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Technical Memorandum

To: Mike Mueller, MDNR
From: Tina Pint and Ellen Considine
Subject: Sunrise River Energy Station Test Well #1 – Geology and Well Information
Date: June 26, 2009
Project: 23131001.00 002 004
c: Jeanette Leete, MDNR; Jim Sehl, MDNR; Blake Wheatley, LS Power; Sharon Shelby, LS Power; Teri Perry, Barr

This memorandum is intended to provide background geology and well information for the area surrounding the Sunrise River Energy Station Site (the Site) located in Chicago County, Minnesota (Figure 1). LS Power Development, LLC, through Sunrise River Energy, LLC, its affiliate, is proposing to build a 780 MW gas-fired electrical generating facility (the Facility) at the Site. Discharge from the Chisago Lakes Waste Water Treatment Plant (WWTP) will be used as the primary water supply for the Facility. However, an additional water source is needed (1) to make up the difference between the water demand for the Facility and the discharge from the WWTP and (2) to provide emergency supply in case water from the WWTP is unavailable or unusable. LS Power's preferred source for additional water is the Mt. Simon Formation. A detailed discussion of the water balance for the Facility is beyond the scope of this document; however, it is anticipated that an average monthly withdrawal of 2 million gallons per day (MGD) and maximum daily withdrawal of 5 million gallons from the Mt. Simon Aquifer will be needed.

LS Power does not currently have any production wells for the Facility. Their intent is to install a series of test wells that could be converted to production wells. A pumping test will be conducted on each test well individually. The test wells will be constructed in a manner that will allow them to be converted to production wells. It is understood that an additional aquifer test with all possible production wells pumping simultaneously will be required by the Minnesota Department of Natural Resources (MDNR) as part of the appropriation permit application. The first test well (referred to here as Test Well #1) will be installed in the northwest corner of the Site (Figure 1).

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This memorandum presents the geologic setting for the Site and information on wells located within 1.5-miles of Test Well #1. This information is being provided to facilitate discussion between the MDNR, LS Power and Barr Engineering regarding the first aquifer test using Test Well #1. It is understood that additional information will be needed prior to the aquifer test, as outlined in the June 12, 2009 letter to Blake Wheatley from Mike Mueller.

1. Geologic Setting

Current understanding of the Site's geology is based on the following sources:

- Boring logs from the Minnesota County Well Index (CWI, maintained by the Minnesota Department of Health, 2009)
- Bedrock Geology of Chisago County (provided in draft form by the Minnesota Geological Survey (MGS), 2009)
- Quaternary Geologic Map of Chisago County, Minnesota (MGS, 1993)
- Aggregate Resource Potential of Chisago County, Minnesota (MGS, 2001)
- Surficial Geology of the Stillwater 30 x 50 Minute Quadrangle, Minnesota (MGS, 1999)
- Bedrock Geology and Structure of the Seven-County Metropolitan Area, Minnesota (MGS, 2000)
- Soil survey data (available online from the U.S. Department of Agriculture, Natural Resources Conservation Service)

The geology of the Site consists of approximately 100 to 400 feet of unconsolidated glacial deposits overlying an erosional Paleozoic bedrock surface.

1.1 Bedrock Deposits

The Site appears to directly overlie a bedrock valley which trends northeast-southwest (based on draft MGS data, 2009) (Figure 2 and Figure 3). Bedrock in the vicinity of the Site dips southward. The youngest bedrock units present in the vicinity of the Site are located approximately one mile south of the Site. These are remnants of the Tunnel City Group and Wonewoc Formation (formerly known as the Franconia and Iron-ton-Galesville Formations, respectively), which overlie the Eau Claire Formation. The Eau Claire Formation is present to the south and east of the Site and is approximately 100 feet thick. It is thought that the bedrock valley cuts through the Eau Claire Formation and into the Mt. Simon Formation but does not incise through the Mt. Simon Formation to the underlying volcanics (based on draft MGS data). The thickness of the Mt. Simon Formation at the deepest part of the bedrock valley is thought to be

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on the order of 50 to 100 feet. Where present to its full thickness 5 miles southeast of the Site, the Mt. Simon Formation is approximately 250 feet thick (CWI). In the opposite direction, about 5 miles northwest of the Site in North Branch, the Mt. Simon Formation is approximately 50 feet thick (CWI).

1.2 Unconsolidated Deposits

Surficial soil at the Site is generally loamy fine sand (USDA, 2009), which is underlain by approximately 20 to 30 feet of sand. The sand, which comprises the New Brighton Formation, is lacustrine in origin (MGS, 1999). It is underlain by approximately 50 to 100 feet of sandy clay, which is likely also lacustrine (MGS, 1993). Approximately 75 to 100 feet below ground surface and below the sandy clay, is a gravelly clay which may be diamicton till. The gravelly clay ranges from approximately 50 to 100 feet thick and may not be laterally continuous below the site, although the sandy clay does appear to underlie the entire Site (see Figures 4 and 5). Both the sandy clay and gravelly clay contain sand lenses. Directly below the Site and to the north and west of the Site, the gravelly clay is underlain by a sand and gravel deposit at least 50 to 100 feet thick. Many domestic wells in the Site's vicinity are screened in the sand and gravel deposit (Figure 3). South of the Site, the sand and gravel deposit appears to terminate and the gravelly clay appears continuous to bedrock. East of the Site, the sand and gravel deposit grades into a lacustrine deposit and/or terminates against a reworked bedrock deposit. There are no deep wells placed in the bedrock valley (described above), so the geology of unconsolidated sediments in the valley is unknown (see Figure 7).

2. Area Wells

Wells located within a 1.5-mile radius of the proposed Test Well #1 were identified using the Minnesota Department of Health's County Well Index (CWI) (Figure 6). Based on this information, 122 wells are located within the 1.5-mile radius area:

- 105 wells are completed within the unconsolidated deposits,
- 9 wells are completed in the Tunnel City or Wonewoc Formations,
- 3 are completed in the Eau Claire Formation,
- 1 is completed in the Eau Claire and Mt. Simon Formations,
- 2 are completed in the Mt. Simon Formation, and
- 2 have no geology or aquifer information.

Table 1 summarizes well information from the CWI for these wells. A door-to-door survey has not been conducted to identify other possible wells in the area.

