3.13 Utilities - Water

This section describes the existing water supply and infrastructure on the project site and the projected water use and water supply capacity for the Silo Ridge Resort Community. Any mitigation measures needed to address potential impacts to the water supply from the proposed development are also discussed.

3.13.1 Existing Conditions

The 670±-acre project site currently consists of a 170±-acre parcel containing the Silo Ridge Country Club, which includes an 18-hole golf course and clubhouse with a restaurant, banquet facilities, pro shop, and offices. The remaining area of the site is undeveloped except for a 2.2-acre residential parcel.

The Silo Ridge Country Club currently obtains water for its existing water needs from a combination of sources. The existing clubhouse is currently served by a water supply system consisting of an onsite groundwater supply well, water treatment equipment and finished water storage. The main well (shown as PW1 on Figure 3.13-1, "Existing and Proposed Water Wells") is located approximately 50 feet north of the clubhouse. The maintenance building near the main entrance off Route 22 is served by a separate groundwater supply well. This well is located 46± feet from the northwest corner of the maintenance building (Well 15).

The existing golf course irrigation system is a separate and independent system used to irrigate the tees, greens, and fairways. In total, approximately 135 acres are irrigated with an estimated 600,000 gallons per day (gpd) during the peak summer irrigation period. Irrigation water is drawn from a natural spring pond onsite and distributed via an intricate network of underground piping to irrigation sprinklers. The irrigation pond is fed by a natural spring source, a small onsite stream and by stormwater runoff from the site. According to the owner of the golf course, the existing irrigation pond has adequate capacity to meet current irrigation water demand.

3.13.2 Potential Impacts

The Proposed Action includes the development of up to 369 homes, including townhomes and single-family units, a resort hotel, a spa and fitness center, restaurants, and a small retail store. The existing golf course and clubhouse will be retained and upgraded. The project sponsor will develop an onsite community water supply system consisting of groundwater wells, a water treatment facility, a water storage tank and a water distribution system to accommodate the demand created by the proposed development. See SP6, "Overall Water Master Plan," contained in "Engineering Drawings" at the end of this document.

This page intentionally left blank.

THE Chazen COMPANIES

Silo Ridge Resort Community

Existing and Proposed Water Wells

Town of Amenia, Dutchess County, New York

Source: 2004 Orthophotos

Drawn by: PWC

1 inch equals 600 feet

Figure 3.13-1

The proposed water system at Silo Ridge is a "community system" as defined by 10 NYCRR Subpart 5-1 (Subpart 5-1)[58] of the New York State Sanitary Code. The design and operation of the system must be in accordance with Subpart 5-1 and the "Recommended Standards for Water Works,"[59] also known as the "Ten States Standards for Water." The proposed water supply system for the project will be designed to provide a suitable supply of water for the project, meeting all appropriate criteria of the NYSDOH and Ten States Standards for Water. Wells have been developed and tested for quantity and quality, as described below and in detail in Appendix 9.12, "Aquifer Pumping Test Report."

Based on a meeting with the Dutchess County Department of Health (DCDOH), the approach to evaluate projected water demand was established. The projected water demand was estimated in accordance with the New York State Department of Environmental Conservation's (NYSDEC) "*Design Standards for Wastewater Treatment Works– Intermediate Sized Sewerage Facilities*" (1988 Edition) manual[60]. The estimated water demand takes into account the allowable 20% reduction in flow due to the mandated use of water saving plumbing fixtures for new construction, and will be subject to review and eventual concurrence by DCDOH and NYSDOH at the time of the water supply application (WSA).

Table 3.13-1 provides a list of anticipated residential and non-residential uses and associated water demand for the proposed project. The projected average day water demand is approximately 217,420 gallons per day (gpd) or 151 gallons per minute (gpm). The anticipated maximum daily flow is 434,839 gpd (302 gpm), with a maximum hourly flow of 906 gpm.

Groundwater Supply

The Chazen Companies (TCC) completed an extensive groundwater investigation in March 2006, with additional focused testing in May 2007. The details of the testing are provided in Appendix 9.12, "Aquifer Pumping Test Report." A 72-hour+ simultaneous pump test was performed on each of the proposed sources of water supply. During this test TCC monitored onsite and off-site water levels in nearby wells to monitor effects of the water resource withdrawals. The test found that no drawdown impacts would extend beyond the property perimeter during normal years if average demand did not exceed 330 gpm. During drought years, drawdown could be expected to occur if average withdrawal rates were to exceed 230 gpm.

