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Section 3 - Sage TMSA

3.0 STUDY AREA DESCRIPTION AND DEVELOPMENT CONSTRAINTS

The Sage planned development includes approximately 1,080 acres of property in the Warm Springs hydrographic basin. The property was added to the Truckee Meadows Service Areas (TMSA) in 2007. The Sage TMSA is shown on Figure 3-1 (see figures at end of section) and is within the jurisdiction of the City of Reno.

The proposed project will be a master planned community with a mix of residential product types and densities that may include age restricted communities. An extensive open space network is envisioned along with a commercial town center and appropriate public facilities such as an elementary school and safety center as determined by the City of Reno.

Areas that are limited or constrained for future development include areas with slopes greater than thirty percent and drainageways. These areas are shown on Figure 3-2. Surface runoff flows to an unnamed drainageway within the Warm Springs hydrobasin.

TAZ data was not used for Sage planning. More detailed land use information provided by the developer's representative was used. The proposed development was assumed to be built out by 2030.

3.0 CONCLUSIONS AND SUMMARY RECOMMENDATIONS

The water supply for Sage can potentially be derived from several on-site sources. The long term reliability and yield of the surface and groundwater resources are currently under investigation by the project proponent. For purposes of this analysis, it has been assumed that these water rights can be developed and reliably support 764 to 1,460 AF of municipal demand. The use of reclaimed water, in addition to the on-site water resources, will likely provide sufficient resources to meet the projected demands.

The water supply improvements consist primarily of an aquifer storage and recovery system, proposed to be located on BLM property to the south of the proposed development. BLM permitting approvals will be required to develop the water supply improvements, as well as the proposed wastewater treatment and disposal facilities.

Tanks were located to serve the entire elevation range of the property, in several instances on property administered by the BLM. The tanks may be able to be relocated to on-site locations once development plans are finalized.

Current facility planning has not identified a suitable area for wastewater treatment, storage and disposal facilities that could be located within the project site. The treatment facility is proposed to be located on property administered by BLM southeast of the Sage development. Wastewater would be treated and disposed of in areas with limited public access, such as the development

open spaces. Reclaimed water that is not used for irrigation of open spaces is proposed to be disposed of on irrigated fields and stored during the non-irrigation season. Irrigated fields and a seasonal storage reservoir, which uses levies to contain the effluent, are proposed to be located next to the wastewater treatment facility.

A summary of the estimated water and wastewater costs for the proposed infrastructure is listed in Table 3.1.

Table 3.1 - Infrastructure Costs (a)

Facility Description	Total Cost (\$M)
Water	\$19.6
Wastewater	\$63.7

() 20 Cities ENRCCI = 7,942 May 2007

3.0 DESCRIPTION OF SERVICE PROVIDERS

There are no current service providers for water, wastewater and stormwater. New systems would be created to provide service for the Sage TMSA. Stormwater management and flood control are discussed in Section 14.

3.0 STATUS OF INFRASTRUCTURE PLANNING

Sage is a new area of development and little planning has been done. The most recent facility plans for water and wastewater that have potential applicability to Sage are listed in Table 3.2.

Table 3.2 - Recent Facility Plans

Plan Name	Date	Description
Water		
2006 Monitoring Report for Lower Warm Springs Creek & Tributaries Reference: Interflow Hydrology, Inc.	March 2007	Describes monitoring activities during the 2006 calendar year for selected surface and groundwater monitoring stations, which have been installed to date.
Wastewater		
Draft Washoe County 208 Water Quality Plan Version 3 Reference: Truckee Meadows Regional Planning Agency	January 2007	Per section 208 of the Clean Water Act this report provides the planning and management of all sources of water pollution and defines the parameters for area-wide wastewater management plans.

3.0 WATER

The projected water demands and required infrastructure are developed in this section.

3.5.0 Assumptions, Planning Criteria and Methodology

Water demand factors used to estimate potential demand are based on TMWA Rule 7 demand factors. It is assumed that this new development will dedicate water resources in accordance with TMWA water rights dedication policies.

In the case of non-residential development, the demand factor used represents an average number for planning purposes only. When TMWA or Washoe County receives a request for water service on a non-residential property, the actual water rights dedication requirement would be based on a project-specific analysis of the number of fixture units and the specific landscaping plan. This level of detail is not available for this analysis.

