

CHAPTER FIVE

COMMUNITY INFRASTRUCTURE



5.1 INTRODUCTION

Chapter Five examines various types of community and regional infrastructure that will be needed to support future land use development in Star Valley Ranch. This evaluation focuses upon the municipal road network, the municipal water system, and electrical distribution system. The potential need for a future wastewater collection system is also explored.

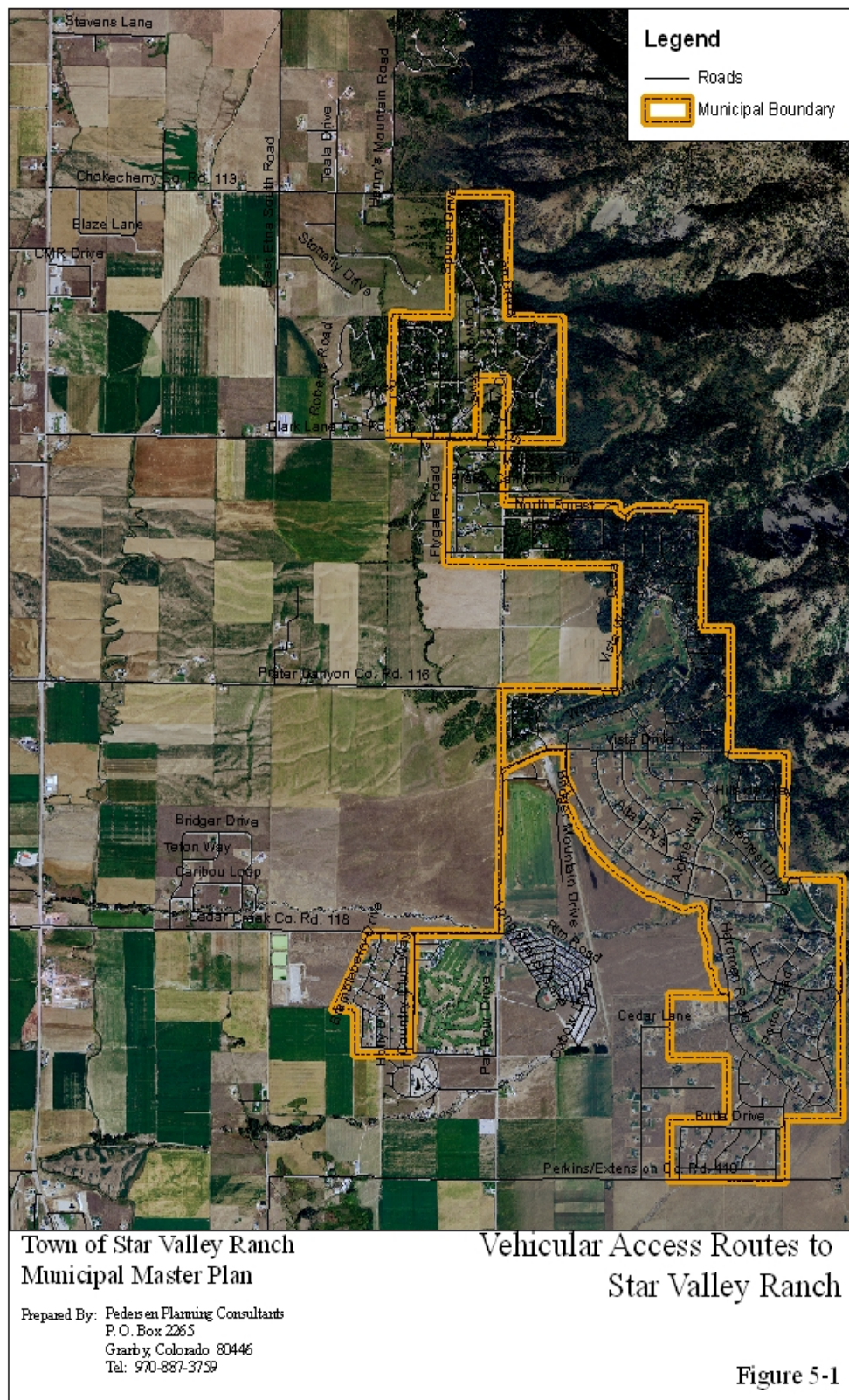
Future needs are considered in the context of anticipated community growth that is presented in Chapter Two. The analysis of the municipal water system relies primarily upon recent water system plans completed by Forsgren Associates. The evaluation of municipal road needs is drawn largely from recent road and surface water studies completed by Sunrise Engineering in 2013, as well as insights provided by the Star Valley Ranch Town Council.

5.2 TRANSPORTATION

5.2.1 Vehicular Access to Star Valley Ranch

U.S. Highway 89 is the principal arterial that provides vehicular access to the Town of Star Valley Ranch (Figure 5-1). Between the communities of Thayne and Etna, this highway is a paved, two-lane roadway that provides access to various communities in Star Valley and southeast Idaho. North of Alpine, U.S. Highway 89 provides access to the Town of Jackson, Grand Teton National Park, and Yellowstone National Park. Southwest of Star Valley, U.S. Highway 89 provides an important link to Salt Lake City and various communities in northern Utah.

Four Lincoln County roads extend east of U.S. Highway 89 to Muddy String Road (Lincoln County Road 117). These collectors include Clark Lane (Lincoln County Road 115), Prater Canyon Road (Lincoln County Road 116), Cedar Creek Drive (Lincoln County Road 118), and Perkins Road (Lincoln County Road 119). Each of these roadways, as well as Muddy String Road, are two-lane roadways that are constructed within a 60-foot road right-of-way (Teichert, 2008).



5.2.2 Vehicular Traffic Volumes in the Vicinity of Star Valley Ranch

Seasonal vehicular traffic counts are conducted and used by the Wyoming Department of Transportation to estimate annual daily traffic volumes at selected locations along U.S. Highway 89. Available data for 2013 indicates an average daily traffic of about 4,037 vehicles travel through the intersection of U.S. Highway 89 and Wyoming Highway 239.

Roughly 95 percent of this traffic included travel by passenger vehicles and light trucks (Wyoming Department of Transportation, Planning Program, 2013). Otherwise, no traffic data is available for the Lincoln County roads that intersect with Muddy String Road near Star Valley Ranch.

5.2.3 Municipal Vehicular Road Network

Town of Star Valley Ranch assumed ownership of all roads in Star Valley Ranch in the spring of 2007. This was achieved by the Town through a “friendly” Eminent Domain action against the Star Valley Ranch Association.

The municipal vehicular road network includes some 31 miles of roadway (Figure 5-2 and Table 5-1). The network includes a combination of roadways that have been classified as Town arterials, neighborhood collectors, local and primitive roads. Existing roadways have been constructed within 40, 50, or 60-foot right-of-ways (Sunrise Engineering, 2013).

The primary access to the municipal road network is Muddy String Road. This road, which is owned and maintained by Lincoln County, is also considered to be an arterial roadway.