LS Power - Sunrise River Energy Station

Data Source	Unique Well				Address	T	R	S	Subsections	Elevation	Well Depth ft.	Well Bottom	Diameter in inches	Casing Type	Static Water level	Drop Pipe Length	Pump Capacity (GPM)	Pump Type	Contractor	Aquifer	Comments
	Map ID	Number.	Well Owner Name	Phone #																	
MNDH-CWI	1	182116	WICKOREN		33850 Kale Ave Stacy MN	34	21W	13	ABADCD	882	76	806	4	Steel	18	42	12	submersible	Salverda Well Co	QBAA	
MNDH-CWI	2	446423	THOMPSON, GIL		33995 Kale Av North Branch MN 55056	34	21W	13	AAAABC	874	296	578	4	Steel	15	42	10	submersible	Johnson G. Well Co.	CECR	
MNDH-CWI	3	552668	PETERSON, LOREN		8778 Lent Tr Stacy MN	34	21W	11	DDDCAD	895	92	803	4	Steel	30	49	10	submersible	Rosga Well Co.	QBAA	
MNDH-CWI	4	763777	CR-1			34	21W	12	CDDCBA	875	247	628	2	Steel	8				Mark J. Traut Wells, Inc.	QBAA	
MNDH-CWI	5	742806	LAPINSKI, JESSE		34080 Kale Av North Branch MN 55056	34	21W	12	DDCBDB	885	179	706	4	Steel	20	60		submersible	Lauren Mccullough Well Drilling	CFIG	
MNDH-CWI	6	473022	LUNDIN, ROBERT		34095 Kale Av North Branch MN 55056	34	21W	12	DDDBAD	875	310	565	4	Steel	12	42	10	submersible	Johnson G. Well Co.	CECR	
MNDH-CWI	7	404607	NIEMEZYEKI, TOM		34150 Kale Ave Stacy MN	34	21W	12	DDBCDA	885	176	709	4	Steel	19	49	12	submersible	Salverda Well Co	CFIG	
MNDH-CWI	8	641780	SCHNEIDER, KURT		34220 Kale Av Stacy MN	34	21W	12	DDBABD	885	133	752	4	Plastic	15	70	10	submersible	Mccullough & Sons	QBAA	
MNDH-CWI	9	714543	HOLTE, PETER		34290 Lanesboro CT North Branch MN	34	20W	7	CACCCD	874	260	614	4	Steel	13	60	20	submersible	Husnik Well Drilling	CIGE	
MNDH-CWI	10	460693	BLOCK, CHARLES		34237 Kale Av North Branch MN	34	21W	12	DADCCA	883	300	583	4	Steel	18	42	10	submersible	Johnson G. Well Co.	CECR	
MNDH-CWI	11	477379	OBITZ		34835 Kable Av North Branch MN 55079	34	21W	12	DBCDA	894	164	730	4	Plastic	0	80	12	submersible	Sampson Bros. Well	QBAA	
MNDH-CWI	12	707084	MIKESKA, BOB		34524 Lanesboro CT North Branch MN	34	20W	7	CBDCAA	876	110	766	0	Plastic	35	66	12	submersible	Schroepfer Well Drilling Inc.	QBAA	
MNDH-CWI	13	713082	REHDER, MARK		34270 Lanesboro CT MN	34	20W	7	CACDBA	872	110	762	0	Plastic	20			submersible	Zuercher Well Drilling.	QBAA	
MNDH-CWI	14	627784	LAWERENGE, PATRICK		8954 Lent Tr Stacy MN 55079	34	21W	11	DBDADC	893	153	740	4	Plastic	14	80	10	submersible	Husnik Well Co.	QBAA	
MNDH-CWI	15	565378	SCHMITT CONSTRUCTION		8645 345th Street Stacy MN	34	21W	11	CACACB	896	90	806	4		38	60	10	submersible	Sampson Bros. Well Co. Inc.	QBAA	
MNDH-CWI	16	709667	DAHLQUIST, SCOTT		34390 Lanesboro CT MN	34	20W	7	CBDBCD	874	109	765	4	Plastic	16	60	12	submersible	Sampson Bros. Well Co. Inc.	QBAA	
MNDH-CWI	17	642621	HERR		8563 345th Street Stacy MN	34	21W	11	CACBDB	896	98	798	4	PVC	45				Zuercher Well Drilling.	QBAA	
MNDH-CWI	18	709696	JOHNSON, DAVID		34416 Lanesboro CT MN	34	20W	7	CBCAAC	879	108	771	4	Plastic	18	80	20	submersible	Sampson Bros. Well Co. Inc.	QBAA	
MNDH-CWI	19	177948	KEVIN, KEVIN		14 CR Chisago City MN 55045	34	20W	7	DBDBBB	885	98	787	4	Steel	2	27	10	submersible	Johnson Bros. Well	QBAA	
MNDH-CWI	20	713051	GREENE, JAMES		34456 Lanesboro CT MN	34	20W	7	CBCBAA	881	95	786	0	Plastic	24			submersible	Zuercher Well Drilling.	QBAA	
MNDH-CWI	21	728268			34427 Lanesboro CT MN	34	20W	7	CBACCD	880	110	770	4	Plastic	22			submersible	Zuercher Well Drilling.	QBAA	
MNDH-CWI	22	544992	KAMENSKI, DON		10275 344th St Stacy MN	34	21W	12	DAADDC	885	100	785	4	Plastic	15				Zuercher Well Co.	QBAA	
MNDH-CWI	23	716421	DONAHUE, JENNY		34321 Lanesboro CT N Chisago City MN	34	20W	7	CABCCA	870	113	757	4	Plastic	28	60	20	submersible	STM Industries , LLC	QBAA	
MNDH-CWI	24	627767	BOREK, DAVID		10155 344th St North Branch MN 55056	34	21W	12	DABDCA	890	115	775	4	Plastic	27	60	10	submersible	Husnik Well Co.	QBAA	
MNDH-CWI	25	507784	STENSRUD		34295 Lincoln Rd Lindstrom MN 55045	34	20W	7	DABDBD	879	97	782	4	Steel	15			submersible	Mccullough & Sons	QBAA	
MNDH-CWI	26	693536	LUNDEEN, DAN & DIANE		10105 344th Street Stacy MN 55079	34	21W	12	DABCCA	895	100	795	4	Plastic	20	80	12	submersible	Black Rock Ent.	QBAA	
MNDH-CWI	27	515342	CHARLES, VINCE		9865 344 th ST North Branch MN 55056	34	21W	12	DBBDAC	895	100	795	4	Plastic	29	77	10	submersible	Bill's Well	QBAA	
MNDH-CWI	28	565379	DOBIE		8675 345th St Stacy MN	34	21W	11	CAACBB	896	93	803	4	Plastic	30	60	10	submersible	Sampson Well Co.	QBAA	
MNDH-CWI	29	638936	WEEKES, DOUGLAS		8535 345th Steet Stacy MN	34	21W	11	CABCB	895	116	779	4	Plastic	20				Lauren Mccullough Well Drilling	QBAA	
MNDH-CWI	30	750880	JOHNSON, BRIAN		34295 Lanesboro CT Stacy MN 55079	34	20W	7	CAACBA	872	110	762	4	Plastic	21	60	22	submersible	Zuercher Well Drilling.	QBAA	
MNDH-CWI	31	586082	HUGHES		8743 345th St Stacy MN	34	21W	11	CAAACC	896	84	812	4	Plastic	30	60	12	submersible	Barott Drilling	QBAA	
MNDH-CWI	32	738679	EUFLORIA		34356 Lincoln RD Lindstrom MN 55045	34	20W	7	DBABDB	900	355	545	4	Steel	38	81	18	submersible	George Johnson Well Drilling	CMTS	
