at 1,250 horsepower each are anticipated.

The permanent ROW requested for the Lake Valley Pumping Station is approximately 466 feet long and 466 feet wide, or 5 acres. Additionally, a temporary ROW is necessary for construction purposes. The temporary ROW is approximately 466 feet long by 466 feet wide, or approximately 5 acres.

2.4 REGULATING TANKS

Six regulating tanks are necessary to regulate water flow through the pipeline. They may be constructed aboveground or belowground, depending upon site specific elevation as determined during final project design. Regulating tanks are constructed of concrete if below ground and either steel or concrete if above ground.

The tanks would be located at high points along the pipeline alignment, including:

- Spring Valley – at Horse Corral Pass, the high point between Lake and Spring Valleys (Sheet 5)
- Hamlin Valley – on the Snake Valley lateral near Big Spring Wash (Sheets 62-63)
- Lake Valley – at Muleshoe Summit (Muleshoe Regulating Tank) in the east-central part of the valley (Sheet 9)
- Cave Valley – at the high point in Sidehill Pass (Sheet 71)
- Dry Lake Valley – in the southern part of the valley near US 93 (Sheet 25)
- Delamar Valley – at the Delamar Valley summit in the southern part of the valley (Sheet 32)

Figure 2-17 depicts the Delamar and Dry Lake Regulating Tanks; the Spring, Hamlin, Lake, and Cave Valley Regulating Tanks would be similar. The main features would be a rate of flow control structure adjacent to each tank, the tank structure, and a retention basin. The rate of flow control structure (also referred to as a flow control structure) automatically regulates flow into a structure such as a tank or reservoir and keeps it from overflowing during periods of higher upstream flow and/or lower downstream flow demand. It consists of a meter that measures water flow and valves that automatically reduce pressure and control flow. The valves and piping would be housed in a buried or partially buried concrete structure.

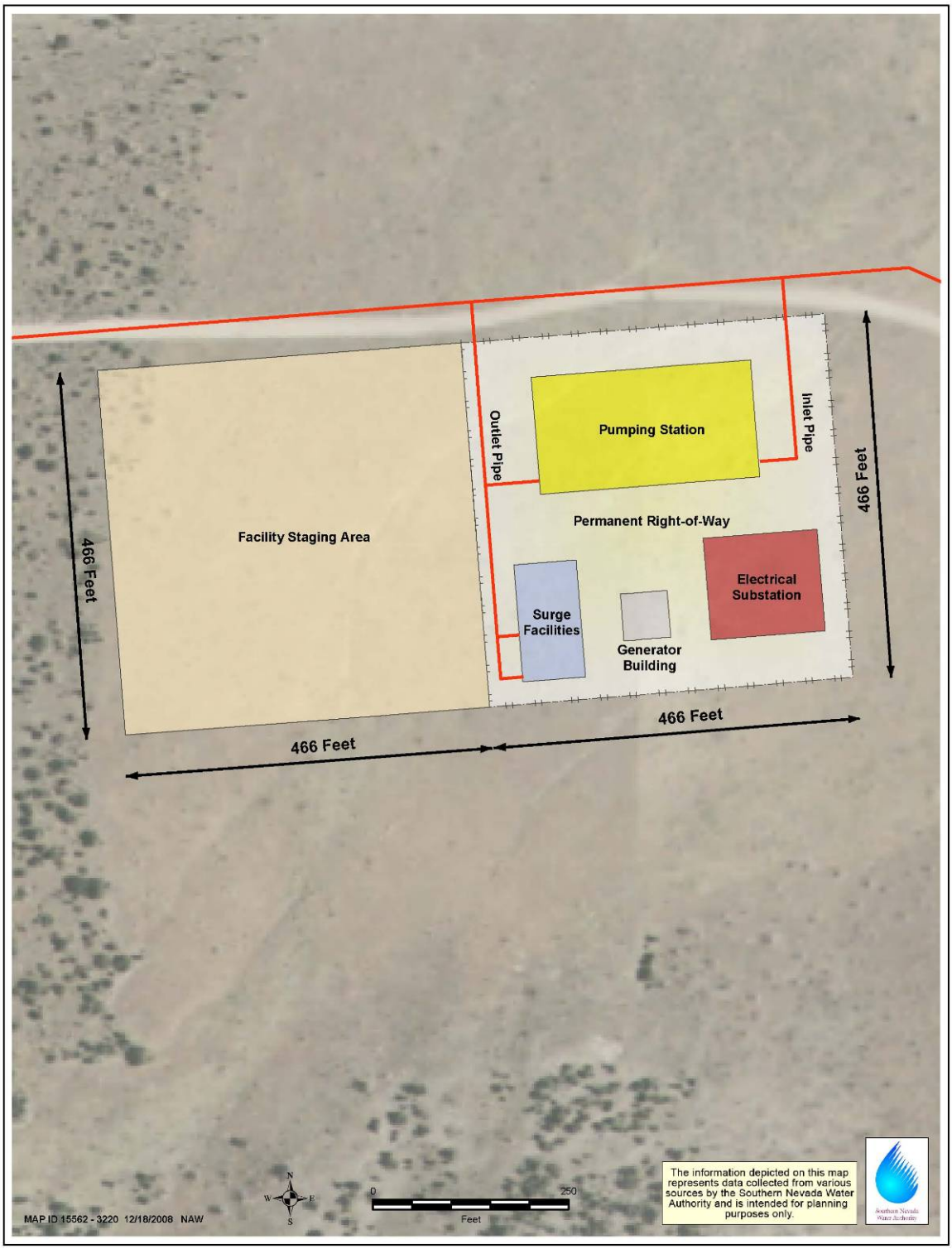


Figure 2-16 Preliminary Lake Valley Pumping Station Site Plan

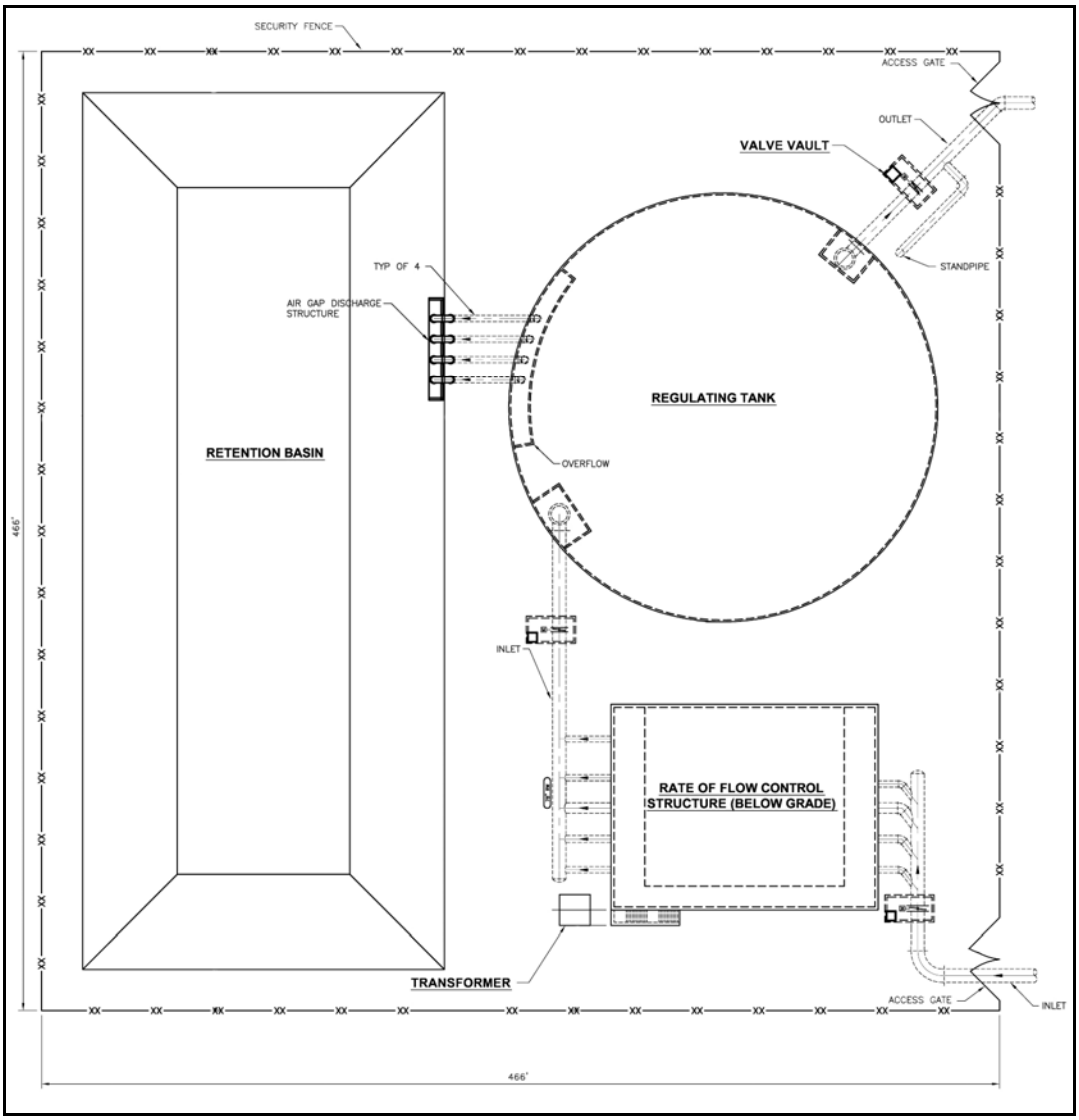


Figure 2-17 Preliminary 5-Acre Regulating Tank Site Plan

Other features of the regulating tanks would be inlet and outlet piping that would connect to the proposed pipeline, piping that would convey water from the flow control structure to the regulating tank, and overflow piping that would direct water from the regulating tank into the retention basin. The retention basins are sized to contain emergency overflow in the event of equipment malfunction. A radio antenna up to approximately 20 feet high for remote communication may be located on each regulating tank site.

The tanks are anticipated to have a capacity of between 3 and 10 million gallons each. Larger tanks may be needed in Dry Lake and Delamar Valleys (in conjunction with the retention basins) to provide for surge control, allowing the tanks to absorb the water in the pipeline in the event of system failure. Tanks are typically cylindrical, and may be between 130 and 200 feet in diameter and approximately 30-40 feet high. Security fencing, typically chain link, with a locked gate would enclose each site.

The permanent ROW needed for the regulating tanks in Spring, Hamlin, Lake, and Cave Valleys is approximately 295 feet long and 295 feet wide each, or 2 acres per site. The regulating tanks in Delamar and Dry Lake Valleys are approximately 466 feet long and 466 feet wide each, or 5 acres per site. The total permanent ROW necessary for the regulating tanks is 18 acres.

Additionally, temporary ROW is necessary for construction around the Spring, Hamlin, Lake, and Cave Valley regulating tanks. The temporary ROW surrounds three sides, with a length of 466 feet and a width of 466 feet each. The fourth side is adjacent to the permanent pipeline ROW, and no additional temporary ROW is required on the pipeline side of these regulating tank sites. No temporary ROW is required for the Delamar and Dry Lake Valley regulating tanks because there is enough space on the permanent sites to use for construction purposes. The total temporary ROW for the regulating tanks is approximately 12 acres.

2.5 WATER TREATMENT FACILITY/BURIED STORAGE RESERVOIR

A water treatment facility and buried storage reservoir would be located on the same site in Garnet Valley (Sheet 47). This location allows treatment of the water prior to entering into SNWA's water system. A conceptual site plan for this facility is shown on Figure 2-18. Final site layout will be determined following completion of water quality testing and facility design.

Treatment of the pumped groundwater to drinking water standards is required before it enters the existing potable (drinking) water system. The water must meet standards of the Safe Drinking Water Act and Nevada Primary and Secondary water quality standards before it can be delivered. As currently envisioned, the Water Treatment Facility would provide for the addition of disinfectant (sodium hypochlorite or chlorine), corrosion inhibitor (zinc orthophosphate or sodium hydroxide) and flouride (hydrofluorosilicic acid). These processes would be accomplished through direct injection into the main pipeline. If necessary based on water quality results of production wells, other treatment could be added to the WTF (such as arsenic removal). These additional treatment processes could be added without additional ROW being required. These processes involve the addition of ferric chloride and sodium hypochlorite to precipitate the arsenic, which is then removed using filtration. Until water quality results from groundwater production wells are available, specific treatment processes cannot be identified.

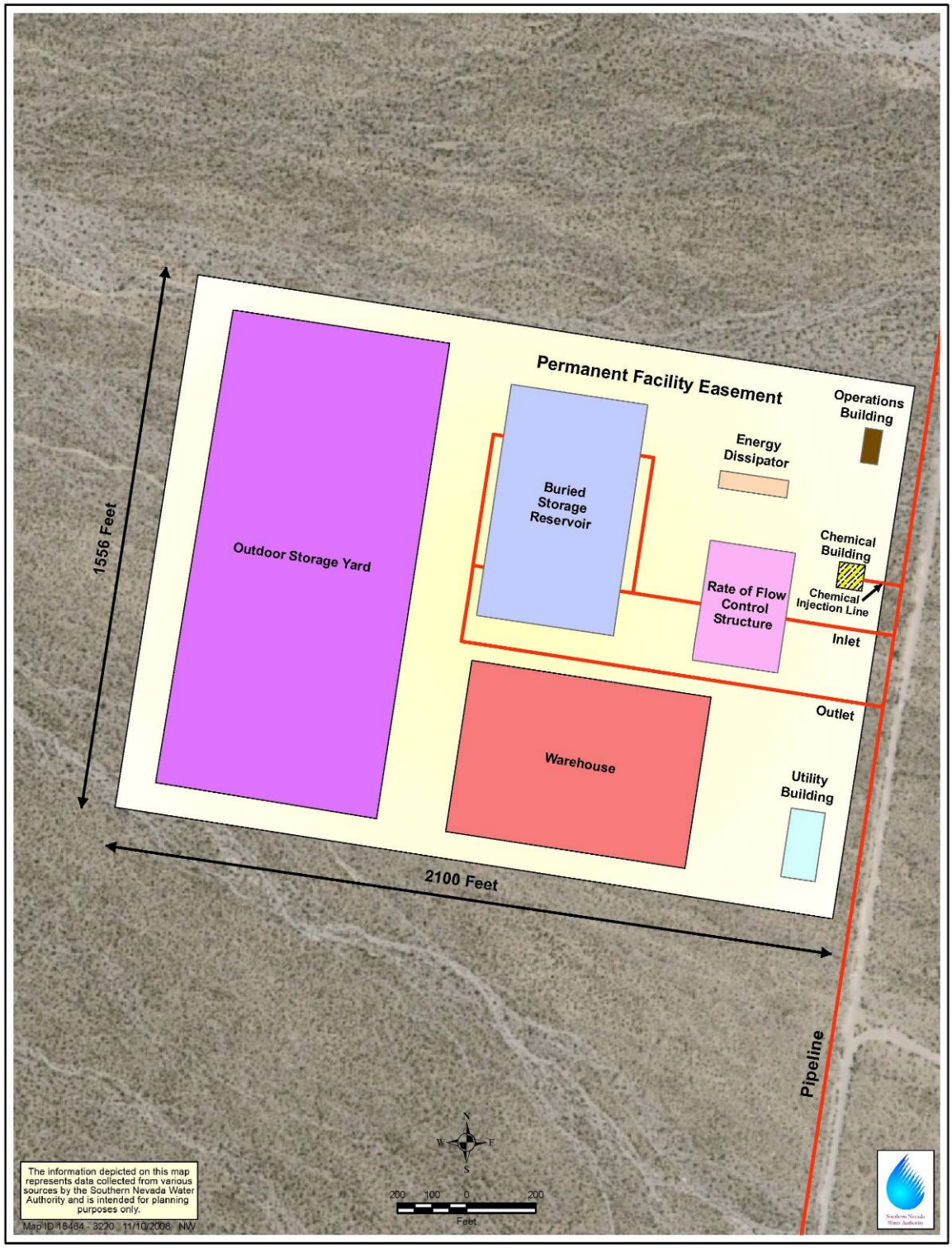


Figure 2-18 Preliminary Water Treatment Facility and Buried Storage Reservoir Site Plan

Any chemicals required for water treatment would be stored in separate tanks, either aboveground or belowground, in designated areas inside the chemical building. Spill containment would be provided as required by federal, state, and local regulations.

The capacity of the WTF is anticipated to be up to 150 million gallons per day. The specific layout and height of buildings at the WTF would be determined during facility design. However, it is anticipated that the maximum building heights would be approximately 20 to 30 feet, to allow for chemical storage and overhead cranes. One or more radio antennae up to 5 to 10 feet in height may also be mounted on one of the building roofs.

A buried storage reservoir is required to manage flow and delivery of the water at the terminus of the main pipeline into SNWA's existing water system. Flow from the reservoir to the pipeline terminus would be by gravity, which requires the reservoir to be sited at an elevation above 2,700 feet. The reservoir is planned to be a 40-million gallon, belowground, covered concrete tank. The reservoir site includes a flow control structure, energy dissipater, utility building, storage and maintenance yard with space for maintenance activities, and parking.

The storage and maintenance yard would be used for storage of parts and equipment, along with facility and equipment maintenance activities. A warehouse building and an operations building are also located on site.

The site may be partially paved, with the remainder covered with crushed gravel, and would have security fencing with a locked gate enclosing the site. A staffed security booth may be installed at the entry gate to the facility.

The permanent ROW needed is approximately 2,100 feet long and 1,556 feet wide, or 75 acres. A temporary ROW is not necessary because there is sufficient room on the 75-acre site to construct both facilities. The site is located on BLM land.

2.6 POWER FACILITIES

Electrical power is required to operate the proposed GWD Project facilities. Table 2-2 identifies the anticipated electrical power requirements for operation of the project. In order to estimate overall total project power requirements, this table also includes assumptions regarding the anticipated power requirements for the future facilities (groundwater production wells and associated facilities), which are described in Chapter 2.9.

Table 2-2 Anticipated Operational Power Requirements

Proposed GWD Project Facilities	Power (megawatts)
Spring Valley North Pumping Station	2.9
Spring Valley South Pumping Station	10.9
Snake Valley North Pumping Station	2.5
Snake Valley South Pumping Station	4.6
Lake Valley Pumping Station	11.9
Buried Storage Reservoir	0.01
Water Treatment Facility	1.5
Anticipated Future Groundwater Wells and Associated Facilities	estimated 40.1
TOTAL	**74.4 (estimated)**

There is currently no electrical power distribution line in the GWD Project area sufficient to meet the operational needs of the GWD Project. Therefore, construction of a power line along the project alignments has been included as part of the GWD Project. The power line would begin in the south at the Silverhawk Generating Station near Apex, and also tie into the Gondor Substation near Ely.

Power supply to operate project facilities is planned to be obtained from the Silverhawk generating station. SNWA owns 25% of the facility, which can produce in excess of 500 megawatts (MW). A substation connection at the northern end of the project provides improved reliability for system operations. The Gondor Substation is owned by Mount Wheeler Power.

2.6.1 Power Lines

Power lines to operate the GWD Project would include 230 kV, 69 kV, and 25 kV conductors (electrical wires). Wherever possible, multiple conductors would be strung on the same power pole. Figure 2-19 depicts the locations of the power lines, including color coding where multiple conductor voltages are hung on the same pole, and Table 2-3 summarizes the power line lengths.

Although power supply would originate from the south, the description of facilities in this section goes from north to south, for consistency with the pipeline and other facility descriptions. Beginning at the Gondor Substation located northeast of Ely in White Pine County (Sheet 75), a 230 kV power line would follow an existing power line south along the west side of the Duck Creek Range. South of Steptoe Creek, it would diverge from the existing power line, but continue to stay on the west side of the Duck Creek Range. The power line would cross US 93, 50, and 6, and parallel the highway for a few miles before heading southeast across the Schell Creek Range. It would reach the main pipeline alignment approximately 4 miles south of the US 93, 50, and 6 interchange (Sheets 75-82, and 55).