Roadways within Star Valley Ranch Classified as Town Arterials

- Vista Drive
- Cedar Creek Drive
- Hardman Road
- East Street
- portions of Butte Drive

Neighborhood Collector Streets

- Vista West Drive
- Vista East Drive
- Vista Drive (from Muddy String to Alpine)
- Birch Drive
- Dogwood Drive
- Cedar Creek (Hardman to Ridgecrest)
- Last Chance Drive
- portions of Hardman (Butte Drive to Last Chance Drive)
- Bonneville Road
- Lilac Drive

All other remaining roadways, which comprise roughly two-thirds of the municipal road network, are classified as local roads. Primitive roads include unimproved roads in the Town of Star Valley Ranch that are located within undeveloped cul-de-sacs. These roads will not be improved by the Town until houses are built on adjoining lots (Sunrise Engineering, 2013).

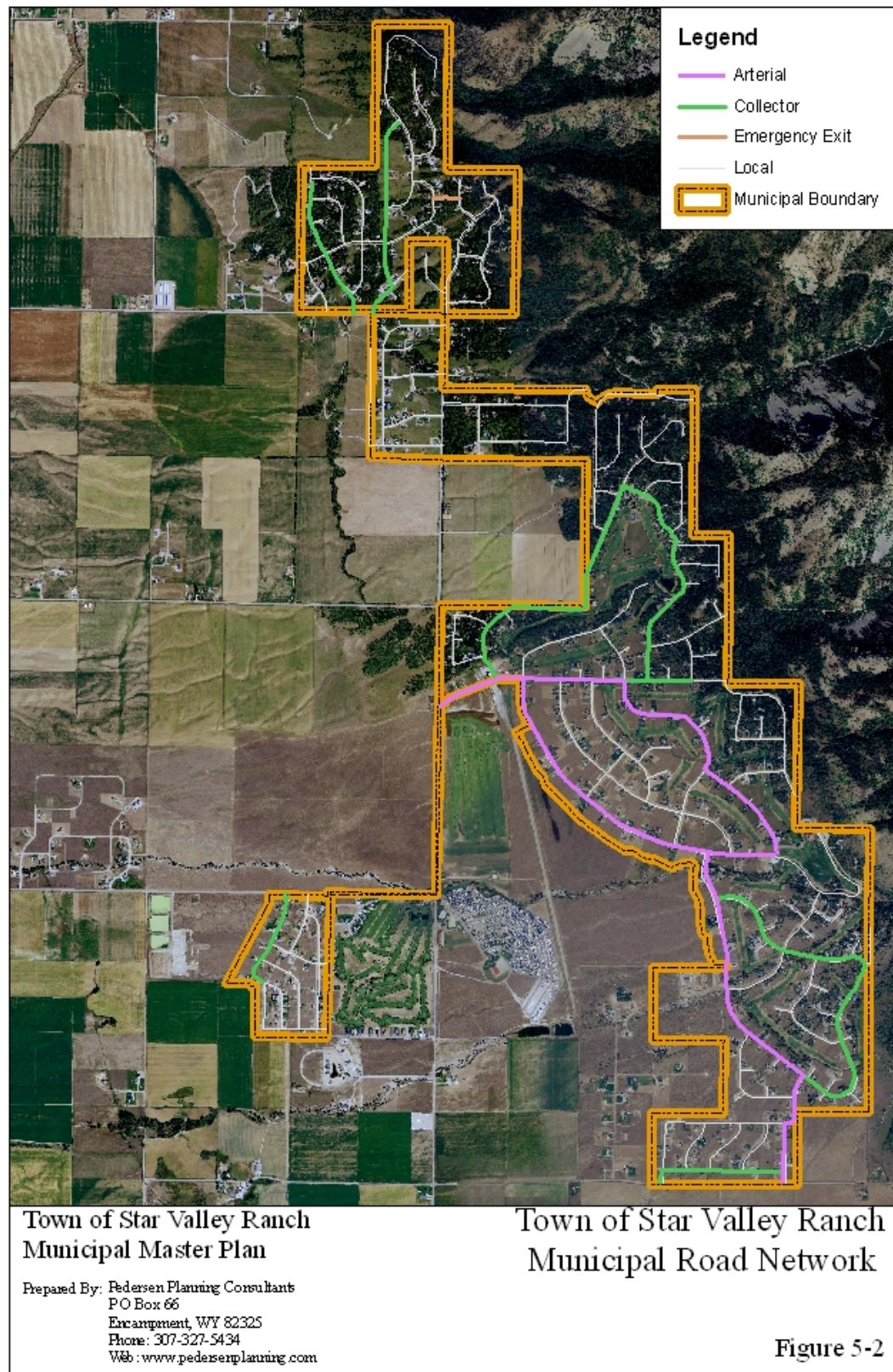


TABLE 5-1
MUNICIPAL ROAD NETWORK CHARACTERISTICS
TOWN OF STAR VALLEY RANCH
December 2013
Source: Sunrise Engineering, Inc.
(Four pages)

Plat #	Street Name	Street Classification	Street Length (ft)	ROW Width	Current Surface	Predominate Basement Soil in 12" to 24" Depth
15	Alpen Way	Local	475	60	Gravel	A-4
15	Alpenglow Circle	Local	800	60	Gravel	A-4
15	Alpenglow Drive	Local	2,400	60	Gravel	A-4
9	Alpine Circle	Local	220	50	Gravel	A-4
9, 12, 14,	Alpine Way (North of Vista)	Local	1,060	50, 60	Gravel	A-4
9, 12, 14, 16	Alpine Way (Ridgecrest to Cedar Creek)	Arterial	1,550	50, 60	Gravel	A-4
9, 12, 14, 16	Alpine Way (Vista to Ridge Crest)	Arterial	2,700	50, 60	Asphalt	A-4
14, 16	Alta Drive (Eastwood Way to Cedar Creek)	Local	2,900	60	Gravel	A-4
14, 16	Alta Drive (Vista To Eastwood Way)	Local	2,030	60	Gravel	A-4
2, 3	Aspen Way	Local	3,540	40	Gravel	A-4
PCE Unit 4	Aztec Drive	Local	1,125	40	Gravel	A-4
5	Barbary Way	Local	1,130	40	Gravel	A-1
21	Bearlake Drive	Local	1,050	60	Gravel	A-1
21	Bingham Drive	Local	1,120	60	Gravel	A-1
2	Birch Circle	Local	220	40	Gravel	A-4
2	Birch Drive	Collector	980	50	Gravel	A-4
7	Blackwood Drive	Local	790	40	Gravel	A-1
21	Bonneville Road	Collector	2,220	60	Gravel	A-1
3	Box Elder Place	Local	185	40	Gravel	A-4
4	Bramble Berry Drive	Collector	1,615	40	Gravel	A-1
4	Brushwood Drive	Local	1,090	40	Gravel	A-1
21	Butte Drive (East Street to West Street)	Local	2,190	60	Gravel	A-1
21	Butte Drive (East Street to Hardman)	Arterial	1,060	60	Gravel	A-1
13	Canyon Pines Way	Local	1,130	60	Gravel	A-4

TABLE 5-1
MUNICIPAL ROAD NETWORK CHARACTERISTICS
(Continued, Page 2 of 4 Pages)