MNDH-CWI	33	575150	DEBILZAN		8795 345th St Stacy MN	34	21W	11	DBBBCB	895	95	800	4	Plastic	45	70	10	submersible	Mccullough & Sons	QBAA	
MNDH-CWI	34	154344	OLSON, GEORGE			34	21W	12	DBABBA	893	209	684	4	Steel	25	105	15	submersible	Mccullough & Sons	QBAA	
MNDH-CWI	35	700553	PETERS, JONATHAN		34524 Lanesboro CT Chisago City MN 55013	34	20W	7	CBBBAA	883	220	663	4	Steel	40	100	12	submersible	Mccullough & Sons	CFIG	
MNDH-CWI	36	512074	WERNER, JOHN		9015 Lent Tr Stacy MN	34	21W	12	BCCCCD	892	205	687	4	Plastic	23	60	20	submersible	Husnik Well Co.	QBAA	
MNDH-CWI	37	679993			10597 Lanesboro WA North Branch MN 55056	34	20W	7	BDCCCC	873	220	653	4	Steel	30	80	10	submersible	Mccullough & Sons	CIGE	
MNDH-CWI	38	642618	JOHNSON, DENNIS		34518 Kale Ln Stacy MN 55079	34	21W	12	ADDCCA	892	110	782	4	Plastic	0				Zuercher Well Drilling.	QBAA	
MNDH-CWI	39	551134	PENNER		34533 Ivan Av North Branch MN 55056	34	21W	11	ACCCAD	897	110	787	4	Plastic	21	60	12	submersible	Husnik Well Co.	QBAA	
MNDH-CWI	40	427650	LEADHOLM, MICHAEL		34550 Lincoln Rd Chisago City MN 55013	34	20W	7	ACCDCB	885	145	740	4	Steel	31	100		submersible	Lauren Mccullough Well Drilling	QBAA	
MNDH-CWI	41	679960			10617 Lanesboro LA North Branch MN 55056	34	20W	7	BDCCAD	873	240	633	4	Steel	50	150	22	submersible	Mccullough & Sons	CIGE	
MNDH-CWI	42	626942			34523 Kale Ln Chisago City MN 55013	34	21W	12	ADDDBC	892	110	782	4	Plastic	35				Zuercher Well Drilling.	QBAA	
MNDH-CWI	43	554480	TINJUM		8620 345th St Stacy MN	34	21W	11	BDCDBA	900	90	810	4	Plastic	35	60	10	submersible	Sampson Well Co.	QBAA	
MNDH-CWI	44	512079	LAUACOT, FRANCIS & ALECI		9061 Lent Tr Stacy MN	34	21W	12	BCCDAB	894	153	741	4	Plastic	24	60	20	submersible	Husnik Well Co.	QBAA	
MNDH-CWI	45	635352	ROSALES		34616 Kale Ln Lindstrom MN 55045	34	21W	12	ADCDBB	894	136	758	4	Plastic	30	60		submersible	Torgerson Well Co.	QBAA	
MNDH-CWI	46	555925	MOLSEN		8680 345th St Stacy MN	34	21W	11	BDBBCC	902	118	784	4	Steel	35	80	10	submersible	Mccullough & Sons	QBAA	
MNDH-CWI	47	676489	URHAMMER, MATTHEW		10560 Lanesboro WA MN	34	20W	7	BCDACC	881	240	641	4	Steel	50	90	10	submersible	Mccullough & Sons	CIGE	
MNDH-CWI	48	681460	BOURASSA, TIM		34585 Kale LA North Branch MN 55056	34	21W	12	ADDBCD	893	120	773	4	Plastic	35			submersible	Zuercher Well Drilling.	QBAA	
MNDH-CWI	49	565237	WAATAJA		34611 Ivan Av Stacy MN	34	21W	11	ACCBDA	896	95	801	4	Plastic	35	60	10	submersible	Mccullough & Sons	QBAA	
MNDH-CWI	50	728282			10631 Lanesboro WA MN	34	20W	7	BCDADA	873	110	763	4	Plastic	10			submersible	Zuercher Well Drilling.	QBAA	
MNDH-CWI	51	557879	KOECHER, KEITH		34570 Ivan Av Stacy MN	34	21W	11	BDDAAD	898	88	810	4	Plastic	30				Lauren Mccullough Well Drilling	QBAA	
MNDH-CWI	52	713087	ROY, THOMAS		10538 Lanesboro WA MN	34	20W	7	BCADCC	881	92	789	0	Plastic	25			submersible	Zuercher Well Drilling.	QBAA	
MNDH-CWI	53	623680	EASTLUND, LLOYD		34665 Kale Av North Branch MN	34	21W	12	ADACCC	891	275	616	4	Steel	25	60	12	submersible	McAlpine Well Drilling	CIGE	
MNDH-CWI	54	500773	MCNALLY, DAN		34720 Lincoln Rd N North Branch MN 55056	34	20W	7	BDACDB	865	87	778	4	Steel	17	42	12	submersible	Johnson G. Well Co.	QBAA	
MNDH-CWI	55	703348			10645 Lanesboro WA MN	34	20W	7	BBDDDA	873	110	763	4	Plastic	20			submersible	Zuercher Well Drilling.	QBAA	
MNDH-CWI	56	551124	WOLF, DAN		34645 Ivan Av Stacy MN 55079	34	21W	11	ACBCDB	897	100	797	4	Plastic	35		12	submersible	Husnik Well Co.	QBAA	
MNDH-CWI	57	512087	SPENCER, GREG		9103 Lent Tr Stacy MN	34	21W	12	BCBDCA	889	212	677	4	Plastic	20	60	20	submersible	Husnik Well Co.	QBAA	
MNDH-CWI	58	728258	NEISEN		10645 Lanesboro WA MN	34	20W	7	BDACCB	875	110	765	4	Plastic	22			submersible	Zuercher Well Drilling.	QBAA	
MNDH-CWI	59	643731			34680 Kale LA North Branch MN	34	21W	12	ADBDBC	894	372	522	4	Steel	29	60	15	submersible	Mork Well Co.	CEMS	
MNDH-CWI	60	554457	JOHN, DUANE		8390 345th Street Sacy MN 55025	34	21W	11	BCACBA	893	105	788	3	Steel	20	40	10	submersible	Sampson Well Co.	QBAA	
MNDH-CWI	61	565340	BUESSELER		8939 347th St Stacy MN	34	21W	11	ACABDA	895	105	790	4	Plastic	35	60	10	submersible	Sampson Well Co.	QBAA	
MNDH-CWI	62	151773	SCHMIDT, RICK			34	20W	7	ADAABC	919	148	771	4		59.5					QBAA	
MNDH-CWI	63	554458	SANDERS, TONY		9063 347th St Stacy MN 55025	34	21W	11	ADBBCB	894	105	789	4	Plastic	23	40	10	submersible	Sampson Well Co.	QBAA	
MNDH-CWI	64	178218	DUMMER		11100 347th Street Lindstrom MN 55045	34	20W	7	ADBABC	910	230	680	4	Steel	75	120	15	submersible	Mccullough & Sons	CFIG	
MNDH-CWI	65	554479	MOORE		9015 347th St Stacy MN	34	21W	11	ACAACA	895	105	790	4	Plastic	37	60		submersible	Sampson Well Co.	QBAA	
MNDH-CWI	66	565322	WENSEN, ERIC		34722 Ivan St Stacy MN	34	21W	11	BDAABD	901	95	806	4	Plastic	31	40	10	submersible	Sampson Well Co.	QBAA	
MNDH-CWI	67	554496	SANDERS		9209 347th St Stacy MN 55079	34	21W	11	ADABAC	895	122	773	4	Plastic	33	60		submersible	Sampson Well Co.	QBAA	
MNDH-CWI	68	512509			9115 Lent Tr Stacy MN	34	21W	12	BCBBBB	892	100	792	4	Steel	20	80	10	submersible	Anderson A. well	QBAA	
MNDH-CWI	69																				