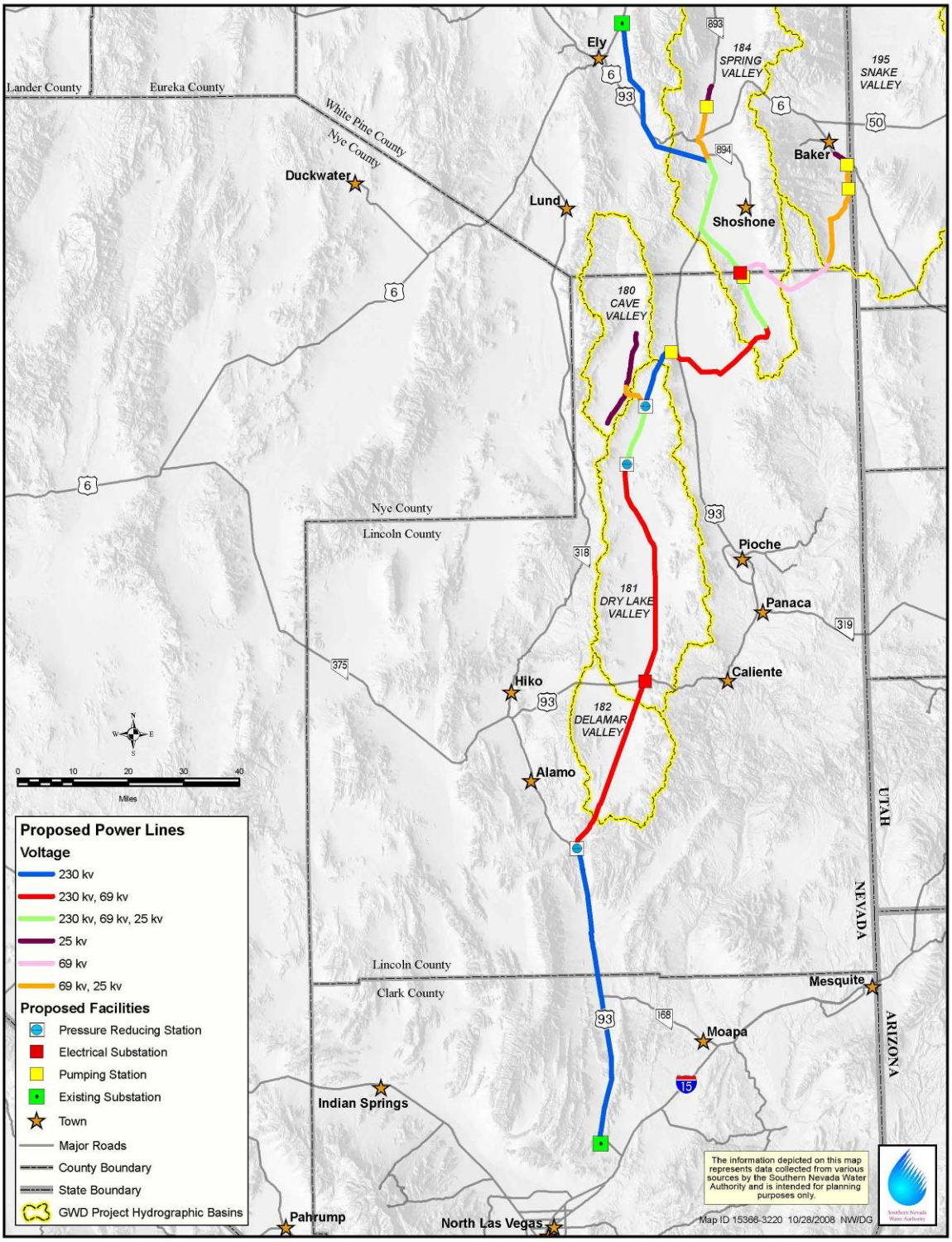


Figure 2-19 GWD Project Power Lines

Table 2-3 GWD Project Power Lines

Power Line Conductor Voltages	Total Miles
230 kV power line	79.8
69 kV power line	10.1
25 kV power line	26.1
230 kV power line with 69 kV and 25 kV underhang	134.9
230 kV power line with 69 kV underhang	49.4
69 kV power line with 25 kV underhang	22.4
TOTAL	**323**

The power line would parallel the main pipeline alignment south through Lincoln County until terminating at the existing Silverhawk Generating Station in Clark County (Sheet 48). There are several areas where the power line would not be immediately adjacent to the pipeline ROW, due to land constraints, avoiding conflicts with other approved and planned power lines, avoiding interference with other facilities including a desert landing strip in Dry Lake Valley, and to minimize the number of angle changes.

Some portions of the 230 kV power poles would also carry a 69 kV and/or 25 kV conductor line hung below the 230 kV line. The lower voltage lines would convey power to pumping stations and other project facilities, where it would be reduced through on-site substations to operational levels. Power lines conveying only 69 kV or only 25 kV, or both, would also be routed along portions of the Spring, Snake and Cave Valley Laterals to provide power to operate facilities in those areas.

The 230 kV power poles are planned to be single, steel power poles approximately 100 feet in height (Figure 2-20) and spaced approximately 800 feet apart depending on terrain. The 69 kV power poles are planned to be single, steel poles approximately 60 feet in height (Figure 2-21) and spaced approximately 600 feet apart depending on terrain. The 25 kV power poles are planned to be single, wooden poles approximately 50 feet in height (Figure 2-22) and spaced approximately 500 feet apart depending on terrain.

The tops of the power poles would be equipped with anti-perching devices to discourage raptors, ravens, and other birds from perching on the poles. The design of the crossbars and supports on the 230 kV poles discourages birds from flying between the conductors, and prevents bird injury. Based on Avian Power Line Interaction Committee recommendations revised in 2005, adequate spacing between conductors is 8 feet or greater based on the wingspan of the female golden eagle.

The permanent ROW needed for power line combinations containing 230 kV and/or 69 kV conductors would be 100 feet in width. The permanent ROW for the power lines carrying only 25 kV would be 50 feet in width. These widths are required for safety considerations to allow for displacement of the conductors. Only a portion of the permanent ROW would be disturbed for installation of power poles and access roads where needed. Temporary ROW for the power lines would not be required because the permanent ROW would be sufficient for construction needs.

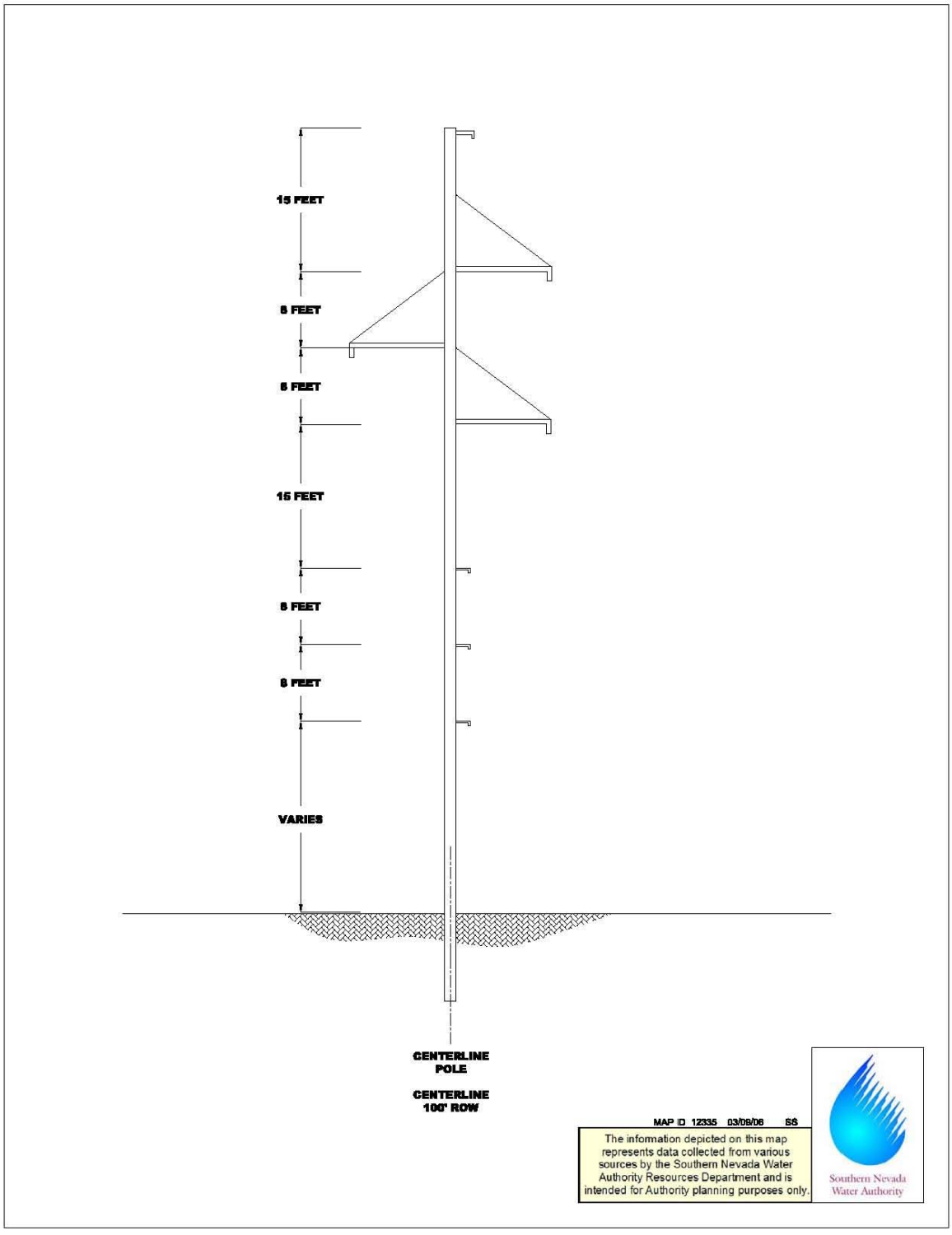


Figure 2-20 Preliminary 230 kV Power Pole with Underhang

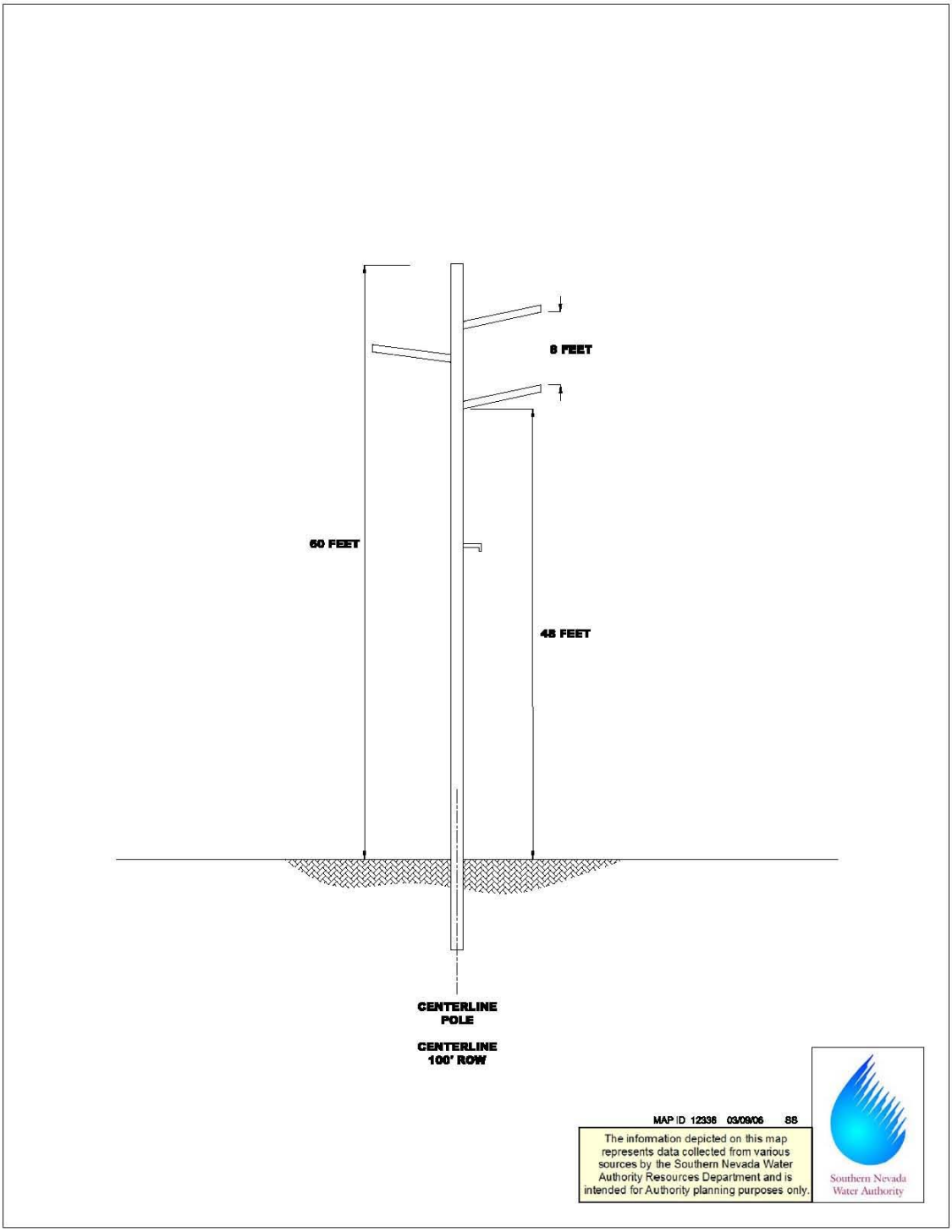


Figure 2-21 Preliminary 69 kV Power Pole

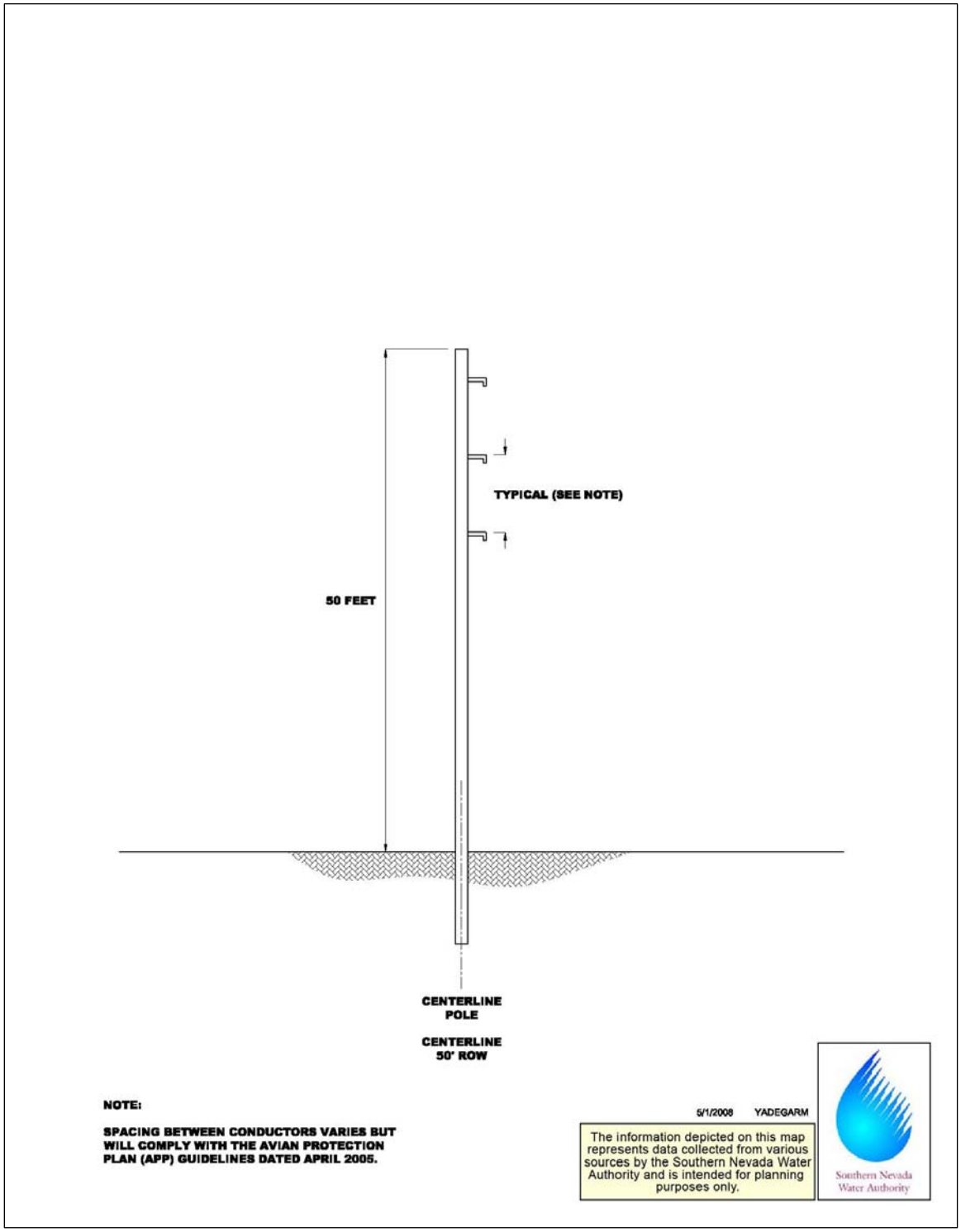


Figure 2-22 Preliminary 25 kV Power Pole

The total length of power line for the GWD Project would be approximately 323 miles. Approximately 299 miles of power line would requires a 100-foot wide ROW and 24 miles require a 50-foot wide ROW. The total permanent ROW required is 3,773 acres. The power lines would be located on lands managed by the BLM (3,739 acres permanent ROW), private property (17 acres), and State Lands (Steptoe Valley Wildlife Management Area utility corridor) (total 17 acres).

2.6.2 Electrical Substations

The GWD Project includes two primary electrical substations and five secondary electrical substations, which are described below.

Primary Electrical Substations

Two primary electrical substations are required to reduce the 230 kV power to 69 kV for transmission to project facilities. Figure 2-23 displays a preliminary site plan for a primary substation. The first would be located within the Spring Valley South Pumping Station site in southern Spring Valley (see Figure 2-13, and Sheet 1). The second would be located in southern Dry Lake Valley at the intersection of US 93 and North Poleline Road (Sheet 25).

Primary substations include power lines and switchgear, a transformer, control building, and warehouse facility (Figure 2-23). The transformer is placed on a concrete pad with a curb around the perimeter for spill containment. The substations would be enclosed by security fencing, typically 8-foot high chain link.

The primary substations would each be 660 feet in width and 660 feet in length, totaling 10 acres in size. Because the Spring Valley substation would be located within the Spring Valley South Pumping Station site, additional ROW is not required for this facility. The Dry Lake Valley substation is located on lands managed by the BLM, and a permanent ROW of 10 acres is required. Temporary ROW is not required for construction of the substations.

Secondary Electrical Substations

Five secondary electrical substations are required to reduce 69 kV to 25 kV. Two would be located in Spring Valley, and one each in Snake, Cave, and Coyote Spring Valleys:

1. The Spring Valley North Secondary Substation would be located adjacent to the Spring Valley North Pumping Station (Sheet 58).
2. The Spring Valley South Secondary Substation would be located approximately 10 miles northwest of the Spring Valley South Pumping Station site, where the Spring Lateral converges with US 93 (Sheet 52).
3. The Snake Valley Secondary Substation would be located adjacent to the Snake Valley South Pumping Station (Sheet 67).
4. The Cave Valley Secondary Substation would be located on the valley floor approximately 1 mile north of Sidehill Pass (Sheet 72).
5. The Coyote Spring Valley Secondary Substation would be located on the Coyote Spring Valley Pressure Reducing Station site in northern Coyote Spring Valley (Sheet 33).

Figure 2-23 Preliminary Primary Electrical Substation Site Plan

The secondary substation sites (except for the Coyote Spring Valley Secondary Substation site) are approximately 209 feet in width by 209 feet in length, or 1 acre each in size for a total or 4 acres. They would be located on lands managed by the BLM. Because the Coyote Spring Valley Secondary Substation would be located within the Coyote Spring Valley Pressure Reducing Station site (also on lands managed by the BLM), additional ROW is not required for this facility.