Plat #	Street Name	Street Classification	Street Length (ft)	ROW Width	Current Surface	Predominate Basement Soil in 12" to 24" Depth
14, 16, 17	Cedar Creek Drive (Alpine Way to Ridgecrest)	Collector	1,840	60	Gravel	A-4
14, 16, 17	Cedar Creek Drive (Eastwood Way to Alpine Way)	Arterial	1,880	60	Gravel	A-4
14, 16, 17	Cedar Creek Drive (Ridgecrest toward Silo)	Local	3,020	60	Gravel	A-1
14, 16, 17	Cedar Creek Drive (Vista to Eastwood Way)	Arterial	2,580	60	Gravel	A-4
7, 8	Cedar Drive	Local	4,150	40	Gravel	A-4
7	Cedar Way	Local	440	40	Gravel	A-4, A-1
PCE Unit 4	Cheyenne Circle	Local	520	40	Gravel	A-4
3	Choke Cherry Circle	Local	210	40	Gravel	A-4
3	Choke Cherry Drive	Local	2,680	40	Gravel	A-4
3	Cottonwood Circle	Local	235	40	Gravel	A-4
3	Cottonwood Lane	Local	995	40	Gravel	A-4
18	Creek Circle	Local	360	60	Gravel	A-1, A-4
21	Custer Drive	Local	990	60	Gravel	A-1
1, 2	Dogwood Drive	Collector	3,130	40	Gravel	A-4
22	East Forest Drive	Local	700	60	Gravel	A-4
21	East Street	Arterial	1,110	60	Gravel	A-1
12	Eastwood Way	Local	1,120	60	Gravel	A-4, A-1
PCE Unit 4	Elkhorn Circle	Local	200	40	Gravel	A-4
1	Evergreen Drive	Local	1,960	40	Gravel	A-4
6	Fir Place	Local	565	40	Gravel	A-1
9, 11	Green Canyon Circle	Local	315	50	Gravel	A-4, A-1
9, 11	Green Canyon Drive	Local	1,615	50	Gravel	A-4
18	Hardman Circle	Local	205	60	Gravel	A-1, A-4
18	Hardman Court	Local	300	60	Gravel	A-1, A-4
18	Hardman Place	Local	225	60	Gravel	A-1, A-4
17, 18	Hardman Road (North and West of Butte)	Arterial	4,780	60	Gravel	A-1, A-4
17, 18	Hardman Road (South and East of Butte)	Collector	5,120	60	Gravel	A-1, A-4
13	Hillside Circle	Local	4,065	60	Gravel	A-4
13	Hillside Way	Local	1,710	60	Gravel	A-4
5	Holly Drive	Local	1,665	40	Gravel	A-1
18	Jade Circle (Cedar on Plat)	Local	170	60	Gravel	A-1, A-4
17	Last Chance Circle	Local	250	60	Gravel	A-1, A-4
17	Last Chance Court	Local	250	60	Gravel	A-1, A-4
17	Last Chance Drive	Local	1,700	60	Gravel	A-1, A-4
17	Last Chance Place	Primitive	270	60	Primitive	A-1, A-4
5	Lilac Drive	Local	1,275	40	Gravel	A-1

TABLE 5-1
MUNICIPAL ROAD NETWORK CHARACTERISTICS
(Continued, Page 3 of 4 Pages)

Plat #	Street Name	Street Classification	Street Length (ft)	ROW Width	Current Surface	Predominate Basement Soil in 12" to 24" Depth
3	Mahogany Circle	Local	170	40	Gravel	A-4
3	Mahogany Way	Local	2,930	40	Gravel	A-4
17	Middle Branch Circle	Local	330	60	Gravel	A-1, A-4
17	Middle Branch Court	Local	320	60	Gravel	A-1, A-4
17	Middle Branch Drive	Local	2,730	60	Gravel	A-1, A-4
17	North Branch Circle	Local	675	60	Gravel	A-1, A-4
17	North Branch Court	Local	300	60	Gravel	A-1, A-4
22	North Forest Drive	Local	2,270	60	Gravel	A-6
6	Oak Drive	Local	820	40	Gravel	A-1
18	Paint Brush Court (Cedar on Plat)	Local	390	60	Gravel	A-1, A-4
3	Pine Drive	Local	1,305	40	Gravel	A-4
12	Pineview Circle	Local	275	60	Gravel	A-4
PCE Unit 4	Piute Drive	Local	1,285	40	Gravel	A-4
18	Ponderosa Circle	Local	230	60	Gravel	A-1, A-4
18	Ponderosa Court	Local	220	60	Gravel	A-1, A-4
18	Ponderosa Drive	Local	2,120	60	Gravel	A-1, A-4
18	Ponderosa Place	Local	210	60	Gravel	A-1, A-4
18	Porto Circle	Local	170	60	Gravel	A-1, A-4
18	Porto Court	Local	325	60	Gravel	A-1, A-4
18	Porto Place	Local	220	60	Gravel	A-1, A-4
18	Porto Road	Local	2,300	60	Gravel	A-1, A-4
PCE Unit 4	Prater Canyon Drive	Local	1,105	40	Gravel	A-4
PCE Unit 4	Prater Circle	Local	275	40	Gravel	A-4
7, 8	Redwood Circle	Local	1,190	40	Gravel	A-4
6, 7, 8	Redwood Drive	Local	2,710	40	Gravel	A-4
13	Ridgecrest Circle	Local	150	60	Gravel	
13	Ridgecrest Drive	Arterial	2,110	60	Asphalt	A-4
5	Sage Way	Local	865	40	Gravel	A-1
5	Scrub Oak Drive	Local	2,245	40	Gravel	A-1
15	Snow Forest Circle	Local	430	60	Gravel	A-4
15	Snow Forest Drive	Local	2,810	60	Gravel	A-4
10	Solitude Circle	Local	200	50	Gravel	A-4
14	Solitude Circle South	Local	375	60	Gravel	A-4
12	Solitude Court	Local	675	60	Gravel	A-4
12, 14	Solitude Drive	Local	2,650	60	Gravel	A-4, A-1
22	South Forest Drive	Local	1,630	60	Gravel	A-4

TABLE 5-1
MUNICIPAL ROAD NETWORK CHARACTERISTICS
(Continued, Page 4 of 4 Pages)

Plat #	Street Name	Street Classification	Street Length (ft)	ROW Width	Current Surface	Predominate Basement Soil in 12" to 24" Depth
1, 2	Spruce Drive (North of Evergreen)	Local	3,570	40	Gravel	A-4
1, 2	Spruce Drive (South of Evergreen)	Local	1,240	40	Gravel	A-4
7, 8	Spur Wood Drive	Local	1,255	40	Gravel	A-4, A-6
17	Star Circle	Local	350	60	Gravel	A-1, A-4
9	Star Peaks Court	Local	445	50	Gravel	A-4
9	Star Peaks Way	Local	800	50	Gravel	A-4
10	Sugar Loaf Circle	Local	180	50	Gravel	A-4
10	Sugar Loaf Drive	Local	2,205	50	Gravel	A-4
5	Tumbleweed Lane	Local	990	40	Gravel	A-1
9	Vista Circle	Local	230	50	Gravel	A-4
9	Vista Court	Local	230	50	Gravel	A-4
9, 13	Vista Drive (Alpine Way to Star Peaks Way)	Collector	1,230	60	Gravel	A-4
9, 13	Vista Drive (East of Star Peaks Way)	Local	3,555	60	Gravel	A-4, A-1
9, 13	Vista Drive (Muddy String to Alpine Way)	Arterial	3,500	60	Asphalt	A-4
6	Vista East Court	Local	250	40	Gravel	A-4
6, 7, 9, 11	Vista East Drive (North of Pond)	Collector	2,325	50	Asphalt	A-4
6, 7, 9, 11	Vista East Drive (South of Pond)	Collector	2,055	50	Asphalt	A-4
7, 10	Vista West Drive (Corner of Field to Vista East)	Collector	2,385	50	Asphalt	A-4, A-6
7, 10	Vista West Drive (Vista East to Redwood Dr)	Collector	690	50	Gravel	A-4, A-6
7, 10	Vista West Drive(Vista to Corner of Field)	Collector	2,925	50	Asphalt	A-4, A-6
6, 9, 10, 11	Walnut Drive	Local	3,090	50, 40	Gravel	A-4
PCE Unit 4	West Elkhorn Drive	Local	3,120	40	Gravel	A-4
22	West Forest Drive	Local	715	60	Gravel	A-4
21	West Street	Local	1,130	60	Gravel	A-1
6	White Pine Avenue	Local	775	40	Gravel	A-1
10	Wildcat Circle	Local	170	50	Gravel	A-4