LS Power - Sunrise River Energy Station

Data Source	Unique Well				Address	T	R	S	Subsections	Elevation	Well Depth ft.	Well Bottom	Diameter in inches	Casing Type	Static Water level	Drop Pipe Length	Pump Capacity (GPM)	Pump Type	Contractor	Aquifer	Comments
	Map ID	Number.	Well Owner Name	Phone #																	
MNDH-CWI	73	641095	BUSSEN		34740 Kale LA North Branch MN	34	21W	12	ADBBAD	889	225	664	4	Plastic	0			Mccullough & Sons	QBAA		
MNDH-CWI	74	415238	HELLIG, BRUCE		11200 347th Street Lindstrom MN 55045	34	20W	7	ADBBAD	912	129	783	4	Steel	53	84	10	submersible	Johnson G. Well Co.	QBAA	
MNDH-CWI	75	512535	PRASKA		34764 Kable Ave Stacy MN 55079	34	21W	12	BACDCC	892	104	788	4	Steel	20	10	60		Anderson A. well	QBAA	
MNDH-CWI	76	575164	O'DONNELL, STEVE & JODIE		11100 Lang Av North Branch MN 55056	34	20W	7	ABCCDB	860	65	795	4	Plastic	0	20	10	submersible	Mccullough & Sons	QBAA	
MNDH-CWI	77	634708	PRICE		8954 347th St North Branch MN 55056	34	21W	11	ABDCAB	896	110	786	4	Plastic	35	80		submersible	Lauren Mccullough Well Drilling	QBAA	
MNDH-CWI	78	615537	GEISE		9020 347th St Stacy MN	34	21W	11	ABDACA	895	85	810	4	Plastic	20	55	10	submersible	Mccullough & Sons	QBAA	
MNDH-CWI	79	412872	RENSINK, DOUG		34880 Linden Av MN	34	20W	7	AACBBB	870	105	765	4	Steel	10	42	10	submersible	Johnson G. Well Co.	QBAA	
MNDH-CWI	80	489001			9179 Lent Tr Stacy MN	34	21W	12	BBDBDB	892	113	779	4	Steel	26	60	12	submersible	Ruppert & Son	QBAA	
MNDH-CWI	81	615546	ANDERSON		9080 347th St Stacy MN	34	21W	11	AACBAD	895	96	799	4	Plastic	20	55	10	submersible	Mccullough & Sons	QBAA	
MNDH-CWI	82	535225	TURNER, RICK		9179 Lent Tr Stacy MN	34	21W	12	BBDBDB	892	122	770	4	Plastic	20			Zuercher Well Co.	QBAA		
MNDH-CWI	83	716780	ALLISON		9216 347th Street Stacy MN 55079	34	21W	11	AADBBB	895	144	751	0	Plastic	30	60	12	submersible	Barott B. Well Co.	QBAA	
MNDH-CWI	84	565316	BYERS		8814 347th St Stacy MN	34	21W	11	ABCBCA	899	110	789	4	Plastic	36	60		submersible	Sampson Well Co.	QBAA	
MNDH-CWI	85	636051	GREY, WAYNE		34761 Lang Av Stacy MN	34	20W	7	BADAAD	868	198	670	4	Plastic	7			Johnson G. Well Co.	QBAA		
MNDH-CWI	86	631239	LINDBECK, BILL			34	21W	11	AACABA	895	152	743	4		30					QBAA	
MNDH-CWI	87	694947	ANDERSON, ROGER		17342 65 UH Albert Lea MN 56007	34	20W	7	AABDBD	867	81	786	4	Steel	10	40	10	submersible	Morrison Well Co.	QBAA	
MNDH-CWI	88	471072	MUELLNER		9187 Lent Tr MN	34	21W	12	BBBCDA	892	135	757	4	Plastic	0	86	10	submersible	Schroepfer Well Co.	QBAA	
MNDH-CWI	89	448319	ORWOLL, KEN		34914 Linden AV MN	34	20W	7	AACBCB	870	95	775	4	Steel	12	40		submersible	Lauren Mccullough Well Drilling	QBAA	
MNDH-CWI	90	512093	GOZZI, GREG		9183 Lent Tr Stacy MN	34	21W	12	BBADBC	885	112	773	4	Plastic	23	60	25	submersible	Husnik Well Co.	QBAA	
MNDH-CWI	91	473019	HOUSE OF PRAYER		34888 Kable Ave Stacy MN	34	21W	12	BAACBD	893	198	695	4	Steel	25	63	10	submersible	Johnson G. Well Co.	QBAA	
MNDH-CWI	92	638072	REICHERT		9280 Lent Tr North Branch MN	34	21W	11	AAADBA	892	104	788	4	Steel	15			Lauren Mccullough Well Drilling	QBAA		
MNDH-CWI	93	435035	STROUT, WILLIAM		34946 Linden Av MN	34	20W	7	ABAADC	865	95	770	4	Steel	7	32	10	submersible	Johnson G. Well Co.	QBAA	
MNDH-CWI	94	519048	DIXON, RICHARD		35304 Lincoln Rd Stacy MN	34	21W	12	BABDDD	886	79	807	4	Steel	16	40	10	submersible	Martin Lake Garage	QBAA	
MNDH-CWI	95	512077	PALMBERG, CLIFF		34970 Kable Ave Stacy MN	34	21W	12	BAABDD	892	203	689	4	Plastic	25	60	20	submersible	Husnik Well Co.	QBAA	
MNDH-CWI	96	513523	HEBRINK		9209 Lent Tr Stacy MN	34	21W	12	BBBBCB	892	113	779	4	Plastic	25	60	12	submersible	Husnik Well Co.	QBAA	