3.5.0 Existing and Future Water Demand

There is no existing water use beyond the current ranching operation.

Based on the land use analysis, projected water demands for Sage are listed in Table 3.3. The irrigation demands are projected assuming that 6,000 gallons per month of water is consumed within the house and the remainder is used for irrigation. The irrigation demand range is based on either front yard only irrigation or the combined front yard and back yard irrigation. Irrigation demand was also included for the school site assuming 3.5 AFA. Irrigation demand was estimated for commercial uses to be 3.5 AFA using 15% of the gross acreage. The total demands include both indoor and outdoor water use.

Table 3.3 - Sage Water Demands (a)

Condition	2030 Irrigation Demands Range (AFA) (b)	2030 Total Demands Including Irrigation (AFA) (c)
Total	161-307	865

- () Based on land use analysis.
- () Based on residential irrigation, and irrigation for a school and commercial land use.
- () Based on 2,500 dwelling units, 15 acres of commercial land use, and 16.5 acres of public facility.

3.5.0 Water Resources

The water supply for Sage can potentially be derived from several on-site sources. Surface water rights were acquired from Warm Springs Valley Creek, Dewey Springs and Pradere Springs. Currently these rights are allocated for municipal use in Lemmon Valley and would need to be reallocated to the Warm Springs basin. The surface water would be stored and used with an aquifer recharge, storage and recovery system located in the southern part of the development area. Groundwater rights exist for the proven original ranching water supply. Other groundwater rights may be available when proven as a reliable future resource.

The long term reliability and yield of the surface and groundwater resources are currently under investigation by the project proponent. Additional study is needed to assess their reliability and

municipal water supply yield. For purposes of this analysis, it has been assumed that these water rights can be developed and reliably support 764 to 1,460 AF of municipal demand.

Substantial amounts of reclaimed water could be available from the future water reclamation facility. This high quality reclaimed water would be suitable for landscape irrigation, including residential areas, and could be used to extend the available potable water supplies. Landscape irrigation accounts for approximately half of the total water demand for a typical residential unit. Water demands could be further reduced by implementing water conserving landscaping practices and/or xeriscaping.

Existing and potentially available water resources to serve the Sage area are presented in Table 3.4.

Table 3.4 - Potentially Available Water Resources (a)

Source Description	Supply (AFA)
Existing Resources	
Surface Water Rights (Permits 64073-64079)	700
Groundwater	64.6
Reclaimed Water	(b)
Total	764.6
Potential Future Resources	
Groundwater (Permits 64977 and 64978)	696
Total	1,460.6

(a) Potentially available water resources based on information provided by Sage Community Group.

(b) Reclaimed water may be used to supplement water resources for non-potable uses.

A comparison of the available resources in the water demand for 2030 is shown in Table 3.5. Use of reclaimed water in addition to the on-site resources will likely provide sufficient resources to meet projected demands.

Table 3.5 - Water Demand and Resources Comparison

Condition	Supply (AFA)	Sage Demand (AFA)
2030	764 - 1460	865

3.5.0 Planned Facilities

Backbone water supply and distribution system facilities were developed to supply demands and satisfy planning and design criteria for the proposed Sage development. These facilities appear in Figure 3-3.

The water supply for the Sage development is located on BLM property to the south of the proposed development. BLM permitting approvals will be required to develop the water supply improvements, as well as the proposed wastewater treatment and disposal facilities. The planned water supply improvements consist of an aquifer storage and recovery system. Infiltration of surface flows from the unnamed stream will be enhanced to recharge the local aquifer, and will be recovered by a system of wells. Additional groundwater wells may also be provided. Water quality data will be collected in the future to determine the need for potential water treatment improvements. A maximum day demand of 1,659 gpm will need to be supported by the water supply system.

The distribution system consists of two main branches. Four wells have been assumed, with a supply capacity of 500 gpm each. To reduce facilities and their associated costs, transmission main pressures in some regions are proposed to exceed 100 psi. A summary of the recommended water facility infrastructure for the Sage development is summarized in Table 3.6.