5.2.4 Planned Road Improvements

In a December 2013 Master Roads Study, Sunrise Engineering recommended the completion of various road improvement projects (Table 5-2). A companion Surface Water Study, which also completed by Sunrise Engineering, also included recommended road drainage projects. In combination, these studies included an extensive list of structural and road drainage improvements to various roadways in the Town. In the Master Roads Study, a priority for each road project is also identified along with cost estimates for selected road improvements.

The Town Council re-examined the list of recommended road improvement projects on September 16, 2014, and discussed project priorities for the coming decade with representatives of Sunrise Engineering. These discussions identified a priority for two roadway projects:

- improvements to Cedar Creek Drive from Vista Drive to Hardman Road, Hardman Road to the south and east to Butte Drive, south to East Street, and south on east Street to where it intersects with Perkins Lane. Road improvements envisioned for these roadways include road drainage improvements and improvement of the gravel roadway surface.
- Vista Drive from Cedar Creek to just east of Vista East Drive where the paved surface terminates. Improvements to this roadway segment include improved road drainage, flood control, and roadway with full drainage, subgrade improvements, and construction of a paved, asphalt surface (Redlin, 2014).



It was also determined that pathways be established in conjunction with these road improvement projects if grant funds were available (Redlin, 2014).

5.2.5 Municipal Road Needs

5.2.5.1 Future Road Surfacing

Responses to the Community Survey included a considerable number of residents desiring the construction of paved, road surfaces within the community. The Master Roads Study provides insight concerning a lingering question concerning the type of roads that should be constructed within the Town in the future. Sunrise Engineering recommended that the construction of paved road surfaces should be reserved for roadways with greater traffic. This conclusion was based upon a net present worth analysis that indicated:

- the maintenance of a well-maintained paved road costs approximately 50 percent more than the maintenance of a well-maintained gravel road; and,
- initial construction costs for a paved road are about 80 percent more than for construction of a gravel road.

TABLE 5-2 PLANNED MUNICIPAL ROAD IMPROVEMENTS

Source: Sunrise Engineering, Inc.

Potential Project Description	Project Score						Total Score
	Public Safety	Property Protection	Cost Impacts to Residents	Long Term Maintenance	Public Convenience	Town Infrastructure Plans	
Reconstruct arterial streets with failing pavements							
Ridgecrest Drive	17	9	0	63	26	17	132
Vista Drive (Cedar Creek Drive to Vista East)	0	14	0	80	20	52	166
Reconstruct collector street with failing pavements							
Vista East Drive (North of Pond)	30	26	0	40	12	10	118
Vista East Drive (South of Pond)	75	-13	0	30	40	0	132
Vista West Drive (Corner of Field to Vista East)	0	-8	0	34	0	-10	16
Vista West Drive (Vista East to Redwood Dr)	29	7	0	22	20	0	78
Vista West Drive (Vista to Corner of Field)	28	27	0	80	24	-5	154
Reconfigure roads with poor sight distance or geometry							
Cedar Drive	133	-5	0	6	36	52	222
Redwood Road	89	2	0	6	28	57	182
Spurwood Drive	44	-5	0	3	10	18	70
Spruce Drive	67	2	0	3	16	18	106
Evergreen Drive	60	-5	0	3	12	13	83
Cottonwood	38	-1	0	0	4	8	49
Pine Drive	48	-1	0	0	8	13	68
Clark and Chokecherry + Birch	56	-28	0	0	7	17	52
Reconfigure roads with steep grades >20%							
Green Canyon Drive	54	-14	0	30	34	13	117
Redwood Drive	78	-20	0	37	38	-12	121
Snow Forest Drive	63	-76	0	25	26	-42	-4
Spruce Drive (North of Evergreen)	43	-55	0	21	30	13	52
Sugar Loaf Drive	70	12	0	3	40	31	156
Walnut Drive	57	8	0	7	38	8	118
White Pine Avenue	53	-51	0	14	20	-2	34
Construct Roadside Ditches							
Vista Drive (Cedar Creek to Vista East)	0	22	0	68	40	18	148
Vista West (Vista to Redwood)	0	18	0	72	44	18	152
Vista East (Various Locations)	0	38	0	50	44	18	150
Install Paved Low Water Crossings							
Cedar Creek Drive	0	32	0	77	26	17	152
Solitude Drive	0	15	0	36	24	17	92
Vista East	0	23	0	40	26	17	106
Choke Cherry Drive	0	29	0	42	26	17	114
Mahogany Way	0	14	0	31	22	17	84
Install asphalt pavement on gravel arterial roads							
Alpine Way (Ridgecrest to Cedar Creek)	8	26	0	7	26	42	109
Butte Drive (East Street to Hardman)	16	29	0	7	26	42	120
Cedar Creek Drive (Eastwood Way to Alpine)	16	29	0	7	32	42	126
Cedar Creek Drive (Vista to Eastwood Way)	16	29	0	7	32	42	126
East Street	16	29	0	7	26	42	120
Hardman Road (North and West of Butte)	16	28	0	7	26	42	119
Install asphalt pavement on gravel collector roads							
Birch Drive	23	35	0	48	26	42	174
Bonneville Road	4	7	0	48	12	22	93
Bramble Berry Drive	4	7	0	48	12	22	93
Cedar Creek Drive (Alpine Way to Ridgecrest)	16	10	0	7	28	32	93
Donwood Drive	16	19	0	36	28	22	121
Hardman Road (South and East of Butte)	16	22	0	36	18	22	114
Vista Drive (Alpine Way to Star Peaks Way)	0	19	0	48	12	22	101
Vista West Drive (Vista East to Redwood Dr)	4	13	0	34	12	22	85
Install asphalt pavement on local roads presently							
Alpenglow Drive	4	26	0	44	30	14	118
Cedar Creek Drive (Ridgecrest toward Silo)	12	10	0	7	30	22	81
Choke Cherry Drive	16	10	0	44	33	18	121
Cottonwood Lane	16	10	0	22	29	10	87
Green Canyon Drive	16	1	0	29	28	6	80
Last Chance Drive	16	10	0	22	28	10	86
Snow Forest Drive	20	1	0	25	16	0	62
Snow Forest Circle	16	10	0	22	26	0	74
Sugar Loaf Drive	16	10	0	22	28	0	76
Provide Emergency Ingress-Egress							
Prater Canyon water crossing	32	39	0	22	34	8	135
Emergency Exit from Cedar Drive Area	40	-10	0	-22	28	12	48
Emergency Exit on north end Alpenglow Drive area	40	-10	0	-11	0	-4	15
Emergency Exit from north Spruce Drive.	40	-10	0	-11	0	-4	15
Emergency Exit from Evergreen Drive	40	-10	0	-11	0	-14	5

During a September 2014 meeting of the Town Council, it was also determined that the Town public works personnel will continue to maintain and improve municipal roads using the best possible gravel surface material and “cold patch” damaged areas of paved road surfaces (Redlin, 2014).