[58] 10 NYCRR 5-1, New York State Code of Rules and Regulations, Title 10, Subpart 5-1, Public Water Supplies.
[59] Ten State Standards, Recommended Standards for Water Works, 2003 Edition, Great Lakes Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers.
[60] New York State Department of Environmental Conservation (NYSDEC) Design Standards for Wastewater Treatment Works – Intermediate Sized Sewerage Facilities (1988).

Table 3.13-1 Silo Ridge Projected Potable Water Demand

Land Use	Unit	Unit Qty	Water Usage Unit Rate (gpd/unit)	Water Saving Credit [6] (%)	Water Usage Rate w/ Credit (gpd/unit)	Average Daily Flow (gpd)
Single Family	4-Bedroom	41	475[1]	20%	380	15,580
Townhouse	3-Bedroom	328	400[1]	20%	320	104,960
Resort Hotel						
Studio	Room	38	120[1]	20%	96	3,648
Suites	1-bedroom	88	150[1]	20%	120	10,560
	2-bedroom	104	300 [1]	20%	240	24,960
	3-bedroom	90	400 [1]	20%	320	28,800
Banquet Hall	person	200	20[1]	10%	18	3,600
Conference Areas	theater seat	200	10[2]	20%	8	1,600
Restaurant	seat	125	35[1]	10%	32	3,938
Spa	sf	15,000	0.40[3]	10%	0.36	5,400
Retail store & shop	sf	2,000	0.10[1]	20%	0.08	160
Golf Clubhouse						
Banquet Hall	person	375	20[1]	10%	18	6,750
Restaurant	seat	100	35[1]	10%	32	3,150
Retail store/Offices	sf	2,000	0.10[1]	20%	0.08	160
Golfers	golfer	160	3[4]	20%	2	384
Swimming Pool (5,000 sf) (5)	swimmer	333	10[1]	0%	10	3,330
Wastewater Treatment Facilities	employee	2	25[1]	20%	20	40
Maintenance Facilities	each	1	400	0%	400	400
TOTAL:						217,420
					Max Day Peaking Factor[7]:	2.0
					Max Daily Flow (gpd):	434,839
					Max Daily Flow (gpm):	302
					Max Hour Peaking Factor:	6.0
					Max Hourly Flow (gpm):	906

(1) Hydraulic Loading Rates from Table 3 of the NYSDEC Design Standards for Wastewater Treatment Works 1988 unless otherwise noted below.
(2) Category or use not specifically listed in above referenced NYSDEC Manual. An Hydraulic Loading Rate of 10 gpd/person corresponding to a Dinner Theatre seat with hotel taken from Table 3 of the 1988 NYSDEC Design Standards is used.
(3) Water usage for Spa facilities is estimated at four (4) times the typical value listed in 1988 NYSDEC Standards for shopping center/office building.
(4) A maximum of 160 golfers are anticipated to be on the golf course at any time and use the restroom facilities (4 golfers/15 min/10-hour day). An Hydraulic Loading Rate of 3 gpd/golfer corresponding to an Airport Passenger taken from Table 3 of the 1988 NYSDEC Design Standards is used.
(5) Number of swimmers/bathers is estimated on the basis of 15 sf of pool water surface area per patron as recommended in NYS Sanitary Code Subpart 6-1.
(6) NYSDEC allows for up to 20% reduction in flows for installations equipped with certified water-saving plumbing fixtures. This credit is pro-rated for facilities that may also include non-low flow devices.
(7) Projected Maximum Daily peaking factor is based on a comparable small community water system with a population of 2,500 to 3,000. Information taken from article entitled "Small Rural Communities' Quest for Safe Drinking Water", Rural America, volume 17, Issue 3/Fall 2002. The information provided in this article was adapted by the Economic Research Service of the USDA from EPA, 1995 "Community Water System Survey".
(8) Projected water demand assumes full occupancy of townhouses and single-family houses including hotel, spa, golf and club facilities.