MNDH-CWI	97	162969	NORTH BRANCH FUR FARM			34	21W	1	DDADCD	881	200	681	6	Steel	24.4	100	60	submersible	Mantyla Well Co.	QBAA	
MNDH-CWI	98	713098	HERBST, LUKE			34	21W	2	CADCCB	899	95	804	0		37					QBAA	
MNDH-CWI	99	512420	NELSON, JOHN		35367 Kost Tr MN	34	20W	6	CACBCD	881	147	734	4	Plastic	30	100		submersible	Lauren Mccullough Well Drilling	QBAA	
MNDH-CWI	100	612914	OLSON, JIM		35690 Lincoln Rd North Branch MN	34	21W	2	DBBBAC	898	14	884	1.3	Steel	0			Handpump	Owner	QUUU	
MNDH-CWI	101	562399	SHANAHAN, BRENT		11312 Loftman Tr North Branch MN 55056	34	20W	5	BCCCCC	911	120	791	4	Plastic	50			submersible	Lauren Mccullough Well Drilling	QBAA	
MNDH-CWI	102	528700	BLOOM		11332 Loftman Tr North Branch MN 55056	34	20W	5	BCCBCD	909	460	449	4	Steel	46	84	10	submersible	Johnson G. Well Co.	CBMS	
MNDH-CWI	103	702270	JOHNSON		35824 Lincoln Rd North Branch MN 55056	34	21W	2	ADABBC	896	137	759	4	Plastic	33	60	10	submersible	Sampson Well Co.	QBAA	
MNDH-CWI	104	744019				34	21W	1	BCBABB	889	0	889	0		0						
MNDH-CWI	105	641840	KOECHER, MARK		8907 360th St North Branch MN	34	21W	2	ABCDDB	895	147	748	4	Plastic	10	60	10	submersible		QBAA	
MNDH-CWI	106	681834	GAIIOVIK, JIM		35880 Lincoln Rd North Branch MN 55056	34	21W	2	AADCBC	896	160	736	4	Plastic	27	60		submersible	Barott B. Well Co.	QBAA	
MNDH-CWI	107	761193				34	21W	1	BDACD	889	0	889	0		0						
MNDH-CWI	108	625128	KOECHER, KEITH		9035 360th St North Branch MN 55056	34	21W	2	ABDAAA	896	165	731	4	Plastic	30	50		submersible	Lauren Mccullough Well Drilling	QBAA	
MNDH-CWI	109	709812	AKER, BRAD		35803 Jensen Rd North Branch MN	34	21W	1	BBADCD	895	192	703	4	Plastic	37	80	17		Sampson Bros. Well Co. Inc.	QBAA	
MNDH-CWI	110	662770	LARSON, DON		8605 360th Street North Branch MN 55056	34	21W	2	BABACC	898	150	748	4	Plastic	32	90	20	submersible	Schroepfer Well Drilling Inc.	QBAA	
MNDH-CWI	111	733477			35919 Jensen Rd North Branch MN 55056	34	21W	1	BBABAC	894	200	694	4	Plastic	40	80		submersible	Lauren Mccullough Well Drilling	QBAA	
MNDH-CWI	112	698275	LARSON, DON		8605 360th Street North Branch MN 55056	34	21W	2	BABABC	898	160	738	4	Plastic	30	80	20	submersible	Schroepfer Well Drilling Inc.	QBAA	
MNDH-CWI	113	465957	LESSMAN, JOE		8914 360 th ST North Branch MN 55056	35	21W	35	DCDBCC	897	186	711	4	Plastic	20			Lauren Mccullough Well Drilling	QBAA		
MNDH-CWI	114	747202	PICKARD, CODY		9084 360th Street North Branch MN 55056	35	21W	35	DCCBAA	900	180	720	4	Plastic	34	60	15	submersible	Mork Well Co. Inc.	QBAA	
MNDH-CWI	115	609617	BENSON, DAVE & MICHELLE		36273 Lincoln Tr North Branch MN 55056	35	21W	35	DADDAD	899	143	756	4	Plastic	35	60	12	submersible	Husnik Well Co.	QBAA	
MNDH-CWI	116	716418	JBS CARPENTRY		36330 Lincoln Tr MN	35	21W	35	DACDBA	901	175	726	4	Plastic	40		10	submersible	STM Industries , LLC	QBAA	
MNDH-CWI	117	674711	WHITE, LAWRENCE		36329 Lincoln Trail North Branch MN	35	21W	36	CBCBDB	899	140	759	4	Plastic	34	66	12	submersible	Schroepfer Well Drilling Inc.	QBAA	
MNDH-CWI	118	620447	PERRAULT, STEVE			35	21W	36	CADBBB	896	94	802	4	Steel	34	69	10	submersible	Rosga Well Co.	QBAA	
MNDH-CWI	119	473681	PERRAULT, ROGER		36338 July AV North Branch MN 55056	35	21W	36	CACBAB	894	115	779	4	Steel	33	67	10	submersible	Rosga Well Co.	QBAA	
MNDH-CWI	120	416399	PERRAULT, ADRIAN		620 4 RD MN 55056	35	21W	36	CABDBD	896	93	803	4	Steel	30				Rosga Well Co.	QBAA	
MNDH-CWI	122	670294	BENSON, STEVE		9277 367th Street North Branch MN 55056	35	21W	36	BCCCAC	898	160	738	4	Plastic	40	66	15	submersible	Schroepfer Well Drilling Inc.	QBAA	
MNDH-CWI	123	720533	SCHULTZ, DAVE		9533 367th Street North Branch MN	35	21W	36	BCDABA	898	156	742	4	Plastic	45	60		submersible	Lauren Mccullough Well Drilling	QABB	



- Proposed Test Well #1
- Site Location
- Section Lines

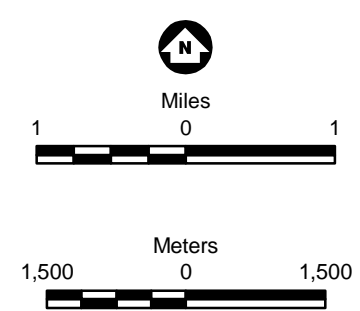
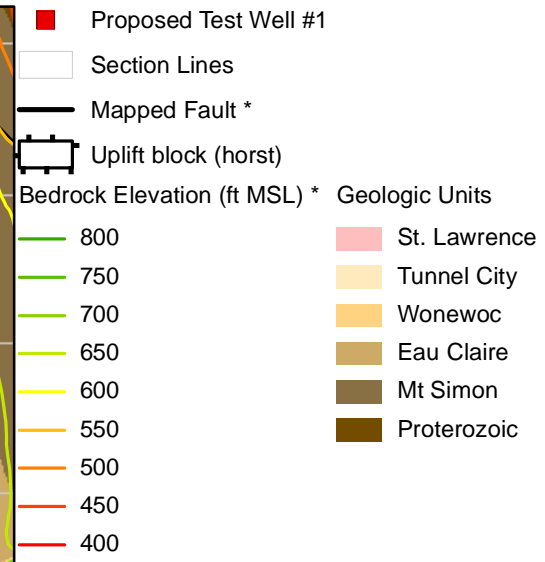
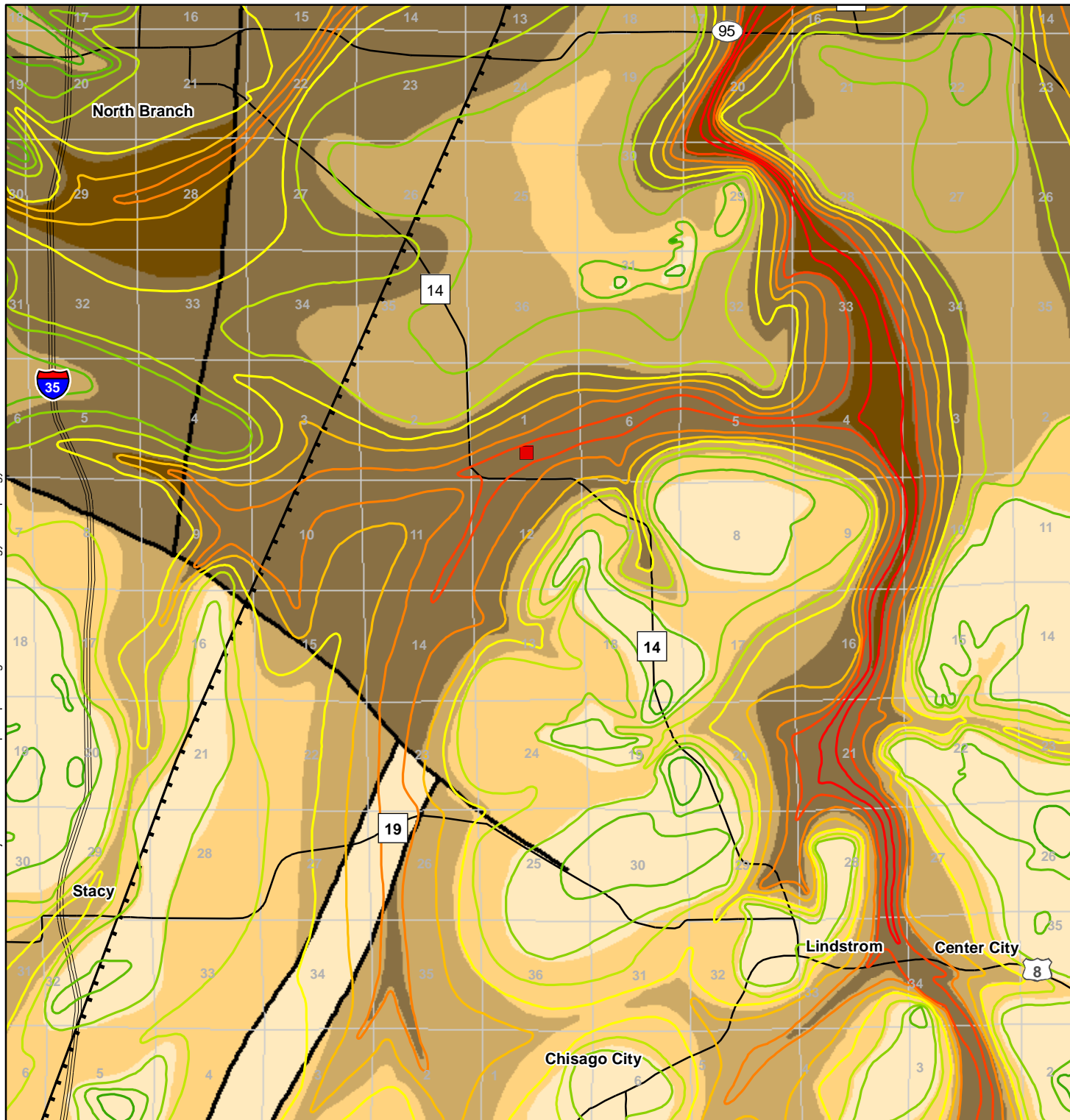


Figure 1
SITE LOCATION
 Sunrise River Energy Station
 LS Power Development, LLC
 Chisago County, MN



* Based on draft MGS data

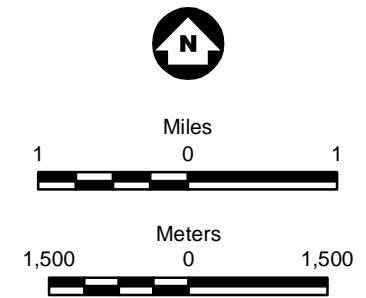
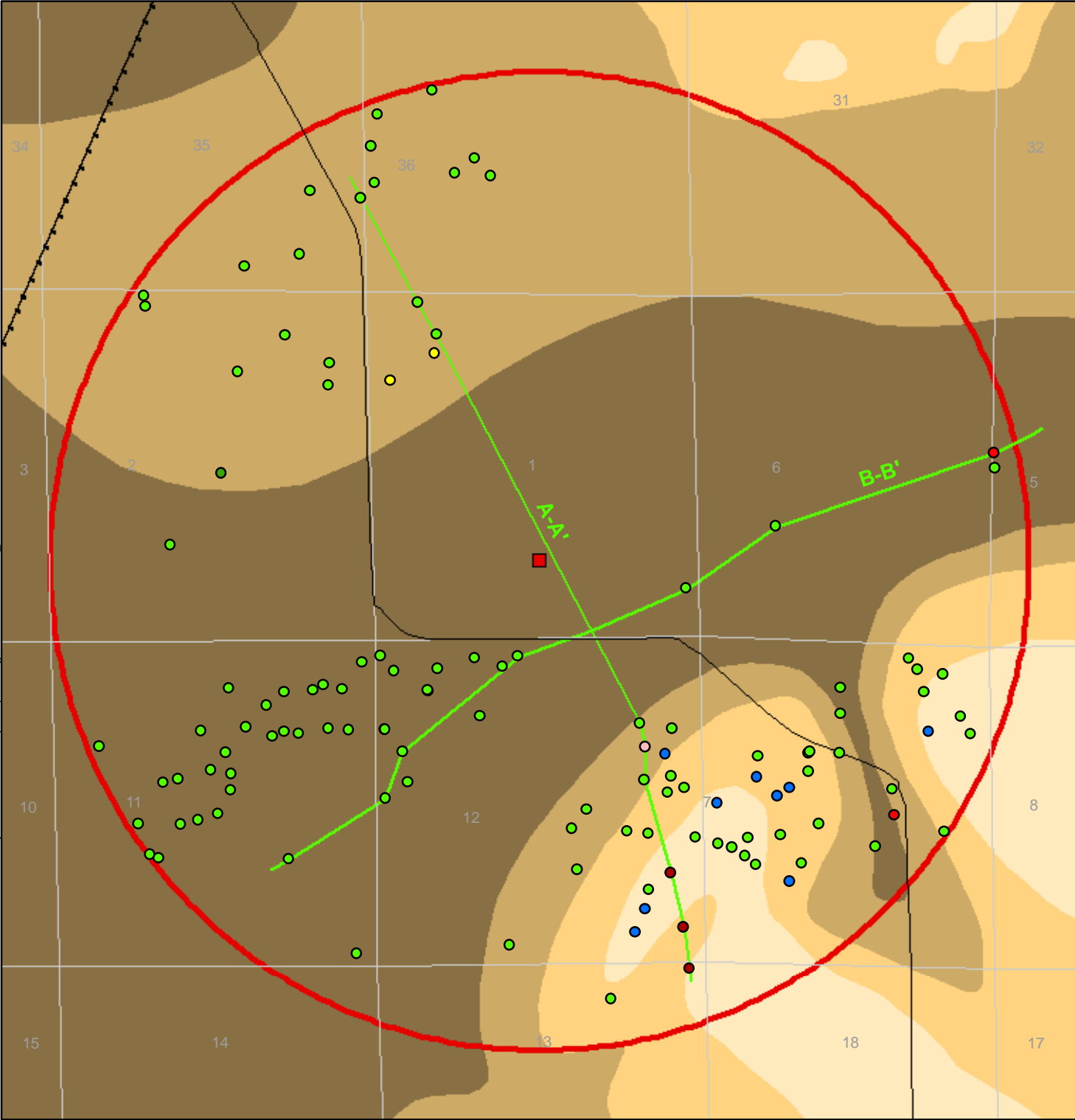


Figure 2
BEDROCK GEOLOGY
AND TOPOGRAPHY
Sunrise River Energy Station
LS Power Development, LLC
Chisago County, MN

Barr Footer: Date: 6/25/2009 3:31:18 PM File: I:\Projects\231131001\Maps\Reports\Figure 3 Wells Within 1.5 Miles.mxd User: arm2



- Proposed Test Well #1
 - Private Well, CWI
 - Unknown
 - Eau Claire
 - Eau Claire - Mt Simon
 - TC - Wonewoc
 - Mt Simon
 - Quaternary - Burried
 - Quaternary
 - Cross Section Location
 - Uplift block (horst)
 - 1.5-Mile Radius
- Geologic Units
- St. Lawrence
 - Tunnel City
 - Wonewoc
 - Eau Claire
 - Mt Simon
 - Proterozoic

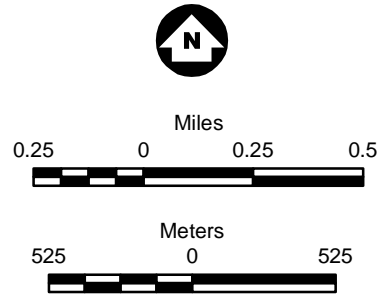
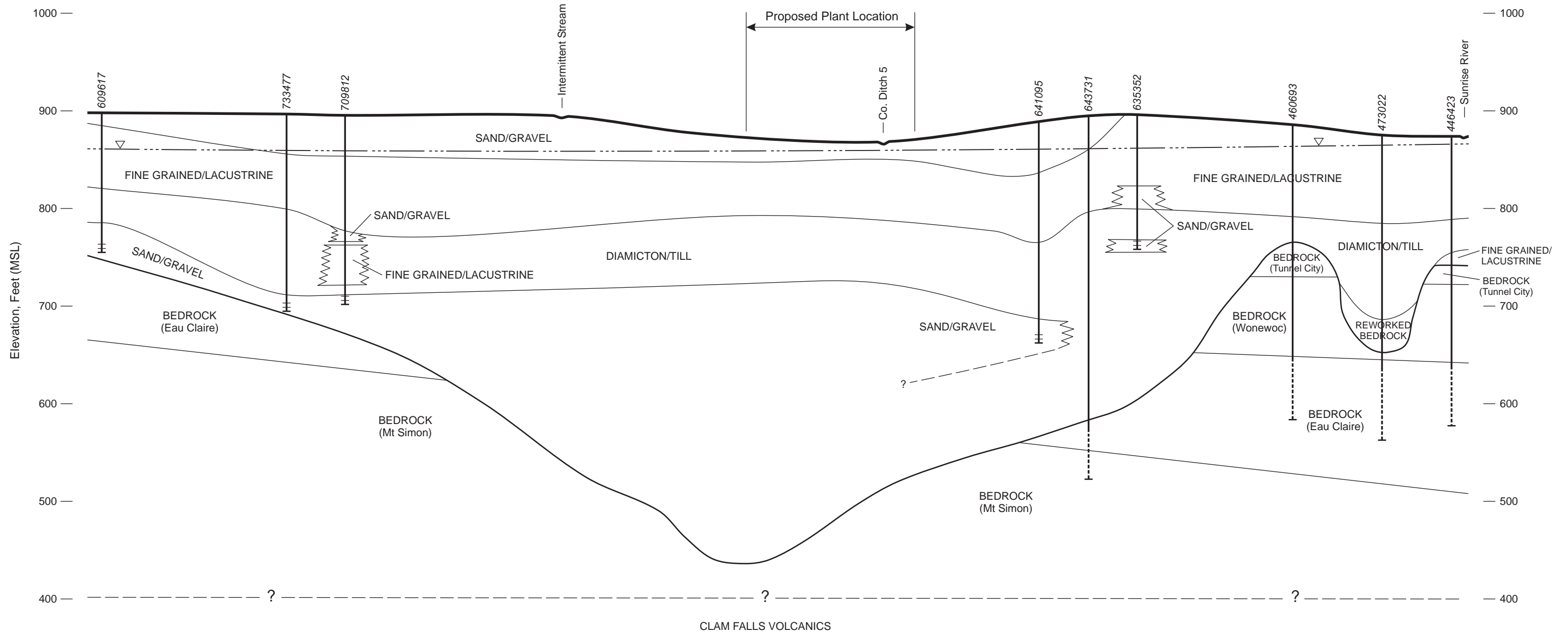


Figure 3
WELLS WITHIN 1.5 MILES OF
PROPOSED WATER SUPPLY WELL #1
WITH BEDROCK
Sunrise River Energy Station
LS Power Development, LLC
Chisago County, MN

A
NORTH

A'
SOUTH



LEGEND

- Ground Surface
- Geologic Contact (Dashed where inferred)
- Approximate Bedrock Surface (Based on draft MGS data and CWL logs)
- Water Table
- Well Screen Interval
- Well Open Interval

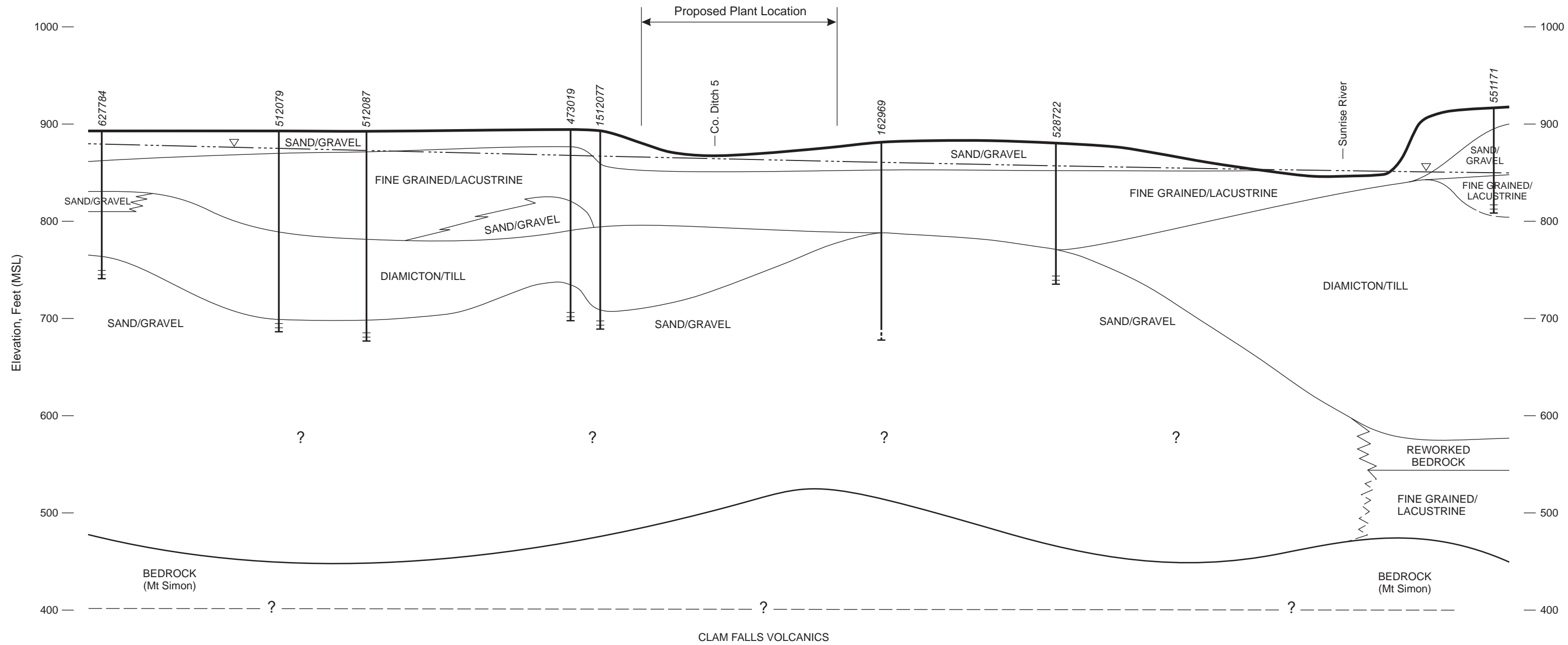
0 1000
Approximate Horizontal Scale in Feet
10X Vertical Exaggeration

DRAFT
Figure 4
CROSS SECTION A-A'

Sunrise River Energy Project
LS Power Associates, LP
Chicago County, MN

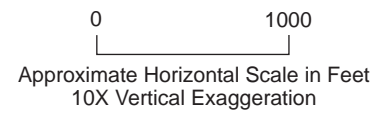
B
WEST

B'
EAST



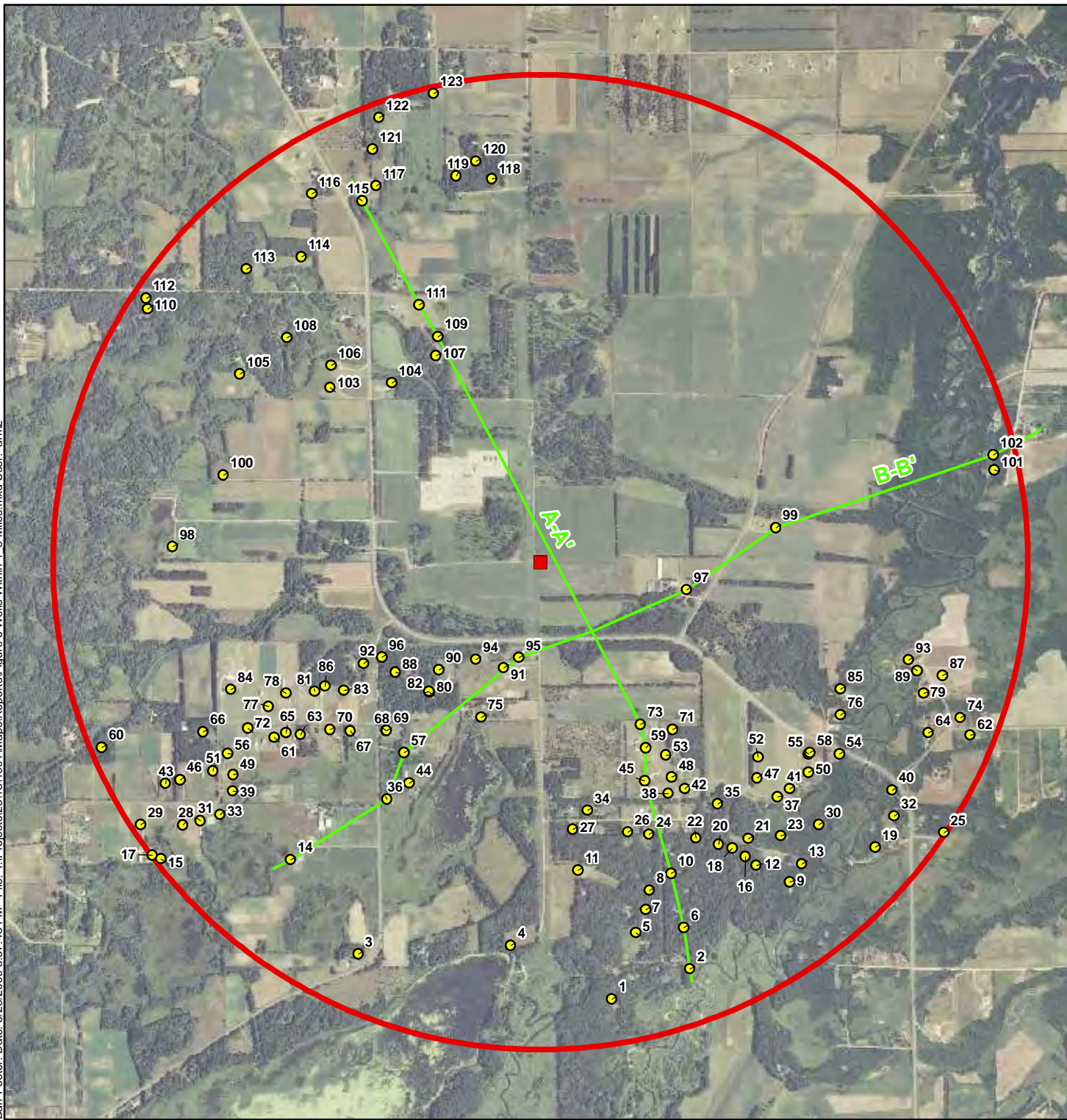
LEGEND

- Ground Surface
- Geologic Contact (Dashed where inferred)
- Approximate Bedrock Surface (Based on draft MGS data and CWL logs)
- Water Table
- Well Screen Interval
- Well Open Interval



DRAFT
Figure 5
CROSS SECTION B-B'

Sunrise River Energy Project
LS Power Associates, LP
Chicago County, MN



- Proposed Test Well #1
- Private Well, CWI (with Map ID Number from Table 1)
- Cross Section Location
- 1.5-Mile Radius

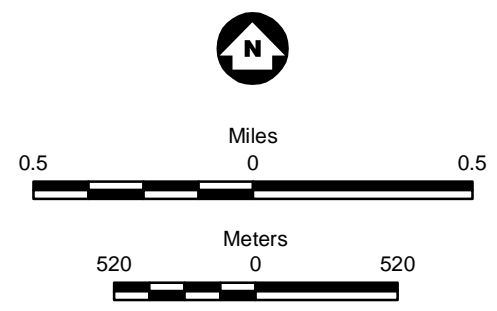