5.2.5.2 *Appropriate Scheduling of Road Improvement Projects*

Aside from the recommendations of the Master Roads Study, the paving of any municipal roads is not recommended until planned water system improvements for the water distribution system are completed by the Town of Star Valley Ranch. Ideally, these improvements could be made immediately following the installation of planned water distribution system improvements along these roadways.

5.2.6 U.S. Forest Service Emergency Access Needs

In the event of a wildfire within Star Valley Ranch or a forest fire within Bridger-Teton National Forest, the U.S. Forest Service needs a designated route to facilitate vehicular access for fire suppression and other emergency vehicles. Both Vista Drive and Cedar Creek Drive represent potential options because of their available road right-of way and proximity to a U.S. Forest Service parking area north of the SVRA Silo Building. However, the preferred route for the designated emergency access would be via Vista Drive, Alpine Way, and Ridgecrest. A formal, written agreement, which identifies the use of this access route during future emergency conditions, should be adopted by the Town of Star Valley Ranch and the U.S. Forest Service, to ensure a predictable and efficient response by Forest Service fire crews.

5.2.7 Lincoln County Road Needs

5.2.7.1 *Bus Stops*

Lincoln County School District presently provides bus transportation for Star Valley Ranch children who attend elementary, middle, and high schools in Star Valley. Several student bus stops are located along Muddy String Road, as well as within Town. Some parents with children desire Lincoln County to build more identifiable bus stops that would each contain a bus shelter. Adjacent to each shelter, parents report that there is also a need for some limited vehicular parking areas along the road right-of-way.

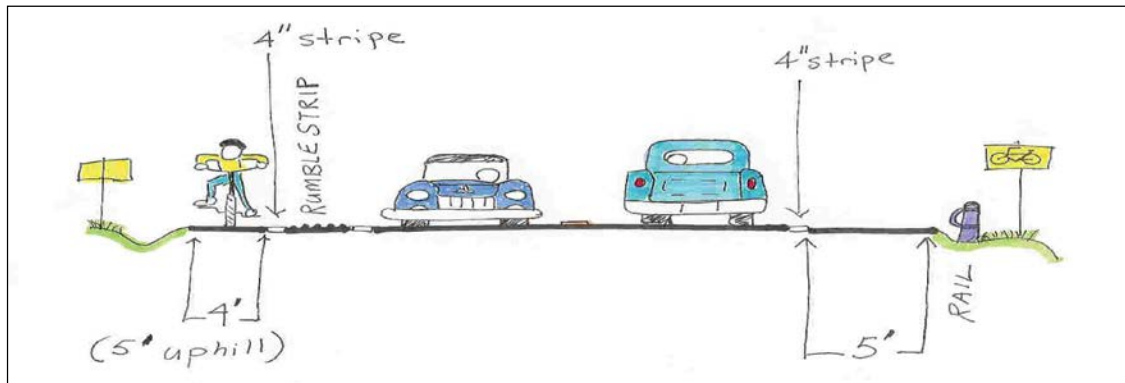


5.2.7.2 *Improved Road Shoulders*

The Star Valley Trails and Open Space Plan calls for the establishment of striped bicycle shoulders along three Lincoln County roads in the vicinity of Star Valley Ranch. These roads include Muddy String Road, Clark Lane, and Cedar Creek Drive (Lincoln County Office of Planning and Development, 2006).

The plan envisions that the striped bicycle shoulders could be accommodated on paved lanes that contain a pavement width of, at least, 14 feet. The typical bicycle shoulder should contain four feet of paving, but a five-foot pavement width is recommended for uphill road segments and road segments that include bridge railings or guard rails (Lincoln County Office of Planning and Development, 2006).

"If a rumble strip is present, the four foot paved bicycle shoulder will be between the outside edge of the rumble strip and the outside edge of pavement. The bicycle shoulder will be marked with the bicycle symbol and separated from motor vehicle lanes by a four inch white stripe. Bicycle shoulders will be designated on both sides of the road. The roadway will be designed with appropriately located bicycle route signs" (Lincoln County Office of Planning and Development, 2006).



Striped Bicycle Shoulders on Shared Roadways

Source: Lincoln County Office of Planning and Development, 2006.

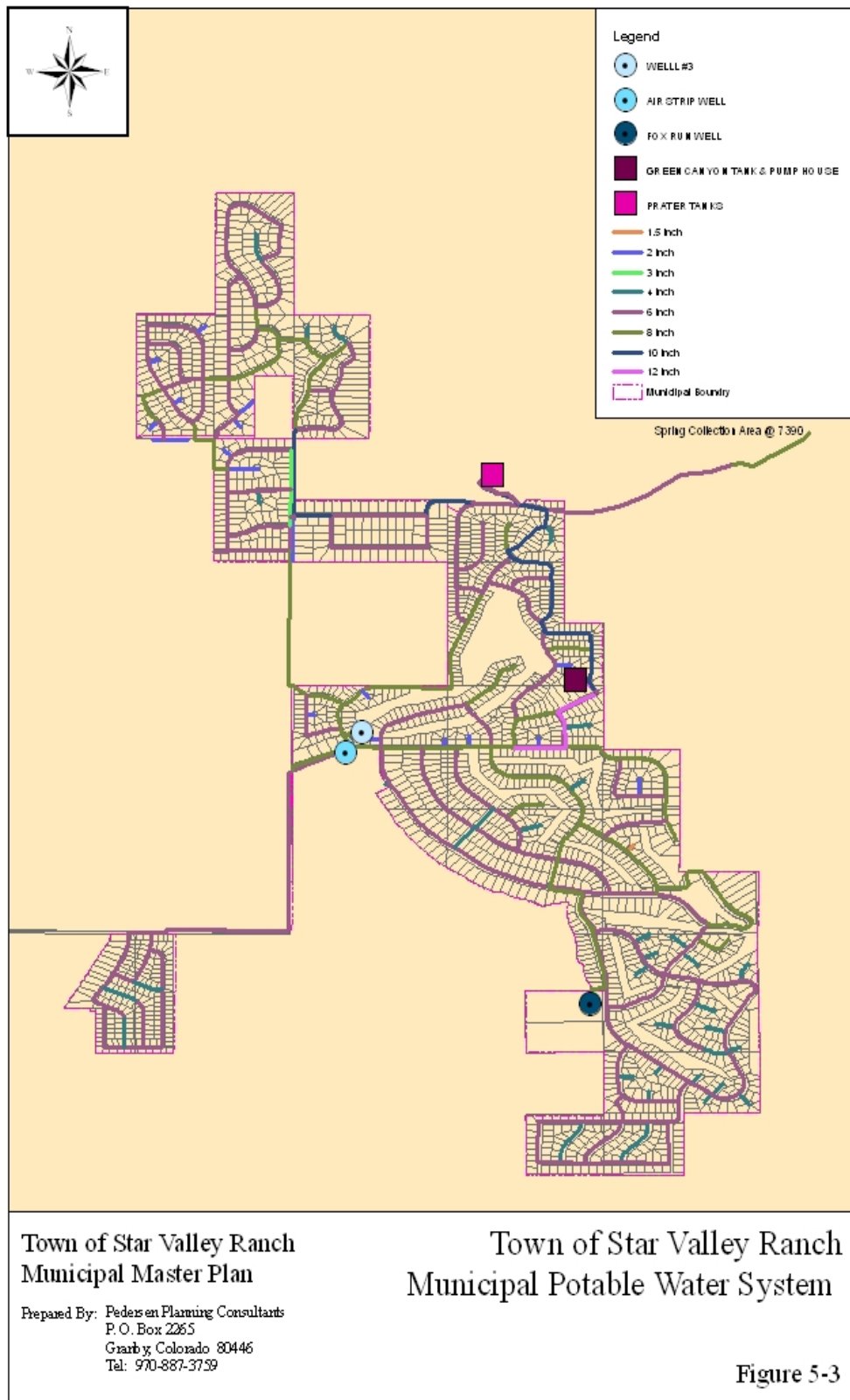
The establishment of striped bicycle shoulders on two of the three Lincoln County roadways will require an expansion of pavement widths along Clark Lane and Muddy String Road. A 22-foot wide pavement exists along Clark Lane while the pavement width along Muddy String Road is 24 feet. In contrast, Cedar Creek Drive, which has a pavement width of 28-feet (Teichert, 2008), may only require the installation of shoulder striping and appropriate signage. Lincoln County recently completed the construction of a paved bikeway along Muddy String Road between Star Valley Ranch Resort and the primary Vista Drive entrance to the Town. The eventual completion of similar improvements along Cedar Creek Drive and Muddy String Road will provide considerably safer bicycle access from Star Valley Ranch Plats 4 and 5 to the Vista Drive entrance to Star Valley Ranch.