A total of 11 new wells were drilled onsite as potential candidate water supply wells for the proposed project. Six wells were identified for development as a source of water supply based on their safe yields, including the existing water supply well on the site (identified as PW-1). The locations of the proposed wells, labeled PW-1, PW-2, PW-4, PW-5, PW-9, and PW-11, are shown on Figure 3.13-1 above. Existing Well 15, near the maintenance building, has a low yield and will be abandoned. Each of the new wells was drilled a minimum of 200 feet from the property line. The proven, combined water production of these wells is 283 gallons per minute with the largest well out of service. Characteristics of each of the six test wells are summarized in Table 3.13-2.

Table 3.13-2 Characteristics of Proposed Groundwater Wells

Well No.	Depth (feet)	Diameter (Inches)	Safe Yield (gpm)
PW-1	170	6	80
PW-2	345	6	100
PW-4	445	8	15
PW-5	465	6	23
PW-9	405	6	105*
PW-11	605	6	65
Total Developed Resource			**388**
Total Developed Resource with Largest Well Out of Service			**283**

* Based on May 2007 pumping test.
Source: The Chazen Companies, *DEIS Water Supply Report*, August 15, 2006, revised June 8, 2007 (see Appendix 9.9).

Section 3.2.1.1 of the 2003 edition of the "*Recommended Standards for Water Works*" (Ten States Standards)[61], stipulates that the total developed groundwater source capacity, unless otherwise specified by the reviewing authority, shall equal or exceed the design maximum day demand with the largest producing well out of service. For the Proposed Action, the groundwater sources must be capable of providing 302 gpm with the largest producing well out of service, and the proposed water treatment facilities must be capable of treating up to 434,839 gpd or 302 gpm. The conveyance systems of the proposed water treatment facilities will be designed to meet the project's anticipated maximum daily water demand. However, with the combined capacity of the wells totaling 283 gpm with the largest well out of service, the anticipated yield is less than the anticipated maximum day demand. If the Applicant were to pursue the proposed development plan, then additional wells would need to be drilled to meet the anticipated maximum day demand.

The aquifer underlying the project site is currently used to support irrigation withdrawals for the golf course from existing irrigation ponds. Although not currently metered, water usage for irrigation is estimated at 600,000 gpd during

[61] Ten State Standards, Recommended Standards for Water Works, 2003 Edition, Great Lakes Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers.

peak summer periods, which is used to irrigate 135± acres. During dry periods this is estimated to require as much as 200 gpm or more of irrigation water, currently drawn from the existing groundwater ponds. The proposed residential and mixed uses would require approximately 151 gpm of water to meet average demand. This water will also be withdrawn from the site aquifer to support potable uses. However, to minimize withdrawal impacts generated by both uses (potable and irrigation), the project will return approximately 80% of the potable withdrawals in the form of treated wastewater that would be released upstream of the existing irrigation ponds to supplement irrigation demand. The project thus leaves the overall site water budget largely unchanged during dry periods, aside from consumptive losses from the residential and mixed uses, which is normally judged to be no more than approximately 20% of the potable water delivery, or approximately 30 gpm for the proposed project. During dry periods, the project is therefore expected to result in new direct impacts or unspecified indirect impacts of 30 gpm on local groundwater or surface water environments. More than 325 gpm recharges the project site aquifers each day during typical years on average (see Appendix 9.12), of which 30 gpm new consumption would amount to less than 10%. As such, the onsite aquifer impacts as a result of the proposed project are largely only shifted from withdrawals primarily from irrigation ponds to withdrawals from supply wells.

The significance of this new water use on the local environment may be considered by reviewing the watershed stream flow at the nearest downstream stream gauging site along the Amenia Brook in Wassaic. According to Ayer & Pauszek (1968) "Streams in Dutchess County", the Amenia Brook through Wassaic has a median flow of 3,600 gallons per minute, falling to 1,500 gpm less than 30% of the time, falling to 673 gpm less than 10% of the time, and falling to 291 gpm once every 10 years on average. The off-site, downstream impact of the estimated 30 gpm average water consumption is less than 1% of median stream flow, 2% of 30% flows, 4.5% of 10% flows, and approximately 10% of flows experienced during the 10 year statistical drought. The proposed project would not terminate flow in this stream, and normal reduction impacts of less than a few percentage points are not expected to affect the stream biota or function.