2.7 ACCESS ROADS

For the purposes of this document, the US Department of the Interior definitions of road types are used (Form DI 1876, Revised 8/1/97). These definitions are:

- Paved Road – asphalt surfaces
- Improved Road – gravel surfaces
- Unimproved Road – dirt surfaces, may or may not be graded.

Access to the GWD Project facilities would be required for both construction and operation. A primary access road would be constructed within the pipeline ROW, which would be used for transport of equipment, materials, and personnel during construction. At the completion of construction, the access roads would remain for facility inspections and operations access.

The majority of the pipeline and power line alignments are located along or adjacent to existing roads, including paved highways and improved and unimproved dirt roads. Where existing roads are within the pipeline ROW, those existing roads would be used or improved as necessary. Figure 2-24 displays access road improvements for the project. Existing roads, as identified on that map and in this discussion, refer to those roads that are currently maintained by the BLM or Counties, or are maintained as part of another ROW. Although much of the alignment follows unimproved roads, those are generally not considered in this discussion as existing roads, per the BLM definition above.

The following access roads are required for construction and operation of project facilities:

- Paved existing road – 14 miles
- Paved new road – 5 miles
- Improved existing road – 85 miles
- Improved new road –200 miles
- Unimproved existing road – 28 miles
- Unimproved new road – 20 miles

Short segments of unimproved spur roads would also be required to access power pole sites from the primary access roads. These spur roads would be identified during project design.

Because the access roads are within the pipeline and power line ROWs, additional ROW for access roads would not be required, with two exceptions. For approximately 14 miles in northern Delamar and southern Dry Lake Valley where the pipeline and power line are

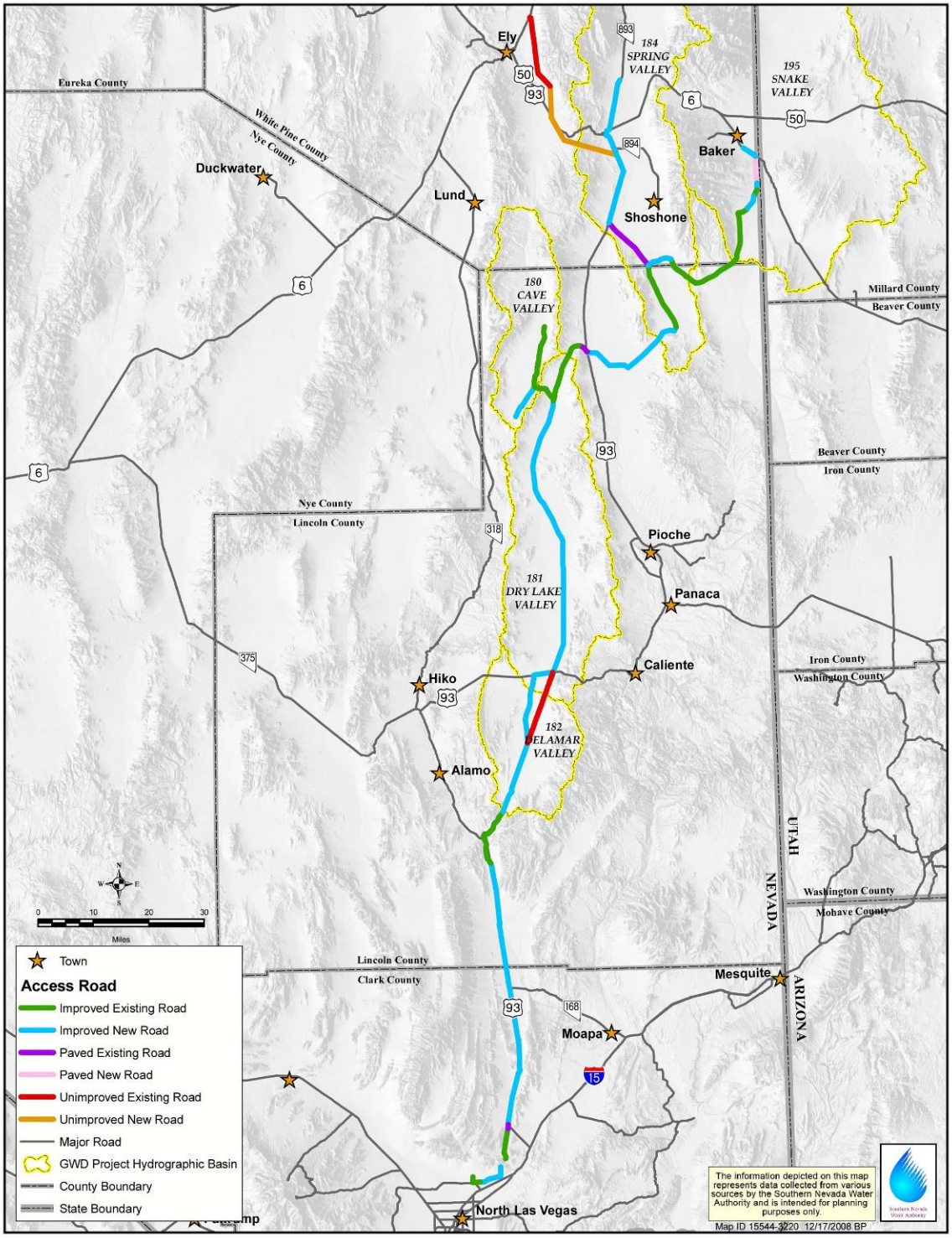


Figure 2-24 GWD Project Access Road Improvements

not contiguous, access to the power line ROW would utilize North and South Poleline Road. For approximately 14 miles from the Gondor Substation, the power line would utilize an existing adjacent power line access road. For both of these road segments, a 20-foot ROW is requested, to allow for leveling of deep ruts and minor grading, if needed.

Access roads would be prepared at the beginning of construction by grading, installation of culverts, and graveling for improved roads. Asphalt paving would be installed on three road segments, as displayed on Figure 2-24, at the completion of construction to allow for operational access to pumping stations and the WTF/buried storage reservoir. The width of the paved and improved roads would be approximately 20 to 26 feet, to allow for two lanes of traffic. Unimproved roads would only be utilized for power line construction, and would be graded dirt roads approximately 12 feet in width.

In areas where the ROW parallels but does not encompass other existing access roads, to avoid proliferation of roads, SNWA would coordinate with the BLM at the completion of construction to determine which roads should be reclaimed. Permanent access would be required along the entire ROW, but this could be done using the improved access roads developed for construction within the ROW or other adjacent access roads if available.

In addition to the ROW access roads described above, which include new and upgraded roads, construction access for personnel and materials deliveries would utilize existing roads and highways. These include Interstate 15, U.S. Highways 93, 6 and 50, and Nevada State Highways 168, 317, 318, 319, 320, 893, 894, and 487. Several unpaved roads currently maintained by Lincoln and White Pine Counties may also be used, including Cave Valley Road (from Ely into Cave Valley), Atlanta Road (from U.S. 93 to the pipeline alignment in Spring Valley), Stampede Road (from Pioche to the pipeline alignment in Dry Lake Valley), Pan American/Ely Springs Road (from Pioche to the pipeline alignment in Dry Lake Valley), and Alamo Canyon Road (from Alamo to the pipeline alignment in Delamar Valley). Upgrades to these roads beyond normal county maintenance activities are not anticipated to be needed; therefore additional ROW is not required.

2.8 COMMUNICATIONS FACILITIES

Communications facilities will be installed along with project facilities for system operation and control, data collection, communication, and security surveillance. Communication requirements would be met through use of fiber optics, radio systems and possibly cellular communications equipment installed at facility sites.

Conduits for fiber optic cables would be installed along with the proposed pipelines. The fiber optic cables would be installed underground in either the pipeline trench or adjacent GWD Project access road, and would be contained within the requested ROW. No additional ROW would be required.

Several two-way radio base stations may be needed to communicate between project facilities and operations and maintenance vehicles. There are many existing commercial radio sites located on mountaintops in the region. Space may be leased inside these existing commercial sites for installation of radio equipment as well as tower space for antennas. It is not anticipated that additional ROW for new radio sites would be needed.

The project facility sites may also be used for two-way radio base stations. These base stations would be housed inside the facility or in a communications equipment shelter that may be placed adjacent to proposed buildings at project facility sites, including pumping stations, regulating tanks, the water treatment facility, and electrical substations. No additional permanent or temporary ROW would be required.

2.9 FUTURE FACILITIES

Future facilities will be required to develop permitted groundwater rights and convey them to the primary conveyance facilities. The final locations of the groundwater production wells and associated facilities to convey water into the primary system have not yet been determined. The wells will be located based on several factors, which include but are not limited to geology, hydrology, well interference studies, environmental issues, existing senior water rights, and proximity to main and lateral pipelines. Production well locations are also subject to approval by the Nevada State Engineer. Since the specific location of these facilities cannot currently be identified, SNWA has not yet requested ROW for them from the BLM. However, assumptions regarding the number of wells, length of collector pipelines, and other needed facilities have been made by SNWA so that BLM can conduct a programmatic-level environmental impact analysis of construction and operation of future facilities in addition to the site-specific analysis of proposed rights-of-way for primary facilities. The assumptions on future facilities are described below.

2.9.1 SNWA Future Groundwater Production Wells

Groundwater production wells will be needed to develop groundwater for the GWD Project. Sufficient wells are needed to develop permitted water rights, provide for maintenance downtime, and allow flexibility in operations for better system management. The actual number of production wells will depend upon the results of exploratory well drilling and individual well yields. For the purposes of developing programmatic-level estimates, it has been assumed that the average well yield will be approximately 800 to 1,000 gallons per minute (gpm). Considering the permitted or application quantity of water for each hydrographic basin, and adding a 20% factor for additional wells needed for maintenance and operational flexibility, the following represents an estimated number of wells per valley:

- Spring Valley: 52 to 64 wells
- Snake Valley: 39 to 48 wells
- Cave Valley: 4 to 5 wells
- Dry Lake Valley: 10 to 11wells
- Delamar Valley: 3 wells

The groundwater production wells are anticipated to be drilled to depths between 1,000 and 2,000 feet deep, in basin fill and bedrock. The production well pumping equipment would be housed within a concrete block or pre-cast concrete structure for protection from vandalism and the elements. Electrical facilities, heating, ventilation, air conditioning equipment, and control facilities would be located in each structure.

Depending upon the water quality at each well site, groundwater treatment facilities may be required on-site, in or adjacent to the well building. Potential chlorination at well sites may consist of closed systems with exchangeable canisters, which would not be refilled on site. The chlorination facilities will comply with applicable OSHA standards. There is a potential that, if naturally-occurring arsenic is present in levels requiring treatment, some of the well sites may also require on-site arsenic removal. This cannot be determined until water quality results from the individual wells are available. However, if on-site arsenic treatment is required, it would likely be done through a small package plant which would add ferric chloride and sodium hypochlorite to precipitate the arsenic, that is then removed using filtration. Any treatment facilities would be equipped with secondary containment, in accordance with OSHA standards. Sludge generated from the filtration would be disposed of in a permitted landfill.

For the purposes of a programmatic analysis, the above estimates are rounded to an assumed total quantity of approximately 110 to 130 groundwater production wells. A permanent site ROW of 1.5 acre is anticipated for each well site. Additionally, a 0.5-acre temporary ROW at each well site is anticipated to be necessary for construction purposes. Thus, approximately 165 to 195 acres of permanent ROW and 55 to 65 acres of temporary ROW may be required for future SNWA production wells.

2.9.2 Future Collector Pipelines

Future collector pipelines would convey water from the future groundwater production wells to the main and lateral pipelines. The size of these future collector pipelines would depend upon the number of wells connected to each. It is currently anticipated that the collector pipelines may range from 10 inches in diameter where connected only to a single well, or up to 30 inches in diameter when more than 3 wells are connected.

Since the future groundwater production well sites cannot yet be identified, the sizes, routing, and distances of future collector pipelines also cannot yet be determined. However, for the purpose of a programmatic analysis, general assumptions on the potential distances of future collector pipelines have been made based on the assumed number of future groundwater production wells and known geologic and hydrologic conditions. The estimated miles of collector pipeline per valley and associated assumptions are listed below:

- Spring Valley: 39 to 96 miles
  Assumes wells may be clustered in groups of 4 wells, with each cluster located between 3 to 6 miles from the main or lateral pipeline
- Snake Valley: 20 to 48 miles
  Assumes wells may be clustered in groups of 4 wells, each cluster located between 2 to 4 miles from the lateral pipeline
- Cave Valley: 12 to 40 miles
  Assumes individual wells may be located within 3 to 8 miles from the lateral pipeline
- Dry Lake Valley: 20 to 44 miles
  Assumes individual wells may be located within 2 to 4 miles from the main pipeline

- Delamar Valley: 15 to 30 miles
  Assumes individual wells may be located within 5 to 10 miles from the main pipeline

For the purposes of a programmatic analysis, the above estimates are rounded to an assumed total quantity of approximately 110 to 260 miles of future collector pipeline. The collector pipelines would require permanent ROW of up to 50 feet in width and temporary ROW of up to 50 feet in width. It is anticipated that most of these collector pipelines would be located on lands managed by the BLM. The anticipated future permanent ROW for the collector pipelines would be 667 to 1,576 acres, with the same estimate for anticipated future temporary ROW.

It is also assumed that temporary construction staging areas may be required along the collector pipelines, one every 3 miles. There would be an estimated total of between 37 to 87 staging areas, 1 acre each, for a total of between 37 and 87 acres of temporary ROW.

2.9.3 Future Pumping Stations

Additional pumping stations may be required to convey water from some of the future groundwater production well areas into the main and lateral pipelines. Since the locations of the production wells cannot yet be determined, the need for and siting of additional pumping stations cannot yet be determined.

For the purposes of a programmatic analysis, based upon known topography of the project area, it is anticipated that two additional pumping stations may be required to convey water from groundwater production well areas into the main and lateral pipelines. One additional pumping station each in Delamar and Dry Lake Valleys are assumed.

It is assumed that each of these pumping stations would have four pumps. The pumps are assumed to be 100 horsepower each. The facilities would also likely include a small electrical substation each to reduce power levels down to serve the facility. The permanent ROW estimated for each pumping station is 5 acres, for a total of 10 acres. The temporary ROW estimated for each pumping station is 5 acres, for a total of 10 acres.

2.9.4 Future Power Facilities

Additional distribution power lines and substations would convey power to the future groundwater production wells and future pumping stations. Since the locations of those facilities cannot yet be determined, these future power facilities also cannot yet be defined.

It is assumed that the future power lines would be overhead 25 kV power lines, routed along the future collector pipeline alignments. Additional 25 kV conductors may also need to be hung on the power poles constructed as part of the proposed GWD Project primary power supply system, described in Chapter 2.6.1 above.

Using the estimated distances of future collector pipeline described above, and the anticipated future permanent ROW required for the power lines of 50 feet in width, the additional permanent ROW would total between 667 to 1,576 acres.

It is also assumed that additional secondary substations may be required in some areas, to reduce power from 69 kV to 25 kV to provide power to future groundwater production wells and pumping stations. The locations of these secondary substations would depend upon the specific locations of the groundwater production wells and pumping stations. However, for the purposes of a programmatic analysis, it is assumed that an additional 69/25 kV substation will be required in Delamar and Dry Lake Valleys.

Each of the future substations may require a site of approximately 1 acre. The anticipated total future permanent ROW for these additional substations would be 2 acres.

Hydroturbines may be installed in the future to generate electrical power as the water flows from higher to lower elevations. These facilities would be built below ground, with turbines placed within pipeline bypass piping. Electrical power generated by the hydroturbines would be transmitted to the project or local electrical system, where it could be used by the GWD Project or added to the utility grid. The specific size of facilities and quantity of power generated can not be determined until the final pipeline design is completed. It is estimated that future hydroturbine electrical generating facilities may be installed at the pressure reducing station sites. Additional future ROW is not anticipated to be required, but these facilities would require permitting through the Federal Energy Regulatory Commission.

2.9.5 Future Access Roads

Access roads to future facilities are assumed to be located within the collector pipeline ROW. These may be either new roads or improvements to existing roads within the ROW. The road improvements may include grading, widening, and installing culverts where needed. Gravel may be applied in some areas if necessary to maintain road conditions. The width of improved dirt roads would be 20 feet. It is assumed that no additional permanent or temporary access road ROW's would be needed because they would be located within the collector pipeline ROW.

2.9.6 SNWA Future Facilities Summary

A summary of the assumed future SNWA facilities by project basin is provided in Table 2-4.

2.9.7 Lincoln County Future Facilities

As described in Chapter 1.3, capacity is being provided in the GWD Project for conveyance of water for Lincoln County. Table 1-1 describes the anticipated water quantity and source basins.

For the 3,000 afy from Dry Lake and Delamar Valleys that SNWA would transfer to Lincoln County in accordance with their existing agreement, the potential future facilities have already been included in the SNWA future facilities estimates above. Future facilities for the remaining Lincoln County capacity cannot be identified at this time. Lincoln County has not identified specific plans or likely development areas that can be used to make reasonable assumptions for programmatic analysis. Any additional facilities required to develop that water and convey it to the GWD Project would be the subject of future ROW applications by LCWD and require future environmental analysis.

Table 2-4 Estimated Future SNWA Facilities

Location	Facility
Spring Valley	52-64 groundwater production wells 39 to 96 miles collector pipeline 39 to 96 miles 25 kV power line
Snake Valley	39-48 groundwater production wells 20-48 miles collector pipeline 20-48 miles 25 kV power line
Cave Valley	4-5 groundwater production wells 12-40 miles collector pipeline 12-40 miles 25 kV power line
Dry Lake Valley	10-11 groundwater production wells 20-44 miles collector pipeline Pumping station 20-44 miles 25 kV power line Secondary substation
Delamar Valley	3 groundwater production wells 15-30 miles collector pipeline Pumping station 15-30 miles 25 kV power line Secondary substation

3.0 LAND REQUIREMENTS

The GWD Project requires ROW across federal lands managed by the BLM. ROW would be needed across State Lands, including parcels used by the Nevada National Guard and Steptoe Valley Wildlife Management Area (utility corridor). ROW would also be needed across private land, including in the northeastern Las Vegas Valley (Apex), central Coyote Spring Valley, and the City of Caliente.

SNWA submitted applications to the BLM for temporary and permanent ROW for the GWD Project on August 19, 2004 and the project was assigned case number N-78803.

3.1 PERMANENT AND TEMPORARY RIGHTS-OF-WAY

A summary of the permanent and temporary ROW required to construct and operate the GWD Project is presented in Table 3-1. This table also shows the types of facilities and acreages located on land managed by each agency and on private land. Permanent ROW is being requested for main and lateral pipelines, pumping stations, regulating tanks, a buried storage reservoir, a WTF, power lines, electrical substations, pressure reducing stations, a construction support area, and an access road. Temporary ROW is being requested for pipelines, staging areas, plant nurseries, borrow pits, some of the pumping stations, regulating tanks, and pressure reducing stations. In areas of level terrain and stable soil conditions, the amount of disturbance of the temporary ROW may be reduced; however, any potential reductions would not be known until after detailed alignment surveys and project design have been completed. Anticipated ROW for future facilities is described in Chapter 3.2

The majority of the proposed permanent and temporary ROW located in Clark and Lincoln Counties are within the utility corridor designated by LCCRDA, which established a 2,640-foot wide corridor on public lands for utilities. LCCRDA also directed the Secretary of the Interior to grant SNWA non-exclusive ROW in perpetuity, for roads, wells, well fields, pipes, pipelines, pumping stations, storage facilities, or other facilities that are necessary for the construction and operation of a water conveyance system.

3.2 FUTURE FACILITIES

As described in Chapter 2.9, additional ROW will be required in the future for groundwater production wells, collector pipelines, pumping stations, access roads, and power facilities. These facilities cannot be identified at this time and will be requested in future applications. However, programmatic-level assumptions have been made regarding these additional future facilities. Table 3-2 describes the anticipated ROW requirements for these future facilities. It is anticipated that all of these facilities will be located on lands managed by the BLM.