Table 3.6 - Water Facility Totals

Total Transmission Main Length	55,440 feet
Total number of Pump Stations	3
Total Tanks/ Total Storage Volume	4 / 2.4 MG

Six pressure zones are planned for the Sage development. Service elevations range from 4430 to 5075 feet. These zones are depicted in Figure 3-3.

3.5.0 Water Facility Cost Estimates

The recommended water infrastructure costs are summarized in Table 3.7 and are listed in more detail in Appendix B. Costs of the proposed wells, transmission mains, pump stations and storage tanks are included. Individual pressure reducing stations are not included in the cost estimates, as these facilities are generally considered development specific, on-site improvements. In addition, the cost of purchasing water rights is not included.

Table 3.7 - Water Infrastructure Costs (a)

Facility Description	Cost (\$M)
Supply	\$5.8
Transmission	\$11.1
Storage	\$2.7
Total	\$19.6

() 20 Cities ENRCCI = 7,942 May 2007

3.5.0 Water Planning Limitations

Specific limitations for the water planning in the Sage area are listed below.

- Single backbone mains were used to supply water throughout the TMSA. As development occurs, it is likely that an equivalent transmission capacity will be conveyed by a distribution network rather than by a single backbone main.
- Due to numerous pressure zones in the Sage development, transmission main pressures are proposed to exceed 100 psi in order to reduce facility costs and simplify system operation. In areas where transmission main pressures exceed 100 psi, connections from transmission mains to distribution system mains will require pressure regulating valves or residences must be equipped with individual pressure regulating valves.
- The tanks were located to serve the entire elevation range of the property, in several instances on property administered by the BLM. The tanks may be able to be relocated to on-site locations once development plans are finalized.
- The long term reliability and yield of the surface and groundwater resources are currently under investigation. Additional study is needed to assess their reliability and municipal water supply yield.
- The improvements required to enhance the infiltration capacity of the ASR site are under investigation. Estimated costs are not included.

3.0 WASTEWATER

The projected wastewater flows and required infrastructure for conveyance, treatment, and disposal are developed in this section.

3.6.0 Assumptions, Planning Criteria, and Methodology

The wastewater flow factor for the Sage area was assumed from the 2007 Washoe County 208 Water Quality Management Plan. The flow factor for new development ranges from a low of 110 gallons per capita per day (gpcd) to 130 gpcd. An average of 120 gpcd was used for flow projection. All other wastewater planning assumptions are as stated in Appendix A.

3.6.0 Projected Wastewater Flow

Using the land use data, flow projections for Sage were developed. The wastewater treatment capacity projection for this TMSA is presented in Table 3.8.

Table 3.8 - Sage Wastewater Projections

Condition	2030 Flows (MGD) (a,b)
Total	0.7

(a) Based on land use analysis.

(a) Based on 2,500 dwelling units, and 15 acres of commercial land use.

3.6.0 Water Reclamation and Disposal

Water reclamation would beneficially reuse a large portion of the effluent generated by Sage, and would provide a valuable water resource to help meet non potable demands. Initial plans are to use reclaimed water to irrigate large portions of the open spaces throughout the community. The available acreage and amount of water that could be reused in these open spaces for each area as listed in Table 3.9. With additional treatment improvements, high quality reclaimed water could also be used, if needed, to help meet non potable irrigation demands for parks, schools, landscape medians and residential areas.

Table 3.9 - Effluent Disposal

Condition	Irrigated Acreage (a)	Potential Reclaimed Water Use (AFA) (b)
2030	215	751

() Includes total open space that could be irrigated.

() Based on 3.5 AFA per acre.

A review of the project site was conducted to evaluate the feasibility of seasonal storage for the reclaimed water. Based on the surrounding topography and proposed land use plan for Sage, there do not appear to be suitable reservoir sites with sufficient capacity to store the anticipated quantity of effluent. However, a seasonal storage reservoir could potentially be constructed south of the Sage development on BLM property by using levies to contain the effluent. This is discussed further in the following section.

3.6.0 Planned Wastewater Facilities

Based on the projected wastewater flows, recommendations for future wastewater collection and treatment facilities were developed for 2030 as shown on Figure 3-4. Backbone reclaimed water and disposal facilities are shown on Figure 3-5. More detailed sizing of the collection and reclaimed water facilities will be required as phasing plans and land uses are finalized.