Existing Town of Amenia water supply wells are sufficiently distant from the project site that the 1,500-foot recharge radii typically identified for deep bedrock wells do not overlap. The absence of offsite aquifer drawdown noted during the aquifer pumping tests on the project site (see Appendix 9.12) indicates that these withdrawals will have no impact on the present productivity of the existing Town of Amenia water wells.

Water Treatment Facility

Raw water samples were collected from each of the six production wells and analyzed for the more than 100 constituents listed in NYSDOH Sanitary Code, Subpart 5-1 in accordance with standard laboratory procedures (see Appendix 9.12, "Aquifer Pumping Test Report," for detailed results of the water quality tests).

Initial results indicate that the raw water from the proposed sources of supply meets all state-mandated drinking water quality standards with the exception of iron, manganese, turbidity, and lead, whose measured levels exceed the established maximum contaminant level (MCL) for those contaminants.

The raw water from PW-9 and PW-11 meet all state-mandated water quality standards. Elevated levels of iron, turbidity and lead exceeding NYSDOH drinking water quality standards were identified in raw water from wells PW-1, PW-2, PW-4 and PW-5. In addition, elevated levels of manganese exceeding NYSDOH drinking water quality standards were identified in water from wells PW-4 and PW-5. Micro particulate analysis (MPA) testing identified well PW-11 as "low-risk" under EPA relative risk ranking guidelines for groundwater under the direct influence of surface water. Table 3.13-3 provides a partial listing of the water quality testing results for several of the tested parameters. Those contaminants whose value exceeds MCL standards are highlighted in bold text. For a complete list of all parameters that were tested, please see Table 5 in Appendix 9.12, "Aquifer Pumping Test Report."

To meet standards established in Title 10NYCRR Subpart 5-1 of the New York State Code of Rules and Regulations, which establishes drinking water maximum contaminant levels and treatment requirements, the water treatment facilities will include particulate filtration, micro-filtration, iron and manganese reduction, lead reduction, and disinfection at a minimum. Each treatment method is described below. The treatment system will be maintained and monitored by a New York State licensed water operator with required reporting to DCDOH.

The water treatment and control building will house the control and instrumentation panels for the well pumps, transfer pumps, disinfection equipment, other treatment as necessary, all the piping, gauges and valves, flow meters, sample taps and other equipment that may be required by the Department of Health. The water treatment and control facility will also meet latest New York State building code requirements.

Particulate Filtration

The NYSDOH requires that turbid groundwater which is not adequately filtered naturally must be provided with additional filtration to remove particulate and

biological contaminants. A pressure cartridge filtration system capable of removing all particles larger than 1 micron in size is proposed for the source water in PW-1, PW-2, PW-4, and PW-5 to meet this requirement. This will be achieved using a three-step filtration process consisting of a preliminary filter with a 20-µm nominal pore size, an intermediate filter with a 5-µm nominal pore size, and a final filter with a 1-µm nominal pore size.

Micro-Filtration

MPA testing identified well PW-11 as "low risk" under EPA relative risk ranking guidelines for groundwater under the direct influence of surface water (GWUDI). To be conservative, it is assumed that the NYSDOH will require this well source to comply with provisions of the USEPA's Surface Water Treatment Rule, which requires 99.9% removal/inactivation of C*ryptosporidium parvum* and G*iardia lambia* cysts, and 99.99% removal/inactivation of enteric viruses. A micro-filtration process and disinfection will be utilized to achieve these levels of removal and inactivation.

Iron and Manganese Reduction

Iron and manganese will be removed from the source water in PW-1, PW-2, PW-4 and PW-5 using conventional treatment methods such as particulate filtration, ion exchange, oxidizing/adsorptive filters (greensand filters), colloidal type filter, or catalytic type filter. The actual treatment may necessitate the combination of several treatment methods to achieve required water quality standards.

Lead Reduction

Lead will be removed from the source water in PW-1, PW-2, PW-4 and PW-5 using conventional treatment methods including particulate filtration, ion exchange, activated carbon filtration, reverse osmosis, or distillation.