Table 3-1 GWD Project Permanent and Temporary Right-Of-Way Estimates

Facility	Permanent Rights-of-Way			Temporary Rights-of-Way			Map Sheet
	Length	Width	Total Acres	Length	Width	Total Acres	
U.S. Bureau of Land Management							
Main Pipeline							
Spring Valley	17.0 mi	100 ft	206	17.0 mi	100 ft	206	1-5
Lake Valley	21.0 mi	100 ft	255	21.0 mi	100 ft	255	5-9
Dry Lake Valley	66.1 mi	100 ft	801	66.1 mi	100 ft	801	9-26
Delamar Valley	23.1 mi	100 ft	280	23.1 mi	100 ft	280	26-32
Coyote Spring Valley	38.9 mi	100 ft	472	40.1 mi	100 ft	486	33-44
Hidden Valley	12.2 mi	100 ft	148	12.2 mi	100 ft	148	44-47
Garnet Valley	7.1 mi	100 ft	86	7.3 mi	100 ft	88	47-49
Pahranagat Valley	6.8 mi	100 ft	82	6.8 mi	100 ft	82	32-33
Las Vegas Valley	5.7 mi	100 ft	69	5.7 mi	100 ft	69	49-50
Subtotal	*197.9 mi*	~	*2,399*	*199.3 mi*	~	*2,416*[a]	
Lateral Pipelines							
Spring Valley Lateral	38.1 mi	100 ft	462	38.1 mi	100 ft	462	1, 51-59
Snake Valley Lateral	42.8 mi	100 ft	519	42.8 mi	100 ft	519	1, 60-69
Cave Valley Lateral	22.4 mi	100 ft	272	22.4 mi	100 ft	272	70-74
Subtotal	*103.3 mi*	~	*1,252*[a]	*103.3 mi*	~	*1,252*	
Temporary Construction Areas							
Main Pipeline Staging Areas (66)	~	~	~	361 ft/ea	361 ft/ea	198	1-50
Lateral Pipeline Staging Areas (31)	~	~	~	361 ft/ea	361 ft/ea	93	1, 51-58, 60-62, 64-75
Plant Nurseries (19)	~	~	~	~	~	*249*	26, 29, 32-43, 45-48
Subtotal						*540*	
Borrow Pits							
Spring Valley- Pit 1	~	~	~	552 ft	552 ft	7	56
Snake Valley- Pit 2	~	~	~	552 ft	552 ft	7	63
Lake Valley- Pit 3	~	~	~	552 ft	552 ft	7	8
Lake Valley- Pit 4	~	~	~	552 ft	552 ft	7	8
Cave Valley- Pit 5	~	~	~	552 ft	552 ft	7	71
Cave Valley- Pit 6	~	~	~	552 ft	552 ft	7	71
Dry Lake Valley- Pit 7	~	~	~	552 ft	552 ft	7	20
Dry Lake Valley- Pit 8	~	~	~	552 ft	552 ft	7	20
Subtotal	~	~	~	~	~	*56*	
Pressure Reducing Stations							
Dry Lake Valley North	295 ft	295 ft	2	466 ft	466 ft	5	11
Dry Lake Valley South	295 ft	295 ft	2	466 ft	466 ft	5	14
Coyote Spring Valley	1,266 ft [b]	242 ft [b]	7	1,266 ft [c]	206 ft [c]	6	33
Subtotal	~	~	*11*	~	~	*16*	

Facility	Permanent Rights-of-Way			Temporary Rights-of-Way			Map Sheet
	Length	Width	Total Acres	Length	Width	Total Acres	
U.S. Bureau of Land Management							
Pumping Stations							
Spring Valley North	466 ft	466 ft	5	466 ft	466 ft	5	58
Spring Valley South	1,615 ft	1,615 ft	60	~	~	~	1
Snake Valley North	466 ft	466 ft	5	466 ft	466 ft	5	78
Snake Valley South	932 ft	466 ft	10	~	~	~	67
Lake Valley	466 ft	466 ft	5	466 ft	466 ft	5	9
Subtotal	~	~	*85*	~	~	*15*	
Regulating Tanks							
Spring Valley	295 ft	295 ft	2	466 ft [b]	466 ft [b]	3	5
Hamlin Valley	295 ft	295 ft	2	466 ft [b]	466 ft [b]	3	63
Lake Valley	295 ft	295 ft	2	466 ft [b]	466 ft [b]	3	9
Cave Valley	295 ft	295 ft	2	466 ft [b]	466 ft [b]	3	71
Dry Lake Valley	466 ft	466 ft	5	~	~	~	25
Delamar Valley	466 ft	466 ft	5	~	~	~	32
Subtotal	~	~	*18*	~	~	*12*	
Buried Storage Reservoir and Water Treatment Facility							
Garnet Valley	2,100 ft	1,556 ft	75	~	~	~	47
Power Lines							
Steptoe Valley- 230 kV	25.6 mi	100 ft	310	~	~	~	75-82
Spring Valley- 230 kV, 69 kV, & 25 kV	67.0 mi	100 ft	812	~	~	~	1-5, 51-59, 82
Spring Valley- 25 kV	4.0 mi	50 ft	24	~	~	~	58-59
Snake Valley- 69 kV & 25 kV	20.2 mi	100 ft	245	~	~	~	63-68
Snake Valley- 25 kV	3.2 mi	50 ft	19	~	~	~	68-69
Hamlin Valley- 69 kV	10.1 mi	100 ft	122	~	~	~	61-63
Lake Valley- 230 kV & 69 kV	20.8 mi	100 ft	252	~	~	~	5-9
Cave Valley- 69 kV & 25 kV	2.2 mi	100 ft	27	~	~	~	11, 71
Cave Valley- 25 kV	16.5 mi	50 ft	100	~	~	~	70-74
Dry Lake Valley- 230 kV, 69 kV, & 25 kV	67.9 mi	100 ft	823	~	~	~	11-26
Delamar Valley- 230 kV & 69 kV	22.6 mi	100 ft	274	~	~	~	26-32
Pahranagat Valley- 230 kV & 69 kV	6.0 mi	100 ft	73	~	~	~	32-33
Coyote Spring Valley- 230 kV	39.6 mi	100 ft	480	~	~	~	33-44
Hidden Valley (North)- 230 kV	12.1 mi	100 ft	147	~	~	~	44-47
Garnet Valley- 230 kV	2.5 mi	100 ft	30	~	~	~	47-48
Subtotal	*320.3 mi*	~	*3,739*[a]	~	~	~	

Facility	Permanent Rights-of-Way			Temporary Rights-of-Way			Map Sheet
	Length	Width	Total Acres	Length	Width	Total Acres	
U.S. Bureau of Land Management							
Electrical Substations							
Dry Lake Valley	660 ft	660 ft	10	~	~	~	25
Spring Valley North	209 ft	209 ft	1	~	~	~	58
Spring Valley South	209 ft	209 ft	1	~	~	~	52
Snake Valley	209 ft	209 ft	1				67
Cave Valley	209 ft	209 ft	1	~	~	~	72
Subtotal	~	~	*14*	~	~	~	
Access Roads							
Unimproved – North and South Poleline Road	14 mi	20 ft	34	~	~	~	25-28
Unimproved - Gondor Substation to Steptoe Creek	14 mi	20 ft	34	~	~	~	75-77
Subtotal BLM	***7,686 acres***			***4,307 acres***			
Private							
Caliente Construction Support Area	irregularly shaped polygon		121	~	~	~	~
Main Pipeline - Coyote Spring Valley	1.6 mi	100 ft	19	1.6 mi	100 ft	19	35-36
230 kV Power Line – Coyote Spring Valley	1.4 mi	100 ft	17	~	~	~	35-36
Main Pipeline - Apex	2.0 mi	100 ft	24	1.2 mi	100 ft	15	49
Subtotal Private	***181 acres***			***34 acres***			
State of Nevada							
230 kV Power Line- Wildlife Preserve	1.4 mi	100 ft	17	~	~	~	80
Main Pipeline, Army National Guard	1.1 mi	100 ft	13	1.1 mi	100 ft	13	50
Subtotal State of Nevada	***2.5 mi***		***30 ac***	***1.1 mi***		***13 ac***	
PROJECT TOTAL	***7,888 acres***			***4,354 acres***			

Note: Total and sub-total lengths are rounded to the nearest tenth. Total acres are rounded to the nearest whole number.

Map Sheet refers to the specific pages in Map Volumes I and II.

[a] Rounded to nearest whole acre

[b] Not square

[c] Not rectangular

Table 3-2 GWD Future Facilities Programmatic Estimates

Facility	Permanent ROW (acres)	Temporary ROW (acres)
Groundwater Production Wells – 110 to 130 sites	165-195	55-65
Collector Pipelines – 110 to 260 miles	667-1,576	667-1,576
Staging Areas – 37 to 87	--	37-87
Pumping Stations – 2	10	10
25 kV Power Lines – 110 to 260 miles	667-1,576	--
Secondary Electrical Substations – 2	2	--
Total	1,511-3,359	769-1,738

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4.0 CONSTRUCTION

Standard construction techniques would be used for construction of the GWD Project. The general construction methods and procedures are described in this chapter. The construction contracting breakdown (i.e., number of construction contracts and sequencing) will be identified during project design.

4.1 STANDARD CONSTRUCTION METHODS

Some construction methods are common for all of the GWD facilities. These are briefly described below.

4.1.1 Surveying and Staking

Prior to ground disturbance activities SNWA would survey and stake the ROW boundaries. In addition, environmental features requiring avoidance such as sensitive plant populations, cultural sites, or other sensitive areas would be staked and fenced as necessary, in accordance with approved environmental measures and federal and state environmental conditions and stipulations. Existing utility lines, culverts, and other existing features would be staked to prevent accidental damage during construction.

4.1.2 Clearing and Grading

Clearing would occur within the staked boundaries of the permanent and temporary ROWs. Clearing would include removal of materials that would interfere with construction activities, create hazards or unsafe conditions, or impair subsequent site work. This includes cutting vegetation as approved by the BLM and removing boulders from the ROW.

After plant and topsoil salvage, the ROW would be grubbed by removing a deep surface layer that includes stumps and roots. It would be graded as necessary to provide a level working surface for the heavy construction equipment. Grading of the ROW would most likely be conducted by a bulldozer or track hoe.

Following site clearing and grading, berms and drainage ditches may be constructed to contain runoff and divert floodwaters from the construction area. The berms and ditches would be incorporated into the final grading of the facility sites, if feasible.

4.1.3 Site Fencing

Temporary security fencing would enclose facility construction sites (pumping stations, regulating tanks, buried storage reservoir, WTF, electrical substations, and pressure reducing stations) and temporary ROW, staging areas, and plant nursery areas where materials or equipment are stored. Permanent site security fencing would be installed around facility sites. The temporary and permanent security fencing would consist of standard 6- to 8-foot high chain-link fencing.

Temporary tortoise-exclusion fencing may be used in the portion of the project within desert tortoise habitat. Permanent tortoise exclusion fencing would be installed along with site security fencing around above-ground facility sites within desert tortoise habitat. Temporary orange plastic snow fencing would be used to delineate construction areas not enclosed by other fencing. This will provide construction site visibility for public safety, and also will ensure construction activities stay within the authorized ROW.

Temporary wildlife fencing may be installed along segments of open trench in areas of seasonal big game movement, as coordinated with BLM and Nevada Department of Wildlife.

4.1.4 Site Access

Access roads within the ROW would be constructed at the beginning of construction activities. This would include construction or new or improvement of existing roads within the ROW, by grading, installation of culverts, and placement of crushed rock, gravel, or other stabilization materials. The final width of unimproved roads would be 12 feet, improved roads would be 20 to 26 feet.

4.1.5 Materials Storage

The temporary staging areas and portions of the temporary ROW would be used for storage of construction equipment and building materials. Equipment is expected to include, but not be limited to, graders, trenchers, haul trucks, and pickup trucks. Building materials may include, but not be limited to, sections of pipe, pumps, motors, concrete block, cement, reinforcing steel bars (rebar), gravel, and sand. Smaller items such as tools, lighting fixtures, and instruments would be stored in enclosed, portable storage units. Fuel for construction equipment and water for dust control and construction uses would also be stored at the sites according to state, federal, and local rules and regulations.

The storage areas would be fenced to secure the equipment and materials, and security at the site will be provided as necessary.

4.1.6 Sanitation, Water, and Power

Sanitary facilities and potable water storage would be provided for construction personnel. Sanitary facilities for construction personnel would be portable units.

Water required during construction would be provided from local sources, temporary construction water wells, or production wells if available. Water may be conveyed to the construction site using water trucks or temporary above-ground water lines as necessary.

Temporary power supply would also be required during construction at some locations, including construction office trailers, pumping station and other facility sites, and the Caliente construction support area. Electrical power would be provided by portable generators, the GWD Project electrical system, or commercial power if available. If commercial power is available, it is anticipated that temporary connections would be arranged by the individual construction contractors, within the requested project ROW. Those temporary connections may be to existing regional electrical power lines operated by NV Energy, Inc., Lincoln County Power District, and/or Mount Wheeler Electric Company.

4.2 PIPELINE

Construction of the pipeline would be standard cut and cover, using an open trench. The only exceptions would be: 1) tunneling in the Apex area, and 2) crossings of the Kern River natural gas pipeline where jack and bore construction would be used.

4.2.1 General Pipeline Construction Techniques

In addition to the measures described in Chapter 4.1 above, the following general construction techniques would apply to pipeline construction.

Trenching

Excavators, backhoes, track hoes, or other similar equipment would be used to dig the trench. The pipe trench top width may vary from 15 to 70 feet wide, with side slopes from 0.75:1 to 2:1, depending upon topography and soil conditions. The depth from the ground surface to the top of the pipe would be a minimum of 6 feet. Material excavated from the trench would be stockpiled adjacent to the trench.

In Pahranagat Canyon, or other areas where construction excavation may be limited due to topographic constraints, pipeline excavation may use trench boxes or other structural trench support measures, in compliance with Occupational Safety and Health Administration standards.

The length of open trench segments would be managed to minimize the duration of construction disturbance. Longer stretches of open trench may be needed in some areas to keep the construction period shorter. It is not anticipated that more than 2.5 miles of individual trench segments would be open at any time.

Bedding

Engineered bedding materials would be laid in the bottom of the pipeline trench eventually extending to the midpoint of the pipe (Lower Pipe Zone). These bedding materials may consist of screened or otherwise processed excavated materials or materials imported from borrow pits. Alternatively, bedding materials may be a cement-based Controlled Low Strength Material.

Pipe Laying and Welding

Pipe sections would be transported to the construction site via truck and strung along the trench. The pipe sections would be lowered into the trench and the sections welded together. All welds would be visually inspected and tested using non destructive and approved testing methods. Welds that do not meet established specifications would be repaired or removed. Once the welds are approved, the welded joints would be tape wrapped and mortar coated. Wrapped and coated joints would be inspected for faults or voids in the coating. Next, appurtenant structures would be affixed to the pipe.

Upper Pipe Zone Backfilling

After the pipe and bedding material have been placed in the trench, the area immediately around the sides of the pipe (upper pipe zone) from the pipe midpoint to not less than 12 inches above the top of the pipe would be backfilled and compacted. Materials used for backfill may include Controlled Low Strength Material, excavated soils, or materials

imported from borrow pits that have been screened or otherwise processed. The imported backfill material would be crushed rock, gravel, and/or sand up to 3/8 inch in diameter.

Trench Backfill

The trench would then be backfilled from the top of the pipe zone to approximately finished grade. Material that is 6 inches in diameter or less would be used as backfill. Trench backfill would meet best management practices, and:

- Selected or processed to be clean, well graded earth material
- Free of excessive fine particles, vegetation, or other deleterious materials
- Compacted in place for maximum pipeline stability
- Moistened or dried before backfilling to ensure optimum moisture content

A back hoe, track hoe, bulldozer or similar equipment would be used for backfilling.

Excess soils not placed in borrow pits would be evenly distributed over the ROW. It is preliminarily estimated that the pipeline excavation could generate approximately 46 million cubic feet of excess soil materials. Respreading of this material across the ROW at the completion of construction could add approximately 3 inches to the ground surface. The ground surface would be graded as close as possible to pre-existing contours and to blend with adjacent land surface, and this increase is not anticipated to be visually discernable. Following grading of the ROW, vegetation restoration would be conducted in accordance with an approved Restoration Plan.

Hydrostatic Testing

Hydrostatic testing would need to be conducted to pressure test the completed pipeline. The testing would be conducted in segments, as the pipeline is completed. Water used for the hydrostatic testing is anticipated to be obtained from existing groundwater wells or other permitted sources.

Water from the hydrostatic testing of a pipeline segment would be discharged to a downstream section of pipe or through the pipeline drain valves into dry washes in the area. As described in Chapter 2.1.5, the specific site locations of the drain valves cannot be determined until detailed site elevations are obtained and facility design is completed. A detailed hydrostatic testing discharge plan will be prepared for each construction contract and approved by the BLM prior to conducting the testing.

Discharges into dry washes would be conducted in accordance with requirements of a State of Nevada temporary discharge permit. A diffuser or similar device would be used that is designed to reduce the potential of discharges to erode and scour dry washes.

4.2.2 Special Pipeline Construction Techniques

In some areas, special pipeline construction techniques may be necessary. These are described below.

Highway and Road Crossings

The pipeline would cross US Highways 93, 93/50/6, and SR 894. Jack and bore construction is anticipated for crossing the US Highways, and may also be used to cross SR 894, depending upon Nevada Department of Transportation requirements . Jack and

bore is a method for installing a casing below grade to carry the pipeline without trenching. A bore pit approximately 100 feet long by 20 feet wide would be placed on one side of the highway (within the requested temporary or permanent ROWs) in which the boring equipment would operate. Minimum depth to the top of the pipe under highways would be 6 feet.

Standard cut and cover using an open trench would be used on all other minor paved and unpaved roads crossed by the pipeline. Open trench crossings would include establishing detours for temporary closing of roads. If no reasonable detour is feasible, at least one lane of the road being crossed would be kept open for traffic, except during brief periods when it is essential to close the entire road to install the pipe. Most road crossings would be completed in 1 day. All necessary measures would be taken to ensure safety and minimize traffic disruption.

Utility and Other Crossings

The pipeline crosses the Kern River natural gas pipeline in two places near Apex, in northeastern Clark County. Crossings would be done by jacking and boring, as described above.

There are no current railroads crossed by the pipeline.

Steep Terrain

There are no areas anticipated where the pipe will be installed across steep terrain.

Water and Wetland Crossings

A formal jurisdictional delineation report is being prepared for submittal to the US Army Corps of Engineers, in accordance with Section 404 of the Clean Water Act. The only location where proposed construction would cross a perennial creek is along the Snake Valley Lateral at Snake Creek. There would be no construction crossing of wetlands.

The plan for constructing the pipeline crossing of Snake Creek is to use a temporary dam, installed within the ROW upstream of the pipeline trench area. The temporary dam may consist of large sandbags or earth wrapped in canvas, or other commercially-available air filled temporary dams. Water flow from the creek would then either be pumped or allowed to flow by gravity through a pipe placed across the construction area, as necessary and stipulated by federal, state or local permits or regulations. An energy dissipater would be used at the pipe discharge location into the natural creek drainage. Following backfill of the pipe trench, the dam and piping would be disassembled and the creek restored to pre-existing conditions. Additional stabilization measures such as rip rap may be used if needed to protect the facilities and prevent increased erosion in the drainage.

There are also many desert washes and ephemeral drainages along the pipeline route. These washes and drainages would be crossed with typical cut and cover open trench techniques. All necessary erosion control activities would be implemented during and after construction to eliminate bank erosion and prevent sedimentation, as necessary and stipulated by federal, state or local permits or regulations. After pipe installation and backfilling, the drainage would be re-contoured to preexisting conditions as much as feasible, and standard restoration activities implemented in accordance with an approved Restoration Plan.

Residential Areas

The proposed GWD Project facilities are not located in or adjacent to any residential areas. Therefore, no special construction techniques for residential areas are necessary.

Blasting

Blasting may be necessary if hard rock, caliche, or large boulders are encountered during excavation activities for the GWD Project. Until detailed geotechnical investigations and pipeline design are completed, it is not known if any blasting would be required. The BLM would be notified in advance if blasting is needed, and skilled and experienced specialists used to ensure that all blasting is conducted according to agency regulations and an approved Blasting Plan.