5.3 WATER SYSTEM

5.3.1 General

On May 30, 2007, the Star Valley Ranch Association transferred ownership of its community culinary water system to the Town of Star Valley Ranch. Concurrently, the Town purchased various types of equipment, as well as an inventory of replacement parts and tools, to support the continued operation and maintenance of the water system.

Since the transfer of water system assets to the Town of Star Valley Ranch in 2007, the Town has thoroughly investigated water system improvement needs. Following the completion of various water system plans by Forsgren Associates, Weston Engineering and other consultants, the Town has secured a combination of grant funds and loans that have been applied to the construction of significant water system improvements. The scope of these improvements is highlighted in the following description of the existing municipal water system (Figure 5-3).



While the municipal water system provides potable water to all residential, commercial and public facilities in the Town, there is a second water system in the community. The Star Valley Ranch Association operates and maintains a separate water system that is used to seasonally irrigate the Aspen Hills and Cedar Creek golf courses.

5.3.2 Potable Water Supply

A combination of surface and groundwater sources are used to provide potable water for the municipal water system. However, ground water is the primary source of supply for the municipal water system.

5.3.2.1 Spring Water Supply

A spring in Prater Canyon is situated at about the 7,390-foot elevation. This spring, which was re-conditioned in 2012, provides the culinary system with a supply of roughly 250 gallon per minute (Smith, 2014).

5.3.2.2 Groundwater Supply

Three municipal groundwater wells are used to obtain ground water from local aquifers.

- The Airstrip #1 Well, which is located on the west side of Vista Drive, was completed in 1993, but was re-developed in 2013. This well provides a supply of approximately 300 to 350 gallons per minute (Smith, 2014).
- Well #2 is situated near the municipal public works complex and Fox Run Park. This well, which is operated with a variable speed pump, provides a supply of about 350 gallons per minute (Smith, 2014).
- Well #3 is situated northeast of the First Response building and Mail Center. This well, which also is operated with a variable speed pump, yields a supply of approximately 650 to 700 gallons per minute (Smith, 2014).



5.3.3 Water Storage

Transmission lines from the Prater Canyon spring collection system carry water downslope to two water storage tanks in Prater Canyon. These include an older, buried concrete storage tank which has a storage capacity of approximately 175,000 gallons. A newer 400,000 gallon storage tank was constructed near the older water tank in 2010 (Smith, 2014).



A third water storage facility is located in Green Canyon. This 400,000 gallon water storage facility was purchased from the Star Valley Ranch Association in 2010.



5.3.4 Transmission and Distribution System

The original transmission and distribution system was significantly under-sized and buried at shallow depths. In addition, there were a significant amount of leaks in the transmission and distribution system. These system characteristics contributed to losses in system pressures and required the Town, during winter months, to run water to keep shallow distribution lines from freezing and damaging portions of the water distribution system.

For this reason, the Town replaced all steel transmission and distribution piping that was part of the original water system between 2010 and 2012. The installation of new distribution piping was also supplemented with the installation of new pressure relief valves, control valves and fire hydrants. On a cumulative basis, these improvements, which were substantially completed in October, 2012, encompassed roughly 40 percent of the municipal transmission and distribution system (Wilkes, 2014).

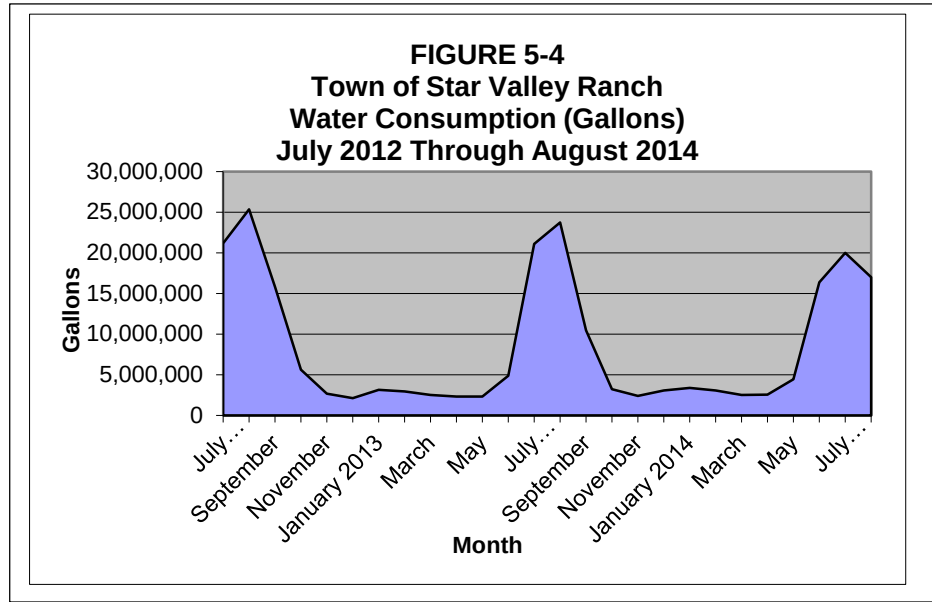
A new pump station was also constructed in Green Canyon. Installed pump station equipment is connected to a SCADA system which enables the off-site monitoring of water system operations and adjustments to rates of water production, water storage volumes, and system pressures.