Disinfection

Sodium hypochlorite will be used to disinfect the raw water from each well source. A chlorine dose will be introduced into the system to provide a free chlorine residual of 2 ppm (mg/L) at the point of entry into the distribution system. The system will be designed to provide the minimum contact time for inactivation of microorganisms to comply with provisions of EPA's Disinfection Profiling and Benchmarking Technical Guidance Manual.[62]

[62] Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) Disinfection Profiling and Benchmarking Technical Guidance Manual (EPA 816-R-03-004), Environmental Protection Agency, 2003, Washington, D.C.

Table 3.13-3 Partial Water Quality Results from Proposed Wells

Contaminants	Units	NYS MCL[(1)]	PW-1	PW-2	PW-4	PW-5	PW-9	PW-11
Asbestos	MFL	7	ND	ND	ND	ND	ND	ND
Antimony	mg/l	0.006	ND	ND	ND	ND	ND	ND
Arsenic	mg/l	0.05	ND	ND	ND	NA	ND	ND
Barium	mg/l	2.00	0.0094	0.0061	0.0130	0.0069	ND	ND
Fluoride	mg/l	2.2	ND	0.2	ND	ND	ND	ND
Chloride	mg/l	250.0	10	2	3	2	2	3
Iron	mg/l	0.3	**0.88**	**0.43**	**2.2**	**1.8**	0.086	0.095
Manganese	mg/l	0.3	0.21	0.23	**0.37**	**0.31**	0.024	0.20
Sodium	mg/l	NDL	5.5	ND	ND	ND	ND	ND
Sulfate	mg/l	250	30	19	27	27	25	24
Zinc	mg/l	5	0.024	0.12	0.31	0.27	0.02	0.029
Color	PtCoU	15	ND	ND	ND	ND	ND	ND
Odor	Ton	3	ND	ND	ND	ND	ND	ND
Turbidity	NTU	1	**3.8**	**1.2**	**3.5**	**5.5**	0.3	ND
Corrosivity		No MCL	0.2	-0.2	-0.52	-0.57	-0.07	-0.18
Alkalinity	mg/l	No MCL	126	129	102	98	107	75
Calcium, Total	mg/l	No MCL	48	41	37	35	35	29
pH		6.5-8.5	7.86	7.49	7.32	7.29	7.81	7.89
Total Dissolved Solids	mg/l	500	214	130	147	85	172	109
Lead	mg/l	0.015	**0.016**	**0.02**	**0.015**	**0.016**	0.001	0.004
Nickel, total	mg/l	0.1	ND	0.0073	ND	ND	ND	ND
Copper	mg/l	1.3	ND	ND	ND	ND	ND	ND
Nitrate	mg/l	10	ND	ND	ND	ND	ND	0.06
Nitrite	mg/l	1	ND	ND	ND	ND	ND	ND
Table 3 GOC	mg/l	0.005	ND	ND	ND	ND	ND	ND
Total Coliform		Any + sample	A	A	A	A	A	A
Escherichia Coli		Any + sample	A	A	A	A	A	A
MTBE	µg/l	10	ND	ND	ND	ND	ND	ND
Radon in water	pCu/l	40,000	ND	ND	ND	ND	ND	ND
Temperature	ºC	No MCL	19.7	19.6	19.7	18.6	18.2	18.3
MPA			A	A	A	A	A	L
	[(1)] MCL = Maximum Contaminant Level from New York State Sanitary Code, NYCRR Title 10, Part 5, Subpart 5-1							
	ND = Not detected above method detection limit A = Absent							
	MPA Risk: L = Low Risk; M = Moderate Risk; H = High Risk							
	NA = Not Analyzed							
	NDL = No designated Limits							
	MFL = Million fibers per liter							
	mg/l = milligrams per liter							
	µg/l = micrograms per liter							

Water Storage Tank

Water from the groundwater production wells will be treated and transmitted into the distribution system where it will be stored in a 500,000 gallon atmospheric storage tank. The normal operating water level in this tank is proposed to be 805 feet above mean sea level (msl). Water from this tank will be delivered to the system through over 21,800 linear feet of eight-inch diameter water mains.

Ten State Standards[63] requires a distribution storage volume equal to one average day of use. Therefore, the atmospheric finished water storage tank will be designed to store a minimum usable volume equivalent to the average day water demand of 211,020 gpd. The proposed finished water storage tank will have a nominal capacity of 500,000 gallons.

The optimal location for the finished water storage tank is an open area on the hillside north of the NYS Route 44 hairpin turn. The tank structure will be partially buried and built into the hillside and will feature an observation deck on the exposed roof.