4.3 PUMPING AND PRESSURE REDUCING STATIONS

Following site clearing and grading, the plumbing, power conduits and other infrastructure beneath the pumping and pressure reducing station floors would be constructed. The foundations of the structure would then be constructed, followed by the floors, walls and roof. Mechanical and interior components may be constructed in conjunction with the building or after it is completed.

The facilities would be inspected and a certificate of occupancy issued according to required county regulations. Permanent power would be connected from the GWD Project electrical system to the facilities' electrical systems. The pumps, valves, and appurtenances within each facility would be connected to the incoming and outgoing water pipelines, and the system tested in its entirety. Temporary electrical, water, and sanitary systems not converted into permanent facilities would be removed. Final grading and site restoration of the temporary ROW would be completed in accordance with the approved Restoration Plan.

4.4 REGULATING TANKS

Following site grading and leveling, the regulating tanks would be constructed of steel (above or below ground) or concrete (below ground). Steel tanks would be built on a concrete foundation, with steel panels welded and bolted together to form the floor, walls, and roof. Concrete tanks may be constructed as cast-in-place structures. Overflow pipes, drain pipes, inlet and outlet pipes, ladders, and other appurtenances would be erected at varying periods during construction.

At the completion of construction, the tanks may be hydrostatically tested. Hydrostatic testing of regulating tanks would be coordinated with testing of the pipelines, if feasible, to conserve the amount of water needed for testing. The volume of water discharged from hydrostatic testing would be dependent upon the final size of each tank, which will not be determined until project design. However, it is anticipated that the maximum volume of water discharged per tank would be 3 to 10 million gallons. Water would be discharged into adjacent dry washes or drainage channels, with the flow rate not exceeding the 2 to 5 year storm event. The water would be discharged in a controlled manner, in accordance with the requirements of a temporary discharge permit and the hydrostatic discharge testing plan. Alternately, testing water may be discharged to downstream piping.

4.5 WATER TREATMENT FACILITY/BURIED STORAGE RESERVOIR

Following site clearing and grading, the plumbing, power conduits and other infrastructure beneath the WTF and reservoir floors would be constructed. The foundations would then be constructed, followed by the floors, walls, and roof. Ancillary components inside and outside of the facilities would be constructed once the concrete structures are constructed.

The WTF mechanical and interior components would consist mainly of storage tanks for wet and dry treatment chemicals, treatment contact vessels, metering and transfer pumps, meters and gauges, and piping. The WTF would be inspected and a certificate of occupancy issued according to applicable county regulations.

Hydrostatic testing of the reservoir would be coordinated with the testing of the pipelines, if feasible, to conserve the amount of water needed for the testing. It is anticipated that approximately 10 to 40 million gallons of water may be discharged from hydrostatic testing of the reservoir. Water would be discharged into adjacent dry washes or drainage channels at a rate not exceeding the 2 to 5 year storm event. The water would be discharged in a controlled manner, in accordance with the requirements of a temporary discharge permit and the hydrostatic discharge testing plan.

Permanent power would be connected from the GWD Project electrical system to the WTF electrical system. The internal piping system would be connected to the incoming and outgoing water pipelines and the system tested in its entirety. Temporary electrical, water, and sanitary systems not converted into permanent facilities would be removed. Final grading and landscaping would follow.

4.6 POWER FACILITIES

Construction of the different power components is described below.

Power Lines

Unlike other facilities, clearing and grading of the entire power line ROW would not be required. Following identification of specific power pole locations, work areas of approximately 100 feet by 100 feet around each power pole structure would be cleared. An access road or access road spur to the pole locations would be rough graded.

A truck-mounted rotary auger would bore pole locations to a depth of approximately 15 feet. After hardware and insulators are installed on each pole, the poles would be erected on site and placed using a truck-mounted crane. Soil removed by the auger would be used to backfill the space around the pole. Excess soil cuttings would be spread around the pole site, within the ROW. Where additional strength is needed to support a power pole, a concrete foundation may be used to reinforce a bore hole, or concrete may be used to backfill a hole after pole installation.

Conductor wires would be strung using tensioning equipment. Stringing conductor wires over US Highway 93, 50 and 6, and other frequently traveled roadways may require the erection of temporary guard structures to elevate conductor wires to a sufficient height to avoid traffic conflicts. Temporary guard structures would be constructed using wood poles in H-frame configuration.

After power lines are connected to substations and facilities, the lines would be energized. Electrical equipment on each power line network would be tested before it is entered into service.

Substations

Following site clearing and grading, berms and drainage ditches would be constructed to contain runoff and divert floodwaters from the substation sites. For each substation, concrete pads would be constructed for transformers. Each pad would include a curb around the perimeter for spill containment. Concrete foundations would be constructed for electrical structures. Electrical conductors would be strung using pulleys. A concrete block control building would be constructed to house controls and relay equipment.

Substations would be enclosed by security fencing, typically 8-foot high chain link, with a locked gate. Once the substations are constructed, they would go through a testing and commissioning process, in accordance with applicable electrical industry standards, codes and procedures.

4.7 CONSTRUCTION SCHEDULE, MANPOWER, AND EQUIPMENT ESTIMATES

A detailed construction schedule will be determined during project design, as individual construction contracts are identified. However, for the purposes of conducting the environmental analysis, assumptions have been made regarding the construction schedule, manpower, and equipment needs.

4.7.1 Construction Schedule

Construction of the GWD Project facilities under this ROW request is planned to begin upon receipt of the ROW grant in 2010 and reach completion in 2018. Various components of the GWD Project may be constructed simultaneously throughout the project area during this period. Table 4-1 provides a preliminary construction schedule for the GWD Project. The access roads would be constructed in conjunction with the pipelines, and so are not separately listed on the table.

Table 4-1 Preliminary Construction Schedule for Proposed Facilities

Facility		Anticipated Construction Start (Quarter/Year)	Anticipated Construction Finish (Quarter/Year)
Main Pipeline	South Terminus to Reservoir/WTF	Q2/2010	Q2/2014
	Reservoir/WTF to Delamar Valley RT	Q3/2011	Q3/2013
	Delamar Valley RT to Dry Lake Valley RT	Q4/2012	Q3/2014
	Dry Lake Valley RT to Muleshoe RT	Q3/2013	Q2/2015
	Muleshoe RT to Spring Valley RT	Q4/2014	Q3/2016
	Spring Valley RT to Spring South PS	Q2/2015	Q4/2016
Lateral Pipelines	Cave Valley Lateral	Q2/2014	Q2/2015
	Spring Valley South Lateral	Q2/2015	Q3/2017
	Spring Valley North Lateral	Q3/2017	Q1/2018
	Snake Valley South Lateral	Q3/2016	Q2/2018
	Snake Valley North Lateral	Q2/2018	Q4/2018
Pumping Stations	Lake Valley Pumping Station	Q4/2013	Q2/2015
	Spring Valley South Pumping Station	Q1/2015	Q1/2017
	Spring Valley North Pumping Station	Q4/2016	Q1/2018
	Snake Valley South Pumping Station	Q3/2016	Q1/2018
	Snake Valley North Pumping Station	Q3/2017	Q4/2018
Pressure Reducing Stations	Coyote Spring Valley PRS	Q3/2011	Q1/2012
	Dry Lake Valley South PRS	Q2/2012	Q4/2012
	Dry Lake Valley North PRS	Q4/2012	Q3/2013
Buried Storage Reservoir	(on same site as Water Treatment Facility)	Q3/2012	Q4/2014
Water Treatment Facility	(on same site as Buried Storage Reservoir)	Q2/2013	Q4/2014
Power Facilities	Transmission, Distribution & Substations	Q2/2012	Q4/2016

RT – Regulating Tank
PS – Pumping Station
PRS – Pressure Reducing Station

4.7.2 Manpower Estimates

A preliminary estimate of the peak manpower required to construct the GWD Project facilities has been developed for the purposes of environmental analysis. Although the specific number of construction contracts and associated contracting schedule has not yet been developed, assumptions were made based upon the preliminary construction schedule and typical construction workforce on other SNWA projects. The estimated peak construction manpower by year is presented in Table 4-2. Estimates for the main pipeline and power line are shown over the entire construction period, because locations and limits of individual construction contracts have not yet been determined. The lateral pipelines and facility sites were grouped into eight general geographic regions for manageability.

Table 4-2 Estimated Peak Construction Manpower by Year

Construction by Region	Year								
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Main Pipeline	5	154	332	451	364	267	130		
Main Power Line			88	89	89	89	48		
Snake Valley North Facilities and Snake Valley Lateral								98	135
Snake Valley South Facilities and Snake Valley Lateral							272	317	131
Spring Valley North Facilities and Spring Valley Lateral						41	42	132	71
Spring Valley South Facilities					71	139	234	151	
Lake & Cave Valleys Facilities and Cave Lateral					72	72			
Dry Lake Valley Facilities			45	46	32				
Delamar and Coyote Spring Valleys Facilities			99	104					
Hidden, Garnet, and Las Vegas Valleys Facilities		70	203	242	285				
Estimated Total per Year	**5**	**224**	**767**	**932**	**913**	**608**	**726**	**698**	**337**

4.7.3 Construction Equipment

Estimates of the types of construction equipment that may be required for project construction have been developed for the purpose of environmental analysis. The estimated construction equipment types are listed in Table 4-3. The categories shown include the following components:

- Pipelines – includes pipelines, valves, regulating tanks, and pressure reducing stations
- Water and Power Facilities – includes the WTF, buried storage reservoir, pumping stations, and substations, and
- Power Lines – includes power poles and power lines.

Table 4-3 Estimated Construction Equipment

Equipment Type	Pipelines	Water and Power Facilities	Power Lines
Auger truck			X
Boom truck		X	X
Bucket lift		X	X
Bulldozer	X	X	
Cable-stringing truck			X
Stringing machine			X
Cement mixer		X	X
Crane	X	X	X
Excavator	X	X	
Flat bed truck		X	X
Forklift	X	X	
Fuel truck	X	X	
Generator, small	X	X	
Generator, large	X	X	
Grader	X	X	
Haul truck	X	X	
Loader	X	X	
Pick-up truck	X	X	X
Plate compactor	X	X	
Roller compactor	X	X	
Water truck	X	X	
Welding rig	X	X	

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5.0 OPERATION AND MAINTENANCE

The GWD Project would be operated and maintained by SNWA safely, correctly, and within environmental parameters required by the BLM ROW grant and other federal, state, and local agency requirements. In addition to routine operation of facilities, activities would include remote and on-site monitoring of system functions, inspection of the pipelines and facilities, regular maintenance of equipment, repairs conducted as needed, and responses to emergency conditions should they occur. All operation and maintenance activities would be confined to the permanent ROW. If additional ROW is required for unforeseen circumstances, SNWA would request it from the BLM.

Operation of the GWD Project would be continuously monitored by SNWA with a remote monitoring system. This system would use fiber optic cables installed along the pipelines to monitor overall performance, including water pressures, flow rates, power demands, and other factors. Staff would be dispatched as needed if any concerns are noted.

Overall operation of the GWD Project would be coordinated with the existing SNWA water system. The SNWA operations staff would manage the water systems to deliver water to the locations requested by the purveyor members.

A detailed operations and maintenance schedule would be developed for GWD Project facilities and components during facility construction and prior to operation. Facilities would periodically be visually inspected to ensure proper functioning, with emphasis on major facilities and mechanical equipment. On-site personnel and SNWA's remote monitoring and control system would track and manage facility functions. Operation of the pumping stations and the WTF would require the use of consumable supplies and may require the use of chemicals that would need to be delivered on a regular basis.

The operational staffing of the GWD Project has not yet been determined. It is currently anticipated that 5 to 10 staff positions may be assigned to the White Pine and Lincoln County areas, which would be dispatched to the different facilities as needed. For facilities in Clark County, a similar number of operational staff may be needed, but they would be coordinated with other existing SNWA facilities and dispatched as needed.

5.1 PIPELINES

Operational activity on the pipeline would be primarily maintenance of the ROW and inspection, repair, and cleaning of the pipeline and appurtenances. Aerial and ground inspections by pipeline personnel would identify any areas of exposed pipeline and appurtenances, erosion, unauthorized ROW encroachment, or any other conditions that could present a safety hazard or require preventive maintenance or reporting. The pipeline route would likely be visually inspected at least monthly.

In the unlikely event of a major system rupture or malfunction resulting in the discharge of water, pressure sensors installed on the system would detect the pressure loss, and the groundwater pumps and wells would begin an automatic, sequenced shut down. Shut down would be sequenced to avoid buildup of dangerous pressures in the pipeline and other facilities. Valve closing times would vary based on location and system conditions, but are estimated to vary from 15 to 25 minutes. For a major system failure, alarms would sound at manned facilities along the pipeline alignment and at the SNWA

operations centers. A plan of action to investigate the source of the problem would commence immediately.

Depending upon the location of the incident, a manned response could take between 30 minutes and 3 hours to reach remote areas. The quantity of water that might be released in the unlikely event of a pipeline rupture or valve failure cannot be precisely quantified, as it would depend upon the type and extent of a break/failure, along with the location of the break within a pipeline segment and its distance from the closest upstream and downstream isolation valves. However, assuming the worst scenario of a catastrophic failure in the low point of a 5-mile section of pipeline, the maximum quantity of water contained in that length of pipeline would range from 5.6 million gallons for a 72-inch pipeline to 7.6 million gallons for an 84-inch pipeline. All of that quantity of water is unlikely to be released, even in an emergency scenario, since immediate actions would be taken through the automated system and on-site response to control and repair the leakage.

5.2 PRESSURE REDUCING AND PUMPING STATIONS

Routine visual inspections of each of the pressure reducing and pumping stations would be conducted. Inflow and outflow would be remotely monitored to ensure proper operation, including ancillary facilities such as the valves and piping needed to control water flow. Equipment would be activated or deactivated as needed to maintain flow through the system. At least one operational personnel is anticipated to visit each pumping station and pressure reducing station weekly. Approximately monthly truck deliveries of supplies and materials would be made at all pumping stations, using established access roads.

The maintenance yard adjacent to the Spring Valley South Pumping Station would be used to conduct maintenance and repair activities at for that and other project facilities as needed. Less extensive on-site maintenance and repair may also occur at each facility site, as necessary and feasible.

5.3 REGULATING TANKS

In addition to remote system monitoring, SNWA would conduct routine visual inspections of the regulating tanks. The tanks would likely be visually inspected monthly.

5.4 WATER TREATMENT FACILITY/BURIED STORAGE RESERVOIR

An integrated control system would be developed for operation of the WTF, which would be coordinated with SNWA's other water supply facilities. At least one operational personnel is anticipated to be present at the WTF daily.

In addition to remote system monitoring, SNWA would conduct routine visual inspections of the WTF and buried reservoir. Valves to maintain water levels in the reservoir would be visually checked and remotely controlled.

Operation of the WTF would require delivery and use of chemicals for water treatment. Table 5-1 shows the major chemicals potentially needed for water treatment, along with potential on-site storage quantity, the approximate number of days of supply, and delivery frequency. The final list and quantities of chemicals would be determined after

water quality testing of groundwater production wells and design of the facility are completed.

It cannot currently be determined if arsenic treatment may be required. This would not be known until water quality results from production wells are available. If arsenic treatment is needed, the treatment process would likely involve the addition of ferric chloride and sodium hypochlorite. Any sludge generated from the arsenic treatment would be disposed of in an approved landfill.

Table 5-1 Potential Water Treatment Chemicals

Chemical	Stored Quantity	Days of Supply	Monthly Truck Trips
Sodium Chloride (salt)	66 tons	30	4
Sodium Hypochlorite	64,000 gallons	generated on-site	NA
Zinc Orthophosphate (inhibitor)	3,200 gallons	30	1
Hydroflosilic Acid (23% liquid)	11,200 gallons	30	4

5.5 POWER FACILITIES

The power facilities would be monitored remotely to ensure proper operation and that adequate power is available. The structures, insulators, conductors, and related hardware would be visually inspected at least annually. Substations would be visually inspected at least monthly. Additional (unscheduled) visual inspections may be carried out following severe weather or other events that could damage the facilities. Maintenance would be performed on an as-needed basis.

5.6 ACCESS ROADS

Improved and paved access roads within the ROW would be maintained throughout facility operation. This may include pavement repair and additional grading and graveling of improved roads, as needed to maintain road integrity.

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6.0 TERMINATION

The ROW granted for the GWD Project would be in accordance with the Federal Land Policy and Management Act of 1976, Southern Nevada Public Lands Management Act of 1998, and LCCRDA. In accordance with LCCRDA and the Southern Nevada Public Lands Management Act, ROW is granted in perpetuity. Termination and abandonment of the GWD Project is not anticipated, unless exceptional circumstances should arise. In such a case, the termination and abandonment would be subject to approvals by the BLM and other federal and private land managers. Termination and abandonment plans would be written in accordance with current management procedures and submitted to the BLM in advance of any associated actions. If the Project was to be abandoned in part or in whole, the ROW would revert to the land managing agencies. In the event that upgrade or replacement of facilities is required, SNWA would coordinate with the BLM prior to initiating major construction in accordance with applicable stipulations of the final ROW grant.

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APPENDIX A

Applicant Environmental Protection Measures

Clark, Lincoln, and White Pine Counties Groundwater Development Project

SNWA has identified environmental protection measures that will be implemented as part of construction and operation of the GWD Project. These applicant-committed measures include design features, best management practices (BMPs), monitoring, standard operating procedures, and other practices. They also include measures SNWA has previously agreed upon in stipulations or other agreements with federal, state, or local agencies and entities.

The applicant-committed environmental protection measures have been divided into three categories: 1) Detailed measures associated with the current ROW request, 2) Programmatic measures associated with future ROWs, and 3) Landscape measures associated with groundwater pumping and potential regional water-related effects. This draft contains only measures from the first two categories. The measures for the last category will be developed in conjunction with the results of groundwater modeling.

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A. ROW Measures

1. GENERAL CONSTRUCTION PRACTICES

Planning and Permitting

A.1.1 SNWA will complete a Construction, Operation and Maintenance (COM) Plan for BLM approval prior to start of construction. The COM Plan will detail project design and construction specifics, including but not limited to construction contract timing and phasing, construction access roads and ROW entry points, locations of refueling and equipment maintenance, hydrostatic discharge locations, areas of fencing for special status species, and other details.

A.1.2 An Environmental Compliance Representative will be designated by SNWA and will be responsible for overseeing mitigation compliance and for coordination with the BLM. The Environmental Compliance Representative will have authority to halt all activities that are in violation of project permits.

A.1.3 All activities directly or indirectly associated with the construction, operation, and maintenance of the project on federal lands will be conducted within the authorized limits of the ROW grant. Any facility relocation, additional construction area, or other use that is not in accord with the ROW grant will not be initiated without prior written approval of the BLM. Cross-country vehicular travel outside of the ROW is prohibited, unless prior approval is obtained from the BLM.

A.1.4 A worker education program will be developed by SNWA and used during construction and operation. A handout will be developed addressing environmental protection measures incorporated into the proposed project, and the responsibility of each worker in environmental protection. Each worker will be briefed on their environmental compliance responsibilities, provided a handout, and required to sign a certification that they understand and will comply with those environmental protection measures. Specifics of the program will include, but are not limited to:

- General site maintenance (i.e., trash disposal),
- Prohibiting driving off the cleared corridor or existing roads,
- Importance of speed limits and other traffic regulations on access roads
- Prohibiting dogs or hunting on the construction and facility sites
- Terms and conditions of project Biological Opinion
- Desert tortoise conservation measures, including:
  - Biology and identification
  - Prevention of desert tortoise handling
  - Checking under vehicles for desert tortoises
  - Purpose of desert tortoise fencing, reporting procedures for damaged fencing
  - Reporting procedures if a tortoise is observed in work area
  - Reporting procedures if a desert tortoise injury occurs or is observed

- Procedure if a desert tortoise is in harms way (imminent danger)

- Consequences of harassment of desert tortoises and penalties for violation of State and Federal Laws

- Identification and reporting procedures for other sensitive wildlife, including gila monster, chuckwalla, western burrowing owl, kit fox, sage grouse, pygmy rabbit, migratory birds, and raptors
- Cultural and paleontological resource identification and protection
- Noxious weed management and identification
- Workers shall receive a sticker or certificate that they have completed the training; a laminated card that can be used for reference, including applicable contact phone numbers, may also be used
- Trainings will be held for new contractors throughout the life of the project

A.1.5 A Public Information Plan will be developed in coordination with the BLM to notify the public in advance of the start of each construction phase. Measures that will be implemented to inform the public may include public notices, public meetings, letters to nearby residents, road signs, and other measures.