5.3.5 Average Day Demand

Average day demands for the municipal water system reflect highly variable levels of consumption (Figure 5-4). This variability typically reflects the influx of seasonal residents in the months of May and June and their subsequent departure in September or October. For example, 928 of the 1,014 water meters recorded consumption in August 2014 compared to 624 meters recording water usage in December 2013 (Table 5-3B).

- Municipal water meter records from July 2012 and August 2014 indicate that higher summer household consumption (June through September) ranged between 202 gallons per day (gpd) in June 2013 and 901 gpd in August 2012 (Table 5-3A). Higher summer household consumption reflects additional water usage for lawn irrigation, as well as significant system leakage prior to October 2012 when the replacement of about 40 percent of the distribution piping was completed.
- Fall and winter consumption between July 2012 and August 2014 dropped considerably with the normal loss of seasonal residents. Average household consumption was 214 gpd in October 2012 compared to 115 gpd in December 2012.



Month	Monthly Water Consumption (Gallons)	Number of Meters Recording Water Usage ¹	Average Water Usage per Month (Gallons) Per Meter ²	Daily Consumption Per Meter (Gallons)
Jul-12	21,171,960	905	23,394	755
Aug-12	25,356,590	908	27,926	901
Sep-12	15,803,280	892	17,717	591
Oct-12	5,616,090	846	6,638	214
Nov-12	2,655,060	699	3,798	127
Dec-12	2,126,400	595	3,574	115
Jan-13	3,115,360	608	5,124	165
Feb-13	2,924,060	600	4,873	174
Mar-13	2,496,330	583	4,282	138
Apr-13	2,310,250	657	3,516	117
May-13	2,310,250	655	3,527	114
Jun-13	4,853,240	801	6,059	202
Notes: 1) Although there were 1,014 connected water meters during this period; some meters recorded no consumption. This column shows the number of meters with actual water consumption for that month. 2) This column reflects the average monthly consumption per meter.				
Source: Town of Star Valley Ranch, 2014				

Month	Monthly Water Consumption (Gallons)	Number of Meters Recording Water Usage ¹	Average Water Usage per Month (Gallons) Per Meter ²	Daily Consumption Per Meter (Gallons)
Jul-13	21,092,070	925	22,802	736
Aug-13	23,742,020	922	25,751	831
Sep-13	10,473,970	899	11,651	388
Oct-13	3,199,390	855	3,742	121
Nov-13	2,378,990	681	3,493	116
Dec-13	3,056,480	624	4,898	158
Jan-14	3,379,000	632	5,347	172
Feb-14	3,050,080	596	5,118	183
Mar-14	2,499,100	591	4,229	136
Apr-14	2,533,090	645	3,927	131
May-14	4,416,000	835	5,289	171
Jun-14	16,347,310	900	18,164	605
July-14	19,975,650	930	21,479	693
Aug-14	16,998,999	928	18,318	591
Notes: 1) Although there were 1,014 connected water meters during this period; some meters recorded no consumption. This column shows the number of meters with actual water consumption for that month. 2) This column reflects the average monthly consumption per meter.				
Source: Town of Star Valley Ranch, 2014				

Despite variations in summer precipitation and seasonal resident population, available water meter records for the July 2012-August 2014 period indicate that the replacement of aging distribution piping has clearly contributed to a reduction in household consumption throughout the year. Household consumption ranged between 591 and 693 gallons per day from June-August 2014 compared to between 755 and 901 gpd in July-August of 2012. This represents a 28 to 30 percent reduction in consumption.

5.3.6 Water System Needs

Recent improvements made to surface and groundwater production, water storage, as well as a portion of the transmission and distribution system, will enable the Town to easily meet continuing water demands for the coming decade. In its evaluation of future water demands and the sizing of well production and water storage facilities, Forsgren Associates assumed a potential build-out of the community, i.e., approximately 2,000 equivalent residential units, and an average day consumption of 466 gallons per water connection that would generate the need for a 647 gallon per minute supply. Forsgren Associates also estimated a maximum day demand of 1,470 gallons per water connection that would require a supply of 2,042 gallons per minute (Forsgren Associates, Inc., 2009).

As of January 2014, only 47 percent of the residential lots in the Town have been developed. And, as stated earlier, the potential build-out of the community during the coming decade is expected to range somewhere between 50 and 60 percent.

Despite recent overall improvements to the water system, existing piping in roughly 60 percent of the transmission and distribution system remains significantly under-sized and buried at shallow depths. These conditions thwart the Town's delivery of adequate system pressures, increase system repair costs, and generate some water losses due to leakage in some remaining segments of the distribution system.

The replacement of aging pipe material in roughly 60 percent of the transmission and distribution system represents an essential system improvement that is necessary to:

- provide adequate system pressures to residential customers and fire hydrants needed for fire suppression;
- reduce repairs associated with the freezing of distribution piping that is buried too shallow; and,
- further reduce system leakage and conserve the water resources from local aquifers.

It is also important that the replacement of piping is supplemented with the related installation of pressure relief and control valves, as well as new fire hydrants.

At the time of this report, the Town has applied for a combination of grant and loan funds from the State Lands Investment Board to enable the construction of an initial phase of these improvements.

5.4 WASTEWATER SYSTEM

5.4.1 Introduction

No centralized wastewater system serves the Town of Star Valley Ranch. All homes, community facilities, and public facilities are connected to individual onsite wastewater disposal systems. Most, if not all, of these systems represent septic tank systems with drainfields.

5.4.2 Potential Long-Term Impact of Onsite Wastewater Disposal Systems

Chapter Four discusses, in part, the capability of surface soils to support future land use development. This evaluation considered the capability of soils to support the construction of residential dwellings, as well as the suitability of soils to treat domestic wastewater via septic tanks. This brief analysis concluded that:

- Onsite wastewater disposal systems in the Town, e.g., septic tank with drainfield, generally do not provide adequate soil-based wastewater treatment.
- Inadequate wastewater treatment simply introduces contaminated wastewater into the local ground water.
- The location of two alluvial fans and existing land contours suggest a potential downstream migration of contaminants, e.g., elevated nitrate levels, bacteria and viruses, to some areas west and southwest of Star Valley Ranch.

The potential long-term, impact of wastewater flows generated from an increased “build-out” of the Town is evaluated more specifically by Robert Palmquist, Ph.D. in a 2008 On-Site Wastewater Study for the Town of Star Valley Ranch. This study examines and calculates potential nitrate concentrations and density of virus that might be generated from the continued use of septic tanks and drainfields as a greater build-out occurs in each of the Town's 21 platted subdivisions. The study, concludes, in part:

The results indicate that septic systems in some plats will pose a ground water quality problem. Nitrate concentrations will the exceed EPA limit in Plat 10 at 65 percent build out and virus will enter ground water in all plats south of CR # 116. Viral travel distances will extend beyond Town boundaries for Plats 4, 5, 10, 16, 17, 18, and 21. Water quality problems could appear in domestic wells located adjacent to Plats 17, 18, and 21. If the Shallow and Deep Aquifer are separated by a leaky aquitard, public supply wells in the vicinity of the present Airstrip Well #1 could be affected (Palmquist, 2008).