Water Distribution System

The proposed water distribution system will be designed to serve the entire Silo Ridge Resort Community and will consist of approximately 21,800 linear feet of eight-inch water mains with approximately 375 individual service connections. The water mains will be generally installed five feet from the edge of the proposed paved roadway with a minimum earthen cover of five feet.

The water distribution system will be designed and sized to deliver the required quantity of water at adequate pressure to provide a satisfactory level of service to all areas of the proposed development. The maximum daily and hourly water demands will be met through a combination of water supply and treatment capacity and water storage capacity.

The distribution system is segmented into five distinct pressure zones to meet NYSDOH and DCDOH criteria for distribution system pressure and to accommodate the wide range of elevations within the proposed service area and provide an acceptable level of service. The atmospheric tank will serve developed property between elevations of 573 to 723 feet above msl by gravitational forces. Portions of the service area located at an elevation above 723 feet msl that cannot be adequately served by the atmospheric storage tank will be provided with water booster pump stations to increase pressures to acceptable working pressure levels. Areas located at an elevation below 573 feet msl which would normally experience

[63] Ten State Standards, Recommended Standards for Water Works, 2003 Edition, Great Lakes Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers.

pressure exceeding 100 pounds per square inch (psi), will be provided with pressure reducing valve (PRV) stations placed at specific locations throughout the system to reduce pressure to the desired range. Each of these pressure zones has been designed to keep normal operating pressures between 35 psi and 100 psi.

Fire Flow and Fire Suppression System

Community water supply systems are not required to be designed to meet fire flow requirements. However, the proposed water distribution and storage facilities will be robust enough in many areas to provide significant fire flows in duration adequate to meet needed fire flows as recommended by the Insurance Services Office (ISO).

Hydrants will be installed throughout the distribution system at all road intersections. During the design phase of this project a complete hydraulic model of the distribution system will be developed and provided to reviewing agencies with calculations that predict flow at each hydrant. After the system is placed in operation, flow tests could be performed on selected hydrants to establish the rated capacity of hydrants in various areas of the distribution system. Tested hydrants will be color coded as to their flow capacity in accordance with the National Fire Protection Agency (NFPA) color coding requirements.

In accordance with the New York State Building Code, buildings including hotels, commercial retail space, offices, banquet and spa facilities requiring fire protection and suppression systems are required to include all related elements in conformance with Chapter 9, "Fire Suppression Systems," and related provisions of the New York State Fire Code. The proposed hotel complex will be designed and built with its own separate fire water storage facility to provide the needed fire flow and duration according to the NYS Building Code, Fire Code, and applicable NFPA Standards and ISO requirements.

Buildings requiring automatic fire sprinkler systems are required to comply with Section 903 of the Building Code, in required areas as defined in Section 903.2. In conformance with Section 904 of the Building Code, alternative automatic fire extinguishing systems will be provided for certain areas where the discharge of water would be hazardous.

Ownership

Consistent with State government policies, the Silo Ridge Resort Community onsite water supply system will be owned and operated by a New York State Transportation Corporation which will be formed under Chapter 3 Article 4 of the New York State Law to serve potable water as a privately owned community water supply system. The transportation corporation is under the regulatory jurisdiction of the NYSDEC for resource allocation, the NYSDOH for the sanitary aspects of the

system and the New York Public Service Commission (NYSPSC) for financial and operational oversight.

The purposes of the transportation corporation, referred to as a Water Works Corporation, are to construct, own, maintain and operate the water supply system including all the facilities incidental to the supply, treatment and distribution of water to the community. The Water Works Corporation must file a Certificate of Incorporation with the Secretary of State.

The Water Works Corporation must also obtain approval from the NYSDEC to use the water resources of New York State and for permission to deliver water to its service area. The water supply permit is issued with all other NYSDEC permits. The New York State Department of Health oversees the sanitary aspects of the Water Works Corporation. The Department of Health reviews plans and comments as to their acceptability to NYSDEC and regulates the operations, routing monitoring and reporting requirements for the Water Works Corporation.