Surveying

A.1.6 To the extent possible, SNWA will protect all survey monuments found within the ROW. Survey monuments include, but are not limited to General Land Office and Bureau of Land Management Cadastral Survey Corners, reference corners, witness points, U.S. Coastal and Geodetic benchmark and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments.

A.1.7 In the event disturbance or destruction of survey monuments is unavoidable, SNWA will report the incident, in writing, to the BLM and the installing authority, if known. If General Land Office or BLM ROW monuments or references are destroyed during operations, SNWA will secure the services of a registered land surveyor to restore the disturbed monuments and references, using surveying procedures found in the Manual of Surveying Instructions for the Survey of the Public Lands of the United States, latest edition. SNWA will record such survey in the appropriate office and send a copy to the authorized officer.

A.1.8 SNWA will survey the edges of the ROW prior to the start of construction. The outer boundaries will be clearly marked with stakes and colored flagging, placed about 100 feet apart or within site of each adjacent flag. All ground-disturbing activities will be confined to the designated ROW.

A.1.9 If any exclusion zones within the ROW are required by the BLM for resource protection, those areas will be staked, flagged, and signed to ensure avoidance during construction.

A.1.10 Survey crew vehicles will remain on existing roads or within previously cleared construction ROW. If off-road travel within the designated ROW is necessary, a qualified biologist will first clear the proposed route. In desert tortoise habitat, a

Fencing

A.1.11 Temporary security fencing may be used to enclose staging areas, nursery sites, and facility sites during construction. This fencing will consist of standard 6 to 8 foot high chain-link fencing and it will be removed at the completion of construction activities. Security fencing of the entire pipeline ROW during construction is not anticipated, but may be used in specific areas for security or safety concerns.

A.1.12 Permanent site security fencing will be used to enclose facility sites, including water treatment facility, buried storage reservoir, pumping stations, regulating tanks, and pressure reducing stations. This fencing will consist of standard 6 to 8 foot high chain-link fencing.

A.1.13 Within desert tortoise habitat, temporary desert tortoise exclusion fencing may be used to enclose active construction areas. The tortoise exclusion fencing may be installed with site security fencing or separately, and may be installed in phases to match construction activity. The tortoise exclusion fencing will consist of 1 x 2 inch mesh, 14 gauge galvanized wire fence (not poultry netting or hogwire), 36 inches high. The top 24-inches of fence, with the two-inch positioned vertically, will extend above ground and be firmly attached to the site chain link fence or 12 gauge galvanized smooth wire. The bottom 12-inches of fence will be either buried vertically or bent at a right angle towards the outside of the construction area, and covered with three to six inches of dirt, rocks or gravel from the surrounding area. Gates with no more than one-inch ground clearance or tortoise-proof guards will be installed at all access points. The temporary desert tortoise exclusion fencing will be maintained in place for the duration of construction, until initial restoration activities (replacement of cactus and yucca) are completed.

A.1.14 Tortoise exclusion fencing will be inspected during construction on an at least bi-weekly basis, and any repairs completed within 72 hours from March 1 through October 31, and within 7 days from November 1 through February 28/29. The biological monitor(s) will also inspect the fencing after major precipitation events to ensure fence integrity. Routine fence maintenance will be performed as needed including removing trash, sediment accumulation, and other debris.

A.1.15 Permanent tortoise exclusion fencing will be installed along with site security fencing around the above-ground facility sites within desert tortoise habitat, including the water treatment facility, buried storage reservoir, and pressure reducing station 3. Permanent tortoise exclusion fencing will consist of the same fencing as described above for temporary tortoise fencing, with the bottom 12-inches of fence buried vertically.

A.1.16 For active construction areas not enclosed by site security or tortoise-exclusion fencing, four-foot high orange plastic snow fencing will be used to enclose the work area. This fencing will provide construction site visibility for public safety, and also will ensure construction activities stay within the authorized ROW.

A.1.17 Fencing may be installed along segments of open trench in areas of seasonal big game movement. The type and location of fencing will be coordinated with Nevada Division of Wildlife and the BLM.

Clearing and Grading

A.1.18 Within desert tortoise habitat, clearing will occur only within the fenced boundaries of the permanent and temporary ROWs. Clearing will include removal of materials that will interfere with construction activities, create hazards or unsafe conditions, or impair subsequent site work. Outside of the desert tortoise habitat, clearing will only occur after boundaries of the permanent and temporary ROW have been staked.

A.1.19 Where possible, vegetation within the ROW shall be crushed instead of removed by blading, to minimize impacts to vegetation and soils.

A.1.20 Trash and debris will be removed from the ROW before clearing and grading activities begin, and properly disposed of in a permitted landfill facility. This is limited to existing surface debris foreign to the natural, native community.

A.1.21 Boulders greater than 18 inches in diameter found on the soil surface will be moved to the edge of the ROW. This will be done carefully to leave as much of the natural patina or desert varnish on the boulders as possible. The boulders will be respread on the ROW at the completion of construction as part of restoration activities.

A.1.22 Topsoil will be salvaged from the ROW, except for areas where the ground surface will be disturbed only by driving and crushing. After completion of clearing and plant salvage activities, the top 4 inches of topsoil and remaining plant material will be windrowed along the edge of the ROW or placed in stockpiles no greater than 6 feet in height. Vegetation shall be ground or chipped to a mulching consistency and mixed with stripped soils. Topsoil stripped from areas with different surface conditions shall be stockpiled separately and later used to restore the same areas. The topsoil will be fenced and signed, and a tackifier, water, or other BLM-approved erosion control measure will be applied to prevent wind or rain erosion. The tackifier shall be derived from natural organic plant sources containing no growth- or germination-inhibiting materials.

A.1.23 For areas within the ROW where noxious weed infestations are noted, topsoil and cleared vegetation will be stockpiled separately and signed, to avoid mixing with topsoil salvaged from other areas.

A.1.24 A record will be maintained of when construction-related major ground-disturbing activities begin and are completed, and when restoration activities are initiated.

Access Roads

A.1.25 A Construction Traffic Management plan will be developed prior to the start of construction for each major phase of the project. The plan will include measures to reduce the numbers of construction trips by use of car-pooling and/or construction shuttles, scheduling of work shifts and materials deliveries, designation of access routes, and other measures to minimize traffic effects.

A.1.26 A maximum speed limit of 25 miles per hour will be maintained within the construction area and while on unposted dirt roads to reduce dust and allow for observation and avoidance of desert tortoise, livestock, wild horses, or other wildlife in the road. .

A.1.27 Public access routes within or across the ROW will be maintained or detour routes will be identified during construction activities. Detours will be established in coordination with the BLM and local authorities where needed for temporary road closures due to safety concerns.

A.1.28 Signing and traffic controls will be placed well in advance of the construction area to warn motorists of detour routes available during construction.

A.1.29 Signs and persons with flags will be used within the construction area as necessary to direct traffic in accordance with all applicable Nevada Department of Transportation, county, and local rules and ordinances.

A.1.30 Designated construction entry locations into the ROW will be identified from existing roads. These entry locations will be stabilized with crushed rock underlain by geotextile filter fabric, or temporary asphalt pavement to prevent sediment from being tracked onto asphalt, concrete, or improved road surfaces and to limit other damage such as road shoulder rutting.

A.1.31 Sediment transported onto a public paved road surface by construction equipment or vehicles will be removed immediately by shoveling and sweeping. This material will be disposed at an approved area, within the ROW. Road washing will be allowed only after the sediment is removed in the above manner.

A.1.32 Wheel washers will be installed where vehicles enter and exit unpaved roads onto paved roads, and trucks and any equipment will be washed every time they leave the site. Excess dirt on the wheels, undercarriage, and bodies of trucks exiting work areas will be removed prior to allowing the trucks to exit onto paved roads, to reduce track-out of soils, debris, and invasive and noxious weeds.

A.1.33 During construction, all unpaved access roads used by construction personnel, equipment, and material deliveries will be maintained in coordination with local county requirements. This maintenance may include use of additional road base materials to maintain road integrity.

A.1.34 At the completion of construction, previously existing access roads will be restored to pre-construction conditions or better. Improvements made for construction will be left in place. In areas of silty soils, the roads will be restored to pre-construction conditions or better.

Construction

A.1.35 Construction contractors will provide site security for equipment and materials, and to limit access to construction sites to authorized personnel. This may be accomplished through use of security personnel, signage, and/or fencing of facility sites as needed.

A.1.36 Firearms and domestic dogs shall be prohibited from the ROW, except for authorized law enforcement personnel.

A.1.37 The ROW will be kept free from any accumulation of trash and debris, to reduce the attractiveness of the area to opportunistic predators such as desert kit fox, coyotes, and common ravens. Food-related trash, also including cigarettes, cigars, gum wrappers, tissue, cans, paper, and bags, will be disposed of promptly in predator-proof containers with resealable lids. Trash containers will be removed regularly (at least once per week). Trash, debris, and/or waste will not be buried or burned. Disposal of trash and debris will be off-site, at a State of Nevada approved sanitary landfill site. Upon construction completion, all construction refuse, including but not limited to broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes will be removed from the ROW and disposed of properly.

A.1.38 Sanitary waste will be contained within portable toilet facilities. Portable toilets will be obtained by construction contractors and sited in designated locations in the construction area. The toilets will be maintained and serviced as needed for the duration of construction, and removed at the completion of construction.

A.1.39 In areas not enclosed by security fencing, escape ramps will be placed at each end and every ¼-mile of any trench or other excavation deeper than one foot to allow escape of wildlife that may become entrapped. The escape ramps will consist of loose dirt at a 2:1 or shallower slope.

A.1.40 Hazardous and toxic materials such as fuels, solvents, lubricants, and acids used during construction will be controlled to prevent accidental spills. Toxic and hazardous materials will be stored in secondary containment structures to prevent any spilled material from leaving the area. Specific areas for equipment maintenance and refueling will be designated and identified in the final COM Plan. Vehicle and equipment refueling and hazardous materials storage will not be allowed within 100 feet of any jurisdictional wash or stream.

A.1.41 Spill cleanup kits will be available on equipment and maintained so that spill of fuels, solvents, lubricants, or acids can be quickly cleaned up. Construction and maintenance personnel will be trained in the proper use of the spill kit materials and correct disposal procedures.

A.1.42 Any leak or accidental release of hazardous and toxic materials shall be stopped immediately and cleaned up at the time of occurrence. Contaminated soils shall be removed and disposed of at a State of Nevada approved landfill site.

A.1.43 Any release of hazardous and toxic materials in excess of reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall also be submitted to the BLM.

A.1.44 A water truck and other fire suppression equipment such as extinguishers and shovels will be available on-site during construction. A designated individual on each construction site will be responsible for fire watch and fire suppression. For welding crews, one team member will be responsible for fire watch. When welding at field

A.1.45 Where the construction ROW crosses beneath existing power lines, warning signs will be installed with identified height restrictions. A construction watchman will be designated during construction activities beneath power lines, to ensure equipment keeps specified distances from the power line conductor cables.

A.1.46 If blasting is determined to be necessary based on project design, a Blasting Plan will be prepared and submitted to the BLM for approval in advance of construction. Any blasting will be conducted as unobtrusively as possible and managed to avoid damage to nearby facilities or properties. Blast noise monitoring will be conducted if blasting will be in the vicinity of occupied properties or sensitive public uses such as campgrounds or visitor facilities.

A.1.47 Dewatering is not anticipated to be required for project construction. If subsequently determined to be needed based on detailed geotechnical investigations, a dewatering plan will be prepared and submitted to the BLM for approval in advance of construction. Should dewatering be necessary, discharge water will be directed to prevent flow from entering streams, wetlands, or sensitive environmental areas.

Stormwater and Erosion Control

A.1.48 A General Permit for Stormwater Discharges Associated with Construction Activity (NVR100000) will be obtained prior to any surface disturbance that includes clearing, grading, excavation, and stockpiling.

A.1.49 A site specific Storm Water Pollution Prevention Plan (SWPPP) will be prepared and implemented for each construction contract. The SWPPP will identify all potential sources of pollution which could affect the quality of stormwater discharges from the construction site, describe the construction activities that disturb soils at the site, provide an estimate of the total disturbance area, and identify waters of the United States within one mile of the site. A copy of the SWPPP will be kept on site and updated as needed to manage pollutants or reflect changes in site conditions.

A.1.50 A Spill Prevention, Containment, Countermeasure, and Cleanup Plan will be prepared and submitted to the BLM. The plan will describe measures that will be taken to properly store, handle, and prevent hazardous materials from entering stormwater.

A.1.51 Construction sequencing will be designed and scheduled to create the shortest construction window practicable and the least amount of potential stormwater runoff. Construction, cleanup, and reclamation will be sequenced to minimize the time between ground disturbance and final restoration.

A.1.52 Erosion and sediment control will be implemented using both non-structural and structural BMPs. Non-structural BMPs are methods or programs such as education, management and development practices, good housekeeping, and construction sequencing. Structural BMPs are physical devices or means for removing, reducing, retarding, or preventing targeted stormwater runoff constituents, pollutants, and contaminants from reaching receiving waters.

A.1.53 Temporary erosion and sediment controls will be installed as necessary prior to initial soil disturbance activities and will be maintained throughout construction and reclamation. These controls will be designed to retain sediment on site to the maximum extent practicable. Typical erosion and sediment control BMPs include siltation or filter berms; filter or silt fencing; sediment barriers, e.g., sand bags, hay bales, straw wattles (straw bound into rolls or bales); rock or gravel mulches, wood chip, straw & bark mulches; and jute & synthetic netting. Any hay or straw used for erosion control will be certified weed-free.

A.1.54 During construction, broken structural erosion controls will be replaced or restored as soon as practicable but before the next forecasted precipitation event. Sediment will be removed from structures when sediment reaches 50 percent of the barrier capacity.

A.1.55 For construction activities crossing a dry wash, soil and spoil stockpiles will be pushed away from jurisdictional dry washes and stored a minimum of 10 feet above the ordinary high-water mark if silt fencing is used to limit sedimentation of these areas; otherwise, stockpiles will be located 100 feet away from dry washes.

A.1.56 A 10-foot vegetation buffer strip or other erosion control measure such as straw bales or wattles (certified weed free) will be maintained between the cleared ROW and the drainage high-water mark of jurisdictional drainages if the time between clearing/grading and trenching/pipe installation is expected to exceed 10 days.

A.1.57 Waters from non-stormwater sources may be discharged from the site during the construction period, including non-hazardous cleanup wash waters from vehicle washing; trench dewatering discharges; and hydrostatic test water discharges. All non-stormwater discharges will be released onto stable upland locations or dry washes. Energy dissipating/filtering devices designed for low flow velocity to trap sediments and other particulates will be used as necessary. Water used for vehicle washing for noxious weed control will be contained within designated areas using berms and allowed to percolate into the ground surface.

A.1.58 Inspections will be conducted by SNWA throughout construction. Inspections will include disturbed areas of the project that have not been stabilized, material and equipment storage areas that are exposed to precipitation, all erosion and sediment control measures installed within the ROW, all structural control measures, and all locations where vehicles enter and/or exit the ROW. Inspectors will notify the construction manager to suspend or redirect work activities where requirements of the SWPPP are not being followed, and implement corrective action as required to achieve compliance. Inspection reports will be maintained on file and submitted to the BLM and Nevada Department of Environmental Protection (NDEP) upon request.

A.1.59 A Hydrostatic Discharge Plan will be submitted to the BLM for approval, prior to the start of any discharges at the completion of construction. During discharge of hydrostatic testing water, a diffuser or other energy dissipater will be used to control and reduce the flow of water. Straw bales (certified weed free), minor earthwork impoundments within the ROWs (obtained from a site free of noxious invasive weeds), or other devices will be used to contain and control water flow as needed for erosion control.

A.1.60 At the completion of construction, all non-natural berms and ditches not required for protection of facilities will be removed, and drainages restored to their original form. The ground surface will be graded to match the surrounding topography and/or slopes as closely as possible.

A.1.61 Desert washes and ephemeral drainages will be restored to pre-existing conditions. Soils will be compacted, and additional stabilization measures such as rip rap will be used where needed to protect the facilities and prevent increased erosion in the wash.

A.1.62 Permanent erosion control measures will be installed as necessary at the completion of construction to protect areas disturbed as a result of SNWA activities. These could include vegetation restoration, tracking and matting of steep slopes to maintain stability, berming, and/or placement of riprap.

Restoration

A.1.63 A detailed Restoration Plan will be prepared and submitted to the BLM for approval prior to the start of construction. Vegetation conditions of the ROW and adjacent reference site locations will be documented prior to construction, to establish baseline conditions for restoration. Restoration will focus on restoring pre-existing habitat conditions, with the exception for pinyon-juniper habitat which has encroached on sagebrush habitat within some portions of the ROW. Soil data maps from the Natural Resources Conservation Service and BLM consultation will be used to determine which ecological pinyon-juniper sites will be restored to sagebrush habitat.

A.1.64 All cacti and yucca within the ROW that will be disturbed in the Mojave Desert habitat portion of the project will be salvaged, with the following exceptions:

- Cholla, including silver or golden cholla (*Opuntia echinocarpa*) and pencil cholla (*Opuntia ramosissima*), equal to or greater than 3 feet tall or less than 1 foot tall
- All cacti and yucca whose vegetative mass is more than 40% dead (i.e., apical leaves, brown or significantly chlorotic, stems rotten or significantly desiccated, etc.)
- All cacti and yucca less than 1 foot tall (excluding barrel cactus [*Ferocactus cylindraceus]*, cottontop cactus [*Echinocactus polycephalus]*, and hedgehog cactus [*Echinocereus* sp.])
- Joshua tree (*Yucca brevifolia*) that are over 6 feet in height
- Any cacti or yucca that cannot be accessed safely due to steep slopes or very rocky areas

All cacti and yucca not salvaged will be left on-site to become part of the vegetative mulch.

A.1.65 Within the portion of the ROW located within an Area of Critical Environmental Concern, additional shrub salvage or enhanced seed application will be conducted to enhance restoration efforts. Additional shrub salvage may be accomplished by either 1) salvaging from BLM lands within the ROW, 2) salvaging from an approved off-site harvest site, and/or 3) propagation of shrubs from native seed in an approved nursery.

A.1.66 Salvaged cacti, yucca, and shrubs will be transported to the designated temporary nursery sites within the ROW until restoration activities are to commence. Upon approval from the BLM, salvaged vegetation may also be stored at designated off-site nurseries. Salvaged plants from the same general areas will be grouped together and identified for future replanting. All salvaged plant material will be approved by the BLM or on-site biologist prior to transplanting into the nursery sites. A list will be developed for each nursery site to verify that the quantities of plant material match what and where it was extracted.

A.1.67 Plant salvage will occur only within the designated ROW or as authorized by BLM. Salvaging will not begin until the ROW has been clearly staked and flagged. As feasible, salvage operations will not be performed during periods of high temperatures or other non-beneficial environmental conditions. All salvaged plants will be documented and catalogued.

A.1.68 Prior to commencing any plant salvage operations, a Free Use Permit, Flora transportation tags, or any other required permits will be obtained to transport salvaged plants as part of restoration activities.

A.1.69 Salvaged plants will be maintained for the duration of construction activities, until replanted within the ROW as part of site restoration. Maintenance will include necessary watering and other care to ensure reasonable survival of the salvaged plants.

A.1.70 At the completion of construction, in areas where there are no above-ground facilities, permanent access roads, or facilities within 12-inches of the ground surface, the ground surface will be scarified to a minimum depth of 4 inches, to help relieve compaction and facilitate water penetration and plant establishment. Topsoil and boulders salvaged at the start of construction will be respread across the ROW.