Wastewater will be collected throughout the development and conveyed by gravity to a new wastewater treatment facility. Current facility planning has not identified a suitable area for wastewater treatment, storage and disposal facilities that could be located within the project site. The treatment facility is proposed to be located on property administered by BLM southeast of the Sage development. Locating the facility away from the development will provide a buffer for noise and odors. Initially, a relatively low technology pond plant is proposed to be constructed sized for the projected capacity of up to 0.7 MGD. An enclosed headworks and odor control facility would be provided. Initially, wastewater would be treated and disposed of in areas with limited public access, such as the open spaces. The reclaimed water that is not used for irrigation of the open spaces is proposed to be disposed of on irrigated fields and stored during the non-irrigation season. The irrigated fields and storage ponds are proposed to be located next to the wastewater treatment facility on BLM property.

If additional water resources are needed to meet demands, the water reclamation facility may be upgraded to a tertiary reclamation facility. Filtered and disinfected effluent could be made available for unrestricted irrigation uses such as landscape medians, residential development and other open spaces. Up to 780 AFA of reclaimed water could be available to help meet projected water demands.

Based on the proposed development plan, there are more potential locations to utilize reclaimed water than water available. The total reclaimed water use potential may be up to 1,050 AFA for both residential and open space irrigation. Potentially, Sage could utilize a portion of Spring Mountain’s reclaimed water, as discussed below.

Wastewater collection pipe sizing and reclaimed water piping calculations are shown in Appendix C.

Table 3.10 - Summary of New Wastewater Infrastructure

Interceptors	33,400	Feet
Reclaimed Water/Disposal Pipe	33,200	Feet
Reclaimed/Disposal Pump Stations	1	Stations
2030 Treatment Capacity for Reclamation Facility	0.7	MGD
Reclaimed Water Storage Reservoir	430	AF
Reclamation Fields	230	Acres

3.6.0 Wastewater Facility Cost Estimates

The proposed wastewater facilities and estimated costs are summarized in Table 3.11 and are listed in more detail in Appendix C.

Table 3.11 - Wastewater Infrastructure Costs (a)

Facility Description	Total Cost (\$M)
Collection System	\$6.2
Treatment	\$31.1
Disposal/Reclaimed Water	\$26.4
Total	\$63.7

(e) 20 Cities ENRCCI = 7,942 May 2007

3.6.0 Wastewater Management Options

The potential exists for a coordinated wastewater treatment and disposal strategy with the planned Spring Mountain development, located north of Sage. The water and wastewater planning criteria for this development area is more fully described in Section 2. Because the developments are independent of one another, and the timing of one project may not be

appropriate for the other, independent water and wastewater facility plans were developed for each area. However, the proposed water reclamation and/or land disposal option for Sage may also be a potentially viable option for Spring Mountain.

3.6.0 Wastewater Planning Limitations

Specific limitations of the wastewater planning in the Sage area are listed below.

- Wastewater flow projections are conservative because a mid-range wastewater flow factor is used. The TMWA Rule 7 water demand projections are representative of actual demands. Therefore, the percentage of wastewater flow compared to the total water demand is more than the “typical” fifty percent reported in previous planning studies.
- More detailed sizing of the collection and reclaimed water facilities will be required as phasing plans and land uses are finalized.
- Effluent disposal planning for the Sage TMSA is conceptual. Additional evaluation will be required to determine the final effluent treatment and disposal strategy.

3.7 POLICY RECOMMENDATIONS (INCLUSIVE OF WATER, WASTEWATER)

On-site resources, in addition to the use of reclaimed water will likely provide sufficient resources to meet projected demands. However, expanded use of reclaimed water, such as front and/or back yard residential landscape watering, should be evaluated on a regional level and implemented where reasonable to extend available water supplies and help fulfill the development potential within the Sage TMSA.

Current landscaping practices account for approximately half of the total water demand for a typical residential unit. Water demands could be reduced by implementing water conserving landscaping practices and/or xeriscaping. However, water conserving landscape practices should be balanced with the need for disposal of reclaimed water.