The water supply and treatment facilities will be constructed on lands that will be owned by the proposed transportation corporation. The six proposed production wells are located on the property owned by the Applicant and will be protected with a 100-foot radius of land ownership centered on each well head. In addition, a 200-foot radius of protection centered on each production well will be provided through land ownership, lease or restrictive easement in accordance with Appendix 5-D of the New York State Sanitary Code.

Operation and Control

The water system will operate in an automatic fashion as follows:

- Water will be pumped from each production well, treated at the central water treatment facility, metered, conveyed into the distribution system, and stored.

- Operators will visit the central water treatment facility daily. Operators will observe equipment, disinfectant dosage and finished water quality. Post contact finished water chlorine residuals will be measured and recorded each day. The level of chlorine solution will be measured and recorded. If needed, additional chlorine solution will be mixed.

- Other automated measures to ensure available water supply will also be incorporated into the design. Details on the system can be found in Appendix 9.9, "DEIS Water Supply Report."

The primary control system for the water supply system will be installed at the central water treatment facility and will be designed to collect information from and control the production, storage, treatment and distribution systems to provide a continuous supply of operational data to the operators. In general, the control system will continually collect and periodically store data from the following sources:

- Water level measurement in all production wells
- Water level in the atmospheric water storage tank
- Chemical feed pumps On/Off status
- Low liquid level in chlorine solution day tank
- Well pumps On/Off status
- Transfer pumps On/Off status
- Booster pumps On/Off Status
- Water Meter status

Based on the data collected from the sources described above, the control system will command the operation of the equipment and activate alarm levels as shown below:

- Well pumps Auto/On/Off status
- Chemical feed pumps On/Off status
- Water storage tank Low and High level alarms
- Chemical feed pump failure alarm
- Chlorine solution day tank low level alarm
- Well low water cut-off
- Well pump malfunction
- System on emergency power alarm
- Emergency generator operational status

- Alarm relay and notification system to 24-hour operator

The control system will be designed and programmed to operate the facilities in "emergency mode" during power outage and emergency conditions. During such conditions, the emergency auxiliary power system will be capable of operating the system to meet the projected average day water demand.

Monitoring and Maintenance

NYSDOH monitoring requirements are established by both the classification of the water supply and the number of persons served. The Silo Ridge Resort Community water supply will meet the NYSDOH Part 5-1 definition of a community water supply system regularly serving an estimated population of about 2,500 people at full buildout. The system will be monitored in accordance with these requirements, as described in more detail in Appendix 9.9, "DEIS Water Supply Report."

In addition, the system will be maintained and monitored by a New York State licensed water treatment plant operator with required reporting to the Dutchess County Department of Health. The operator will exercise daily control over the entire system and be responsible for all monitoring and reporting required by Part 5 of the New York State Sanitary Code. The operator will also visit the treatment facility daily to observe its operation. Emergency generators will automatically be exercised weekly. Operators will have on-call contractors with the equipment necessary to repair water main breaks and electronic experts capable of fixing any of the control and telemetry equipment. The distribution system will also be flushed once a year.

3.13.3 Proposed Mitigation Measures

For the Proposed Action, the groundwater sources must be capable of meeting the anticipated maximum day demand of 302 gpm with the largest producing well out of service. Currently, with the six wells identified for development as a source, the combined capacity with the largest well out of service is 283 gallons per minute, which is less than the anticipated maximum day demand. If the Applicant were to pursue the Proposed Action, then additional wells would need to be drilled to satisfy the source capacity criterion established in the Recommended Standards for Water Works (Ten States Standards), which stipulates that the total developed groundwater source capacity, unless otherwise specified by the reviewing authority, shall equal or exceed the design maximum day demand with the largest producing well out of service. It should be noted that, as described in Section 1.0, "Executive Summary," the Applicant now intends to pursue the Traditional Neighborhood Alternative plan that is fully described in detail in Section 5.0, "Alternatives." The analysis of water supply and demand provided in that Section of the DEIS illustrates that the Alternative generates less water demand than the Proposed

Action and that the combined capacity of the groundwater wells is sufficient to meet the estimated maximum day demand. Please see Section 5.0 for details.

Water treatment facilities will be installed to ensure that water quality meets all applicable water quality standards. At a minimum, water treatment will include particulate filtration, micro-filtration, iron and manganese reduction, lead reduction, and disinfection. No further mitigation measures are necessary.

This page intentionally left blank.