A.1.71 Upon the completion of topsoil replacement, salvaged plants will be removed from the nursery sites and transplanted within the ROW, in areas not occupied by above-ground facilities or access roads. Efforts will be taken to restore plants to the same general area from which they were salvaged. Plants will be replanted in a random and non-uniform pattern, in an effort to mimic the adjacent non-disturbed native plant communities. Planting holes will be two times the size of the plant material to be transplanted and will be pre-watered. All backfill will be free of any debris, foreign objects, larger rocks, and noxious weeds. As feasible, transplanting will not occur during periods of high temperatures or other non-beneficial environmental conditions.

A.1.72 A comprehensive seeding program will be applied after completion of topsoil and plant replacement. The seed mix, application rate, and application method will be described in the Restoration Plan and approved by the BLM. Vegetable-based soil binders and/or hydromulch may be used on steep slopes to reduce seed movement and erosion. Seeds used for restoration will be obtained from a BLM-approved commercial seed vendor, and will be certified weed-free.

A.1.73 A final watering will be conducted approximately 2 weeks after completion of seeding, to help remove air pockets and compact soils in and around the roots of transplanted vegetation. Additional supplemental watering may be conducted, if practicable based on access, and if needed to enhance restoration.

A.1.74 Signs indicating restoration activities are being conducted may be installed where needed to deter public off-road vehicular damage to restored areas. Placement and design of signs will be coordinated with the BLM and identified in the Restoration Plan.

Noxious Weeds

A.1.75 A Noxious Weed Plan will be prepared and submitted to the BLM for approval prior to the start of construction. Noxious weed control will be implemented to minimize the spread of noxious weeds during and following construction activities. All weed control efforts on BLM-administered lands will be in compliance with BLM Handbook H-9011, H-9011-1 Chemical Pest Control, H-9014 Use of Biological Control Agents of Pests on Public Lands, and H-9015 Integrated Pest Management.

A.1.76 Areas within the ROW that have pre-existing noxious weed infestations will be sprayed with a BLM-approved weed herbicide two to three years prior to the start of construction activities, as feasible. If noxious weed infestations still exist within the ROW at the start of construction, topsoil and fill will be kept segregated, and not transported to other areas within the ROW.

A.1.77 Prior to the import of borrow or fill from outside the ROW, the material source location will be inspected by a qualified biologist or weed scientist to ensure it is free of noxious weeds.

A.1.78 Any hay, straw, or other organic products used for construction, restoration, or stabilization will be certified free of noxious weeds.

A.1.79 Vehicles and equipment will be cleaned with a high pressure washer prior to arrival on the ROW and prior to departure from areas of known noxious weed infestations to prevent and minimize the introduction or spread of noxious weeds. Cleaning efforts will concentrate on tracks, tires, and vehicle undercarriage, with special emphasis on axels, frames, cross members, motor mounts, on and underneath steps, running boards, and front bumper/brush guard assemblies.

A.1.80 Specific areas will be designated within the ROW for vehicle and equipment washing. These areas will be identified in the COM Plan and approved by the BLM.

A.1.81 Prior to the use of any weed herbicide, SNWA or its certified licensed contractor will submit a Pesticide Use Proposal to the BLM, prior to the planned application and a Pesticide Application Record after the weed herbicide use. No herbicide mixing or rinsing of containers or application equipment will occur within 100 feet of jurisdictional drainages. An annual report on herbicide application will be provided to the BLM.

2. GENERAL OPERATION PRACTICES

A.2.1 Facility inspection and maintenance will only use established access roads, and no off-road travel will be allowed. A maximum speed limit of 25 miles per hour will be maintained while on unpaved access roads, to reduce dust and allow for observation of desert tortoise, livestock, wild horses, or other wildlife in the road.

A.2.2 The ROW will be maintained in a sanitary condition, and any waste material, including human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment that may be deposited in the ROW will be disposed of promptly at a State of Nevada approved sanitary landfill site.

A.2.3 Hazardous materials at the WTF will be stored in secondary containment structures, in compliance with Clark County and Occupational Safety and Health Administration (OSHA) standards.

A.2.4 Pipeline and facilities will be equipped with pressure and flow sensors that will immediately indicate a major system failure or break. The system will begin an automatic shutdown process to isolate the affected area. Valve placement and storage capacity are planned to allow isolation of pipeline segments to minimize drainage volumes as much as possible. Personnel will be promptly mobilized to evaluate and repair any failure as quickly as possible.

A.2.5 Stormwater discharges will be managed during facility operation through regular inspection and maintenance of any permanent erosion control structures. Post construction, inspection and maintenance of erosion control measures and structures will continue on a monthly basis after construction, or for one year after regionally large storm events. After one year, erosion control measures and structures will be inspected following regionally large storm events, and during other facility inspections. An annual report detailing erosion control inspections, maintenance, and agency communications will be prepared and submitted to NDEP until final site restoration has been completed and a Notice of Termination has been submitted and approved by NDEP.

A.2.6 Pipeline or other facility repairs that may be needed will be accomplished within the ROW, following all environmental requirements of this plan. If additional temporary ROW is required for pipeline or facility repair, prior written approval will be obtained from the BLM.

A.2.7 If major infrastructure replacements or improvements are required, additional temporary ROWs may be required. Notification and prior approval will be obtained from the BLM as required.

Restoration / Noxious Weeds

A.2.8 Vegetation restoration success will be monitored by SNWA and reported to the BLM, as defined in the approved Restoration Plan. Monitoring will include both qualitative and quantitative data collection and analysis. Restoration will be considered successful if the area meets a specified percentage of vegetation cover and species density of adjacent reference sites.

A.2.9 Annual restoration monitoring reports will be submitted to the BLM for seven years of post-construction monitoring. Along with the annual report, SNWA will include quantitative analysis in the fifth year, to allow opportunity to correct any issues that may prevent restoration site release within the subsequent two years. If monitoring indicates that restoration is not trending towards meeting or has not met designated success criteria, the restoration activities may be revised and remedial measures implemented, subject to BLM approval.

A.2.10 In the unlikely event of a major system rupture resulting in discharge of water and off-site erosion, SNWA will coordinate with the BLM and will develop and implement incident-specific restoration measures as necessary.

A.2.11 The ROW, and primary unpaved access routes used for facility inspections, will be monitored for noxious weeds throughout the seven years of post-construction monitoring. A BLM-approved herbicide for weed control will be applied as needed to control noxious weeds. A Pesticide Use Proposal will be submitted to the BLM prior to any planned noxious weed herbicide application, and a Pesticide Application Record will be submitted after weed herbicide use.

A.2.12 An annual report on noxious weeds conditions and control activities within the ROW will be submitted to the BLM during the seven years of post-construction monitoring.

3. GEOLOGIC HAZARDS AND SOILS

Environmental protection measures listed within the following subsections of the General Construction Practices section are also pertinent to geologic hazards and soils: planning and permitting, surveying, access roads, and construction.

A.3.1 If fault crossings of the pipeline are identified during detailed geotechnical investigations, additional design features will be added to ensure pipeline integrity (e.g., flexible couplings, increased pipe wall thickness, pipe sleeves).

A.3.2 In the fissures area of Dry Lake Valley, in addition to design features, over excavation of existing soils and replacement with engineered fill, grouting of fissures, and/or use of geo-textile fabric will be utilized as needed to ensure pipeline stability.

A.3.3 Soils unsuitable for use as pipeline backfill will be used to refill borrow pits identified as part of the project and will not be exported from federal lands.

4. WATER RESOURCES

Environmental protection measures listed within the following subsections of the General Construction Practices section are also pertinent to water resources: planning and permitting, surveying, construction, and stormwater and erosion control.

A.4.1 BMPs will be implemented for the pipeline crossing of Snake Creek, which contains perennial water flow, in accordance with Clean Water Act permitting requirements.

A.4.2 The project has been sited to avoid wetlands, and no construction would occur in wetlands.

5. BIOLOGICAL RESOURCES

Environmental protection measures listed within the following subsections of the General Construction Practices section are also pertinent to biological resources: planning and permitting, surveying, fencing, clearing and grading, access roads, construction, and restoration.

A.5.1 A qualified biologist(s) shall act as a biological monitor(s) and be present on-site during project-related actions that may impact sensitive biological resources. All biological monitors shall be approved by BLM and the U.S. Fish and Wildlife Service to handle desert tortoises and other threatened or endangered species.

A.5.2 The biological monitor shall be responsible for determining compliance with measures as defined by the Biological Opinion or other agreements between SNWA, the BLM, and other federal agencies. Biological monitors shall have the authority to halt non-emergency construction activities that are not in compliance with these measures. Stop work directives shall be effective long enough to remedy the immediate situation, and will be limited to the equipment and parties involved in the situation. All action of non-compliance or conditions of threat to listed species will be recorded immediately by the biological monitor and reported to SNWA. SNWA will immediately report all such action and conditions to BLM, who will then report to the USFWS.

A.5.3 No intentional harassment or harming of animals will be allowed. Animals found entrapped in open holes or excavations will be reported to the biological monitor. If the wildlife is unable to escape on its own, it will be moved from the construction area by a qualified biologist.

A.5.4 Prior to discharge of water used for hydrostatic testing of the pipeline and other facilities, the drainage locations will be surveyed for sensitive species and nesting migratory birds. BLM will be notified of any sensitive species or nesting migratory birds found in the drainage area, and will determine whether additional measures beyond those identified in this plan need to be implemented prior to the discharge.

A.5.5 Biological resources monitoring and compliance updates will be provided to the BLM throughout the construction period. These will include information on ongoing construction activities, monitoring, wildlife and sensitive species observations, species relocations, and any biological issues. Updates may be written or oral, as agreed upon by the BLM and SNWA biologists. An annual written report will be provided to the BLM.

A.5.6 Perch deterrents will be installed on power lines to limit hunting perches for raptors and Corvids, to minimize increased predation on sage grouse, pygmy rabbit, and desert tortoise.

Special Status Plants

A.5.7 In areas where sensitive plant species were identified in previous surveys either within or adjacent to the ROW (rosy twotone beardtongue [*Penstemon bicolor* spp. R*oseus*], Blaine's fishhook cactus [*Sclerocactus spinosior* ssp. *Blainei*], Eastwood milkweed [*Asclepias eastwoodiana*], Las Vegas buckwheat [*Eriogonum corymbosum* var. *nilesii*], long-calyx egg milkvetch [*Astragalus oophorus var. lonchocalyx*], Meadow Valley sandwort [*Arenaria stenomeres*], Nachlinger catchfly [*Silene nachlingerae*], bashful four o'clock [*Mirabilis pudica*], Welsh cryptantha [*Cryptantha welshii*], and white bearpoppy [*Arctomecon merriamii]*), pre-construction surveys will be conducted during the blooming or fruiting season as needed to verify plant identification. Specific locations of sensitive plants will be recorded for subsequent salvage or seed collection.

A.5.8 SNWA will adjust construction activities as feasible to avoid any identified sensitive plant populations within the ROW. Orange snow fencing will be used to mark the avoidance area to alert construction personnel to avoid the area, and will include a reasonable buffer.

A.5.9 If the sensitive plant species cannot be avoided, SNWA will implement plant or seed salvage prior to the start of construction:

- Seeds will be collected from sensitive plants that are located within the ROW. Collection, storage, and handling of seeds will be in accordance with commonly accepted scientific practices. Collected sensitive plant seed will be applied with the seeding program as part of restoration at the completion of construction, and in the same general area as the seeds were initially collected, as feasible.
- All Blaine's fishhook cactus will be salvaged, and transplanted immediately into suitable adjacent habitat on BLM land that will not be disturbed.

A.5.10 If previously unknown special status plant species are discovered within the ROW prior to start of construction, SNWA will consult with the BLM on appropriate plant and/or seed salvage.

Desert Tortoise

A.5.11 Desert tortoise will only be handled by a qualified biologist and solely for the purpose of moving them out of harm's way. All desert tortoise found in harm's way will be captured and moved to a secure location by an authorized desert tortoise biologist. Appropriate state and federal permits or approvals will be obtained prior to handling any living specimen, dead carcass of an adult or immature tortoise, or any egg of tortoise.

A.5.12 For areas not enclosed by tortoise exclusion fencing and for installation of tortoise fencing, at least 7 days and no more than 30 days prior to initiation of ground-disturbing construction activity, authorized biologists will survey the site for desert tortoises, using techniques providing 100 percent coverage. The site boundaries shall be flagged prior to the biological survey. A second pre-construction tortoise clearance survey shall be conducted no more than 24-hours prior to any ground-breaking activity during the desert tortoise active season (March 1 through October 31) and no more than 72 hours during desert tortoise inactive season (November 1 through February 28/29). This survey allows for removal of tortoises that may move from adjacent habitat into the cleared area.

A.5.13 For areas enclosed by tortoise exclusion fencing, clearance surveys will be conducted before the start of any construction activity. These clearance surveys will be made with two passes conducted perpendicular to each other, to facilitate discovery of all burrows regardless of orientation.

A.5.14 All burrows found in the construction area, whether occupied or vacant, will be excavated by the biologist and collapsed or blocked to prevent desert tortoise re-entry. All burrows will be excavated by hand with hand tools to allow removal of desert tortoises or desert tortoise eggs. All desert tortoise burrows, other species' burrows, and natural excavations that may be used by tortoises where the burrow end cannot be seen

A.5.15 All desert tortoises and desert tortoise eggs found within the construction area will be relocated by the biologist 300 to 1,000 feet into adjacent, undisturbed habitat. Tortoises found above ground will be placed under a shrub in the shade. A desert tortoise located in a burrow will be placed in an existing unoccupied burrow of the same size and orientation as the one from which the desert tortoise was taken. If a suitable natural burrow is unavailable, a qualified biologist will construct one of similar shape, size, depth, and orientation as the original burrow. Burrow construction protocol shall follow Section B-5-f of the Desert Tortoise Council Guidelines for Handling Desert Tortoise During Construction Projects (developed in 1994, revised 1999). Desert tortoises moved during inactive periods will be monitored for at least two days after placement in the new burrows to ensure their safety. The authorized biologist will be allowed sufficient judgment and discretion to ensure that survival of the desert tortoise is likely.

A.5.16 Any desert tortoise found within one hour before nightfall or when ambient temperatures reach or exceed 90 degrees F will be placed in a separate clean cardboard box and kept upright in a predator-free location under appropriately controlled temperatures to minimize stress to the desert tortoise. Each box will be used once and then disposed of properly. The desert tortoise will be released the following day in the area from which it was collected and using the procedures described above. Each desert tortoise will be handled with a different pair of disposable latex gloves. After each use, the gloves will be properly discarded and a fresh set used for each subsequent desert tortoise handling.

A.5.17 If the biologist(s) identify any desert tortoises to be at high risk for death or injury, they will contact the U.S. Fish and Wildlife Service for translocation direction.

A.5.18 Authorized biologists shall monitor construction activities in desert tortoise habitat. The level of monitoring will depend upon whether the area is enclosed by tortoise exclusion fencing or not, and whether the activity is taking place within the tortoise active period (March 1 through October 31) or inactive period (November 1 through February 28/29).

- If any construction-related activities occur in an area not enclosed by tortoise exclusion fencing during the active period, a biological monitor will be assigned to each work crew or piece of ground-disturbing equipment and will clear the vehicle ingress/egress path and parking or work areas before allowing the activity to commence. During the inactive period, a biologist shall conduct two 100 percent clearance surveys prior to the start of the work; subsequent desert-tortoise monitoring would not be required, however, biological monitoring for compliance with other environmental stipulations will still occur.
- If fence construction occurs during the active period, a biological monitor will be on-site during the installation. During the inactive period, a biologist shall thoroughly examine the proposed fence line and nearby burrows for the presence of tortoise no more than five days before construction.

- If construction activities are completely enclosed by tortoise exclusion fencing, biological monitoring will not be required other than periodic inspections of the exclusion fencing.
- For access roads outside the ROW other than state and federal highways which are not enclosed by tortoise exclusion fencing, a biological monitor shall be assigned to every 5 miles of access road during the active season.

A.5.19 If any construction pipe, culverts, or similar structures with a diameter of 3 inches or greater are stored in areas of desert tortoise habitat not enclosed by tortoise exclusion fencing, they shall be inspected by a biological monitor for the presence of tortoises before the material is moved, buried, or capped. Alternatively, all such structures may be capped before being stored.

A.5.20 Any time a vehicle is parked in an area not enclosed by tortoise exclusion fencing, whether the engine is engaged or not, the ground around and under the vehicle will be inspected for desert tortoise prior to moving the vehicle. If a desert tortoise is observed, an authorized biologist will be contacted to safely move the animal. If possible, the desert tortoise will be left to move on its own. If the desert tortoise does not move within 15 minutes, the desert tortoise will be removed and relocated by the authorized biologist. Checking under parked vehicles is also recommended, but not required, for areas enclosed by tortoise exclusion fencing.

A.5.21 The authorized biologist(s) will record each observation of handled desert tortoises. Data will be collected, including: location, date, time of observation, whether the tortoise was handled, the general health of the tortoise, whether it voided its bladder, the location the tortoise moved from and the location it moved to, and any unique physical characteristics. This information will be provided to the BLM in an annual report.

A.5.22 BLM and the U.S. Fish and Wildlife Service will be notified of any desert tortoise death or injury resulting from project activities by close of business on the following work day.

Banded Gila Monster and Chuckwalla

A.5.23 Pre-construction surveys of the ROW will be conducted by qualified biologists no more than 24 hours prior to construction to identify occupied banded gila monster and chuckwalla habitats. These surveys may be conducted simultaneously with desert tortoise preconstruction surveys. All occupied burrows found in the construction zone will be examined and excavated as described for the desert tortoise. All banded gila monsters, banded gila monster eggs, chuckwallas, and chuckwalla eggs located in the ROWs will be relocated 300 to 1,000 feet into adjacent undisturbed habitat.

A.5.24 Gila monsters and chuckwalla will be moved only by a qualified biologist and solely for the purpose of moving then out of harms way. Appropriate state permits will be acquired from Nevada Department of Wildlife (NDOW) prior to handling any live individuals, carcasses, or eggs.

A.5.25 All gila monsters and chuckwalla observed by project workers will be reported immediately to the biological monitor. A report of the gila monster sighting will be filed with NDOW. The report will include information on the animal's size and

Burrowing Owls and Kit Fox

A.5.26 Surveys of suitable habitat in the ROW for active burrowing owl will be conducted during wintering (December 1 to January 31) and/or nesting season (April 15 to July 15), prior to the start of construction. Surveys for active kit fox burrows can be conducted at the same time. The presence of active burrows or dens will be verified through non-invasive means including motion cameras, fiber-optic scope or miniature closed-circuit video probe. The locations of active burrows within the ROW will be noted with GPS for subsequent mitigation actions.

A.5.27 If feasible, active burrows or dens within the ROW will be avoided by modifying construction activities in the immediate area. Orange construction fencing will be used to mark the avoidance area, which shall include a reasonable buffer. The avoidance area will also be signed to inform construction personnel to avoid the area.

A.5.28 When destruction of occupied burrowing owl burrows within the ROW is unavoidable, existing unsuitable burrows on adjacent BLM land outside of the ROW will be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2 enhanced or new burrows to each 1 active burrow that will be destroyed.

A.5.29 Burrowing owls in active burrows which cannot be avoided will be relocated during the fall to winter season prior to the start of construction, in coordination with BLM and NDOW. One-way doors (e.g., modified dryer vents) will be installed at active burrow entrances, and left in place for at least 48 hours to ensure all owls have left the burrow. The project area should be monitored daily for one week, to confirm the owls' use of replacement enhanced or new burrows.

A.5.30 When destruction of occupied kit fox dens within the ROW is unavoidable, kit fox will be live-trapped, using leg-hold and/or wire cage traps positioned outside of the den, in coordination with BLM and NDOW. Traps used will be of a type specifically made to avoid leg breaking. Any trapping will be done as humanely as possible, using experienced biological trappers to ensure the best success possible.

A.5.31 After relocation, burrowing owl and kit fox burrows or dens located within the ROW will be excavated using hand tools and refilled to prevent reoccupation. Clearing and collapsing of burrows or dens will be done by qualified biologists during the fall to winter season prior to the start of construction.

A.5.32 Occupied burrowing owl burrows will not be disturbed during the active nesting season (February 1 to August 31) unless a qualified biologist verifies through non-invasive means that either: 1) the birds have not begun egg laying and incubation, or 2) juveniles from the occupied burrows are foraging independently and are capable of independent survival.

A.5.33 Occupied kit fox dens will not be disturbed during the active denning and weaning season (February 15 to May 15), unless a qualified biologist verifies through non-invasive means that either: 1) there are no newborn pups in the den, or 2) pups have

Sage Grouse

A.5.34 The pipeline has been sited to be 0.25-mile or more from active sage grouse leks, as identified based on data from NDOW. Above-ground permanent facility sites have been sited 2-miles or more from active sage grouse leks. No new roads will be constructed within 0.25-mile of an active sage grouse lek.

A.5.35 When there is active construction between March 1 and May 15 within 2 miles of an active sage grouse lek, an approved biologist will monitor the lek. The biologist will observe for signs of disturbance such as abandonment of the site, failure of males to display, etc. Should signs of disturbance be noted which affect the viability of the lek, SNWA will consult with BLM and implement additional measures to minimize disturbance, such as limiting the daily construction time period, reducing construction noise, and reducing vehicle traffic.

A.5.36 Within 2 miles of active sage grouse leks, between March 1 through May 15, nighttime lighting of the construction site will be limited to that necessary for public safety. Lighting will be directed downward, to avoid incidental and unnecessary lighting of the lek.

A.5.37 Within 2 miles of active sage grouse leks, between March 1 through May 15, grading, excavation, and earthmoving activities will be restricted to daytime hours, beginning 2 hours after sunrise to 2 hours before sunset, to avoid disrupting breeding behavior.

A.5.38 Within 2 miles of active sage grouse leks, initial vegetation clearing of the ROW will not be conducted between March 1 and June 30, to avoid disruption of sage grouse breeding and nesting.

A.5.39 For the portion of the disturbed ROW within sage grouse winter habitat area, a high quality seed mix will be used and restoration efforts specifically tailored to restore sagebrush habitat as quickly as possible will be implemented.

A.5.40 SNWA will enhance sage grouse habitat on its private properties in Spring Valley by managing of agricultural and livestock operations. Measures may include:

- Maintain and cut existing alfalfa fields in a manner to avoid harm to sage grouse.
- Manage livestock operations to promote riparian area and meadow utilization by sage grouse, which could include developing alternate water sources for livestock, and situating supplemental feeding and supplements outside of high quality sage grouse habitat.
- Control coyote and other predator populations on SNWA properties to minimize predation on sage grouse, in accordance with Nevada state and federal regulations.

A.5.41 SNWA will coordinate with BLM on sage grouse habitat enhancement measures within grazing allotments held by SNWA. This may include resting of allotments,

A.5.42 SNWA will assist with BLM habitat treatments to benefit sage grouse on federal lands outside of the ROW, for an acreage equivalent to the amount of sagebrush habitat disturbed by construction of the GWD Project. Habitat treatments could include, but are not limited to sagebrush shrublands restoration, pinyon-juniper removal by mechanical or herbicide treatments methods, and seeding. This treatment will also benefit other sagebrush dependent species, such as pygmy rabbit.

Pygmy Rabbit

A.5.43 For areas of the ROW which have had documented recent pygmy rabbit observations or sign, clearance surveys will be conducted by qualified biologists prior to initial ground disturbance. Burrows will be cleared by live trapping of rabbits, and then collapsed using hand tools. Captured individuals will be relocated to adjacent federal lands, in coordination with BLM and NDOW.

A.5.44 For the portion of the disturbed ROW which had higher densities of pygmy rabbit, a high quality seed mix and restoration efforts specifically tailored to restore sagebrush habitat as quickly as possible will be implemented.

Desert Valley Kangaroo Mouse

A.5.45 For areas within the ROW in Dry Lake Valley with documented desert valley kangaroo mouse occurrence, silt fence will be placed along the edges of the ROW for the duration of active construction activities to keep the mouse out of the ROW. After the fence is installed, live trapping will be conducted within the ROW, to remove the mice prior to construction. Mice captured within the ROW will be relocated onto adjacent BLM land.

Migratory Birds and Raptors

A.5.46 A predictive model created by the Great Basin Bird Observatory will be used to predict the probability of occurrence of migratory birds on BLM's Bird Species of Conservation Concern List. The predictive model will be applied to individual project construction segments to determine species with the highest probability of occurrence in the construction areas, and to identify the critical nesting periods for those bird species. Generally, critical nesting periods are between April and mid-August.

A.5.47 As feasible, SNWA will conduct initial ground clearing outside of the critical nesting period for migratory birds.

A.5.48 If initial ground clearing will occur during the critical nesting period, pre-construction surveys for nesting migratory birds will be conducted by qualified biologists.

A.5.49 If nesting migratory birds are found during the pre-construction surveys, SNWA will obtain guidance from the BLM on appropriate avoidance and minimization measures. If feasible, the bird nests will be avoided until the birds have fledged. Orange construction fencing will be used to mark the avoidance area, which will also be signed to inform construction personnel to avoid the area. If avoidance is not feasible, SNWA

A.5.50 Power poles and lines will be designed and constructed in accordance with the recommendations of the Avian Power Line Interaction Committee (updated 2005 by The Edison Electric Institute's Avian Power Line Interaction Committee and US Fish and Wildlife Service), in order to reduce the potential to electrocute or otherwise harm raptors.

A.5.51 SNWA will continue working with NDOW to support on-going surveys for eagles, ferruginous hawks, and other raptors within the general project vicinity.

A.5.52 If tall trees located within the ROW cannot be avoided and must be removed for construction, the trees will be removed outside of the nesting period for ferruginous hawk, other raptor, or eagle as feasible. If removal of the tree during the nesting period is required, the tree will first be surveyed by a qualified biologist to ascertain the presence of any nests. Should nests be present, the tree will not be removed until the birds have fledged. Removal of nests will be conducted after obtaining any necessary permits and in compliance with all applicable regulations.

A.5.53 If a ferruginous hawk, other raptor, or eagle nest becomes established within 0.5 mile of the ROW, the nest will be monitored by a qualified biologist from May 1 through July 15. If construction activities appear to be disrupting the nesting behavior, SNWA will consult with BLM and implement additional measures to minimize disturbance, such as limiting the daily construction time period, reducing construction noise, and reducing vehicle traffic.

Big Game and Wild Horses

A.5.54 There will be no permanent site fencing along the pipeline alignment, in order to avoid restricting the free-roaming behavior of wild horses.

A.5.55 SNWA will coordinate with local ranchers and land permitees to ensure that existing water sources continue to be available during construction for wild horses. In consultation with BLM, a plan will be developed to either turn water on or off to aid in animal distribution away from active construction areas. If construction is within two miles of an existing water source, supplemental temporary stock water tanks will be placed in a suitable location away from the construction area. The location of the temporary stock water tanks will be selected in consultation with local ranchers, land permitees, and the BLM. The water tank will be filled using a water tanker, and maintained for the duration of construction in this area.

A.5.56 For the duration of pipeline construction through Lake and southern Spring Valley, two temporary water hauls will be established. The water hauls will consist of placement of an aluminum water trough (with escape ramps for small wildlife), which will be filled as needed by water truck. The water hauls will be sited in southeast Spring Valley and the foothills of the west side of the Fortification Range, to provide water for wild horses in the Wilson Creek Herd Management Area whose migration patterns through the construction area may be temporarily disrupted. Specific sites for the water hauls will be selected in conjunction with BLM and other grazing permitees.

A.5.57 For the duration of pipeline construction through northern Dry Lake Valley, two temporary water hauls as described above will be established. The water hauls will be sited on the west side of the pipeline, in the Muleshoe Use Area, to provide water for wild horses in the Dry Lake Herd Management Area whose access to existing water sources may be temporarily disrupted by construction.

Game Fish

A.5.58 BMPs will be implemented to minimize effects to fish from the temporary rerouting of perennial flow in Snake Creek during pipeline construction. Practices will comply with NDOW and Clean Water Act permitting requirements.

6. PALEONTOLOGICAL RESOURCES

Environmental protection measures listed within the following subsections of the General Construction Practices section are also pertinent to paleontological resources: planning and permitting, and surveying.

A.6.1 A field survey will be conducted of areas within the ROW identified as having a high potential for paleontological resources, based upon a paleontological records search (following BLM Instruction Manual 2008-009, Potential Fossil Yield Classification System for Paleontological Resources on Public Lands). The field survey will identify if there are any surface exposures containing visible fossils and if there is a potential for buried fossils within the construction footprint. If any important fossils or middens are found during the field survey, a program will be developed and implemented to remove any exposed fossils prior to construction.

A.6.2 Areas identified as having a high potential for buried paleontological resources based upon the field survey will be monitored by a qualified paleontologist during construction activities involving ground disturbance, including grading, excavation, and trenching.

A.6.3 Any fossils recovered during the field survey or construction monitoring will be prepared in accordance with standard professional paleontological techniques. The fossils will be curated in a BLM-approved facility. A report on the findings and significance of the salvage program, including a list of the recovered fossils, will be prepared following completion of the program. A copy of this report will accompany the fossils, and a copy will be submitted to the Nevada State Museum.

7. CULTURAL RESOURCES

Environmental protection measures listed within the following subsections of the General Construction Practices section are also pertinent to cultural resources: planning and permitting, and surveying.

A.7.1 A Class I literature review will be conducted to identify cultural resources within one mile of the Project centerline. The findings will be incorporated into a report and submitted to the BLM for review and approval.

A.7.2 A Class III (intensive) pedestrian survey will be conducted of the Area of Potential Effects (APE) for direct effects (project ROW) to identify cultural resources. Cultural resources identified as a result of the survey will be incorporated into a report and submitted to the BLM and the Nevada State Historic Preservation Office for review.

A.7.3 All ranch complexes within the APE for direct effects and visual effects (area one-mile from the ROW) will be inventoried and recorded. Descriptions and photo documentation per BLM standards will be conducted for those properties determined by BLM to be adversely affected by the project.

A.7.4 Effects on properties eligible to the National Register of Historic Places will be avoided, as feasible. If effects cannot be avoided, a historic properties treatment plan will be developed to lessen or mitigate project-related effects. Treatment will be implemented, upon BLM approval of the plan, prior to the initiation of construction.

A.7.5 All records and materials resulting from identification and treatment efforts will be curated in accordance with federal requirements in BLM-approved facilities.

A.7.6 If previously unidentified cultural resources are discovered during construction, ground-disturbing activity within 100 meters (325 feet) of the discovery shall cease immediately. Ground-disturbing activity in that area will not resume until BLM has evaluated the discovery and, for sites eligible for the National Register, assured the completion of any necessary mitigation or treatment measures.

A.7.7 Unanticipated discovered Native American human remains found as a result of construction activities, including grading, excavation, and trenching, will be guided by Native American Graves Protection and Repatriation Act procedures.

8. LAND USE AND RANGE MANAGEMENT

Environmental protection measures listed within the following subsections of the General Construction Practices section are also pertinent to land use and range management: planning and permitting, surveying, fencing, clearing and grading, and access roads.

A.8.1 SNWA will coordinate in advance of construction with BLM and grazing permit holders that will be affected, to minimize access conflicts. This coordination will allow for advance planning of grazing practices to ensure continued use of the range.

A.8.2 Range improvements, including fence lines and cattle guards, located within the ROW and along designated access roads will be documented prior to the start of construction. If range improvements are temporarily removed or damaged as a result of construction, they will be repaired to BLM standards and be functional upon completion of construction.

A.8.3 If livestock is struck by a vehicle directly associated with construction activities, SNWA will ensure that the property owner is compensated for the livestock at market value.

A.8.4 If access to livestock watering sources or facilities will be temporarily restricted during construction, alternate water source(s) will be made available for the duration that access is restricted. If livestock watering sources or facilities are damaged during

9. NOISE

Environmental protection measures listed within the following subsections of the General Construction Practices section are also pertinent to noise: planning and permitting.

A.9.1 All construction equipment will be equipped with manufacturer's standard noise control devices (i.e., mufflers, acoustical lagging, and/or engine enclosures). All construction equipment will be inspected at periodic intervals to ensure proper maintenance and presence of noise control devices.

A.9.2 Pumping stations will be enclosed and utilize design features to minimize operational noise levels. Pressure reducing station valves will be fully enclosed in vaults. Potential facility noise levels will be estimated during facility design, and features incorporated to minimize normal operational noise levels with an objective of 70 dBA or less at 500 feet from the facility.

A.9.3 Equipment will be operated conservatively, which means the operator will take special care not to throttle the engine excessively and will keep engine speed as low as possible. In addition, the operator will not leave the equipment running or idling needlessly.

10. AIR QUALITY

Environmental protection measures listed within the following subsections of the General Construction Practices section are also pertinent to air quality: planning and permitting, and access roads.

A.10.1 Dust control permits will be obtained for each construction contract in accordance with local county and/or state requirements. These will be a Dust Control Permit in Clark County, and a Surface Area Disturbance permit in Lincoln and White Pine Counties. The permits will contain a Dust Mitigation Plan listing all construction activities that will occur and the BMPs that will be used to mitigate construction dust. The BMPs will include site-specific dust control measures that are based on each project soil type, specific construction activities, phases and stages. They may include watering, pre-watering to maintain moisture or to form crust, applying clean gravel, paving, applying and maintaining a dust palliative or dust suppressant, covering or enclosing material, covering or stabilizing soil with vegetation, using phased construction, limiting size of ingress and egress points, limiting size of staging areas, limiting vehicle speeds on the work site, cessation of operations when winds make fugitive dust control difficult, berming or fencing to prevent unauthorized access to disturbed areas, and application of track-out controls.

A.10.2 Operating permits will be obtained for stationary sources as necessary, such as aggregate rock handling equipment, rock crushers, conveyors, and screening equipment which may emit particulate matter. The operating permit will be obtained from the local county and/or the state, and will include operating requirements, reporting requirements and pollutant emission limits. Fugitive dust control measures will be used

A.10.3 Operating permits will be obtained for combustion equipment such as stationary internal combustion engines (greater than 250 horsepower) used during construction or operation of the project. The Operating Permit will include operating requirements, reporting requirements and pollutant emission limits.

A.10.4 Active construction sites and unpaved roads used for construction will be watered daily or chemical dust suppression applied as needed to maintain effective dust control.

A.10.5 In periods of excessive wind speed (sustained over 40 miles per hour), excavation and grading activities will be suspended or additional watering applied to maintain dust control.

A.10.6 Soil stockpiles will be covered, and a tackifier, water, or other BLM-approved erosion control measure will be applied as needed to maintain effective dust control.

11. VISUAL RESOURCES

Environmental protection measures listed within the following subsections of the General Construction Practices section are also pertinent to visual resources: planning and permitting, clearing and grading, and restoration.

A.11.1 Pumping stations, water treatment plant, buried storage reservoir, and pressure reducing station facilities will utilize architectural details, and be painted or use colored block to blend with the colors of the surrounding landscape. Architectural details will be approved as part of local building permit approvals.

A.11.2 Nighttime lighting at the pumping stations, pressure reducing stations, regulating tanks, and electrical substations will either be manually controlled and used only when occupied or be motion activated if needed for safety and security. Lighting will be shielded and directed downwards and towards the facility site.

A.11.3 In the Pahranagat Canyon area, rock faces within the ROW that are cut for construction will be painted with an artificial desert varnish, such as Permeon®, to reduce the visual contrast and restore the appearance of natural desert varnish. Application rates and color tint would be site-specific.

12. SOCIOECONOMICS

Environmental protection measures listed within the following subsections of the General Construction Practices section are also pertinent to socioeconomics: planning and permitting.

A.12.1 SNWA will hire local companies and utilize local community resources as available for construction management support services. Bidding of work or services will be in compliance with NRS 332 and 338.

A.12.2 SNWA will pay White Pine County for property taxes and other lost revenue associated with purchase of private property in Spring Valley, as identified in an August 2008 agreement. SNWA will provide for a one-time payment in lieu of the County's portion

A.12.3 SNWA will use a Project Labor Agreement (PLA) to cover the construction of the pipeline. Under the PLA, SNWA will require contractors to pay Clark County prevailing wage rates and a ratio of use of union employees is defined.

A.12.4 SNWA will work with labor unions and rural governments to encourage development of trade apprenticeship programs, with the objective of developing a local skilled trade base that could be utilized during construction of the project.

A.12.5 SNWA will package the work contracts such that locals will have a reasonable opportunity to be the successful bidder in accordance with NRS 332 and 338.

B. Programmatic Measures – Future ROWs

Future ROW applications for production wells, collector pipelines, and associated facilities will be analyzed in site-specific NEPA analyses. It is anticipated that the measures described above will be incorporated as part of the applicant-committed environmental protection measures for those future ROWs, as applicable. There will also be additional project-specific environmental protection measures, which may include but not be limited to the measures described below.

1. PLANNING AND DESIGN

B.1.1 Groundwater production well sites will be selected considering:

- Proximity to main and lateral pipelines
- Proximity to existing roads or utility corridors
- Suitable hydrogeologic conditions, including well yield, groundwater drawdown, and groundwater chemistry, based upon exploratory drilling
- Adequate well spacing
- Avoidance of riparian/wetland areas
- Avoidance of cultural resource sites eligible for the National Register of Historic Places

B.1.2 Monitoring wells will utilize solar panels to provide power supply for data recording, to the extent possible to reduce the need for additional power lines. When possible, the solar panels will be installed flush with the housing to reduce visual impacts.

B.1.3 Collector pipeline, distribution power line, and secondary substations will be sited, as feasible:

- Along existing roads or other utility alignments
- Avoiding wetlands and stream crossings
- Avoiding cultural resource sites eligible for the National Register of Historic Places

B.1.4 Groundwater production well sites will be designed to have:

- Infrastructure within a metal, concrete block or buried vault housing that is insulated to dampen noise
- Well housings that are painted or use colored block to blend with the colors of the surrounding landscape
- 6-8 foot chain link site security fencing
- Gravel cover within the site for dust, soil stability, and weed control
- Nighttime lighting that is either manually controlled and used only when occupied, or motion activated if needed for safety and security; lighting will be shielded and directed downwards and towards the facility site

- Features that reduce noise levels to 70 dBA or less at 500 feet from the well site

2. GENERAL CONSTRUCTION PRACTICES

B.2.1 All necessary notices, permits and waivers for drilling of wells will be submitted or obtained from the Nevada Division of Water Resources, Office of the State Engineer (State Engineer). In accordance with Chapter 445A of the Nevada Revised Statues, a "Temporary Authorization to Discharge" Permit from the Nevada Division of Environmental Protection, Bureau of Water Pollution Control will be obtained prior to hydraulic testing of groundwater wells, if applicable. Well abandonment and plugging will be in accordance with the Nevada Division of Water Resources requirements, set forth in the Nevada Administrative Code, section 534.

B.2.2 Water generated during drilling of wells will be contained in a small settling pit on-site or a tank, then directed towards existing dry washes.

B.2.3 Hydraulic testing water from well drilling will be directed towards existing dry washes as feasible. Water discharges will use a diffuser or other energy dissipater to control the flow of water and reduce erosion.

B.2.4 Lighting needed to conduct drilling or pipeline construction at night will be limited to the basic requirements to conduct the work. Lighting will be shielded, and directed down towards the site and not into surrounding areas or onto roads.

3. GENERAL OPERATION PRACTICES

B.3.1 Water levels and discharges of all production wells will be recorded on a schedule as required by applicable permits and agreements.

4. WATER RESOURCES

B.4.1 If wells drilled during exploratory drilling are not suitable for groundwater production, they will be converted to use as groundwater monitoring wells.

5. BIOLOGICAL RESOURCES

B.5.1 Groundwater production wells and overhead power lines will not be sited within 0.25-mile of an active sage grouse lek. Collector pipelines will be routed to avoid 0.25-mile of an active sage grouse lek, unless placed within an existing road and not constructed during the active lekking season (March 1 through May 15).

C. Regional Water-Related Effects

This section will be developed based upon results of the groundwater modeling.