As of January 2014, the overall build-out of all subdivisions within the Town was approximately 47 percent. In the coming decade, the overall build-out of the Town is expected to range somewhere between 50 and 60 percent. The build-out of subdivision plat 10 in December 2013 was approximately 58 percent. No estimate has been made of when Plat 10 when the build-out of this plat will reach beyond 65 percent, but this could occur sometime near the end of the coming decade. Consequently, the potential impact of effluent from the continued use of septic systems upon groundwater quality represents a potential longer-term consideration.



The results of periodic monitoring at each of the Town's three groundwater wells also provides another important measure of the potential influence of septic tank system effluent discharges upon groundwater quality. The 2013 municipal water quality report of water quality associated with the Town's three groundwater wells indicates little or no influence by septic effluent as nitrate levels ranged only between 0.1 and 0.6 parts per million (ppm) in 2013. Required monitoring of the Town's

groundwater wells will continue to provide an important tool for measuring the potential impact of septic system effluent upon local groundwater quality.

5.4.3 Potential Long-Term Needs

In the long-term, the Town may need to eventually consider alternate approaches to future wastewater management. For example, a long-term solution may require the eventual development of a regional treatment facility by a future wastewater district that can support the treatment of wastewater from the Town and other nearby subdivisions. Any future wastewater management plans should keep in mind that there is no land available within the municipal boundary to support the establishment of municipal wastewater treatment facilities.

5.5 ELECTRICAL ENERGY SYSTEM

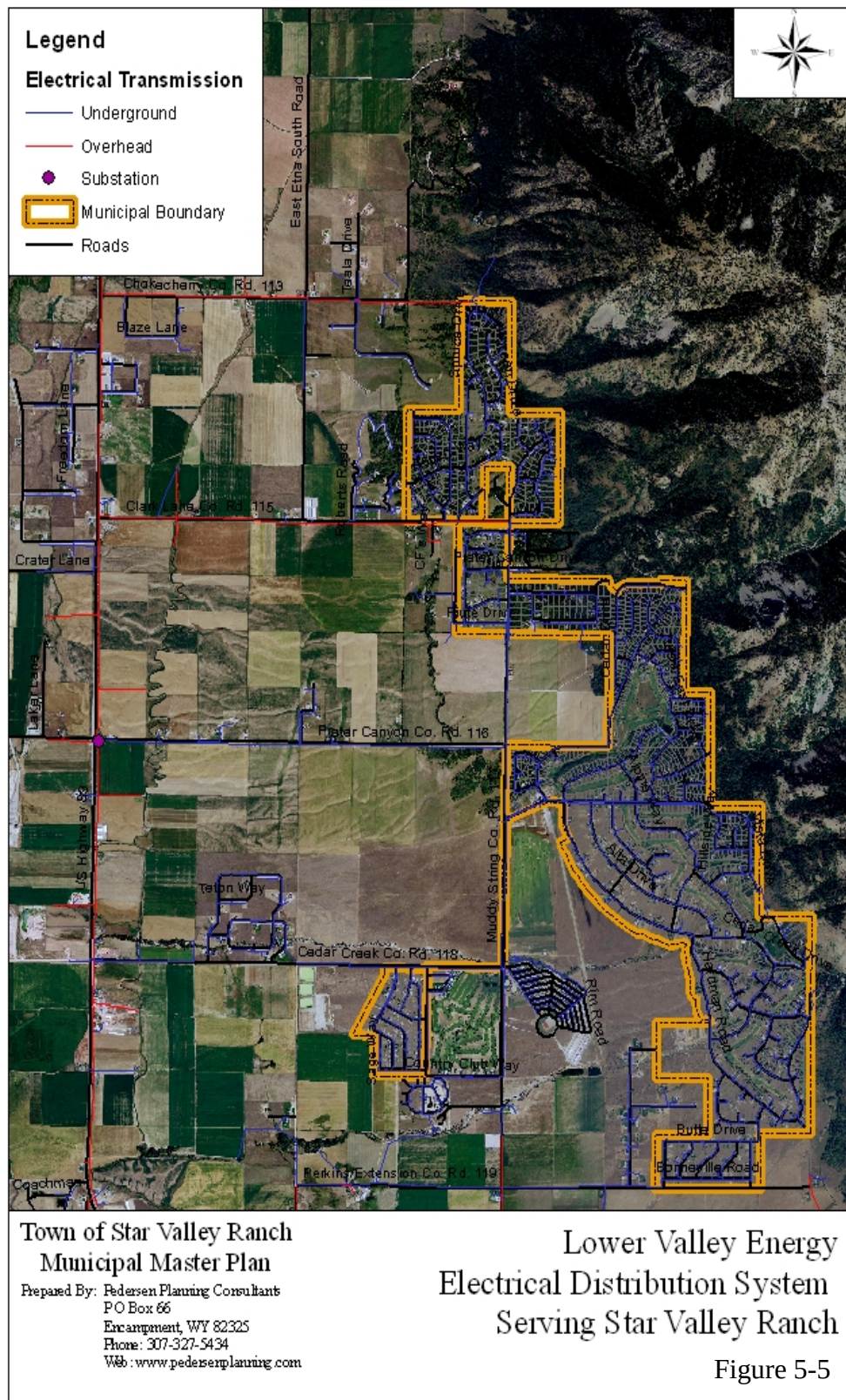
5.5.1 General

Lower Valley Energy, based in Afton Wyoming, provides electrical service to the Town of Star Valley Ranch. Lower Valley Energy is a rural, member-owned cooperative that generally serves Lincoln, Sublette and Teton counties in Wyoming; Bonneville and Caribou counties in Idaho; and portions of Yellowstone National Park.

5.5.2 Freedom Substation

Lower Valley Energy operates and maintains an electrical substation near Freedom along the southeast side of U.S Highway 89/Lincoln County Road 116 intersection (Figure 5-5). This substation has been increased to a winter capacity of 27,200 kilowatts (KW). Four feeders from this substation provide electrical energy to the communities of Etna, Freedom, Star Valley Ranch, and Thayne. Three of the four feeders serve different portions of the Town of Star Valley Ranch.

Lower Valley Energy periodically evaluates the capacity of its distribution system to meet the anticipated electrical energy needs of its residential and commercial customers. Lower Valley Energy estimates that peak demands in the service area supported by the Freedom Substation are expected to increase to a peak demand of about 16.0 MW by 2017 (Jones, 2014).



5.5.3 Electrical Distribution

The electrical distribution system serving the Town of Star Valley Ranch is owned and operated by Lower Valley Energy. The 7.2 Kv feeder line along Lincoln County Road 113 and the 12.5 Kv feeder line along Lincoln County Road 115 are both overhead lines. In contrast, the 12.5 Kv feeder line along Lincoln County Road 116 is installed underground (Figure 5-4).

Within Star Valley Ranch, the distribution system comprises a combination of 12.5 and 7.2 Kv distribution lines. The entire distribution system within the Town is installed underground (Figure 5-4).

5.5.4 Energy Consumption

Lower Valley Energy services 926 customers within the Town of Star Valley Ranch. The utility projects a peak load of 4,677 Kva during the winter of 2015 (Jones, 2014).

5.5.5 Electrical Distribution Needs

In 2007, engineering representatives of Lower Valley Energy previously indicated that they were investigating possible site alternatives for a new substation somewhere east of U.S. Highway 89. However, after further evaluation, Lower Valley Energy more recently decided to maintain the use of its Freedom Substation (Jones, 2014) which appears to have ample capacity to serve the future energy needs of the Town during the coming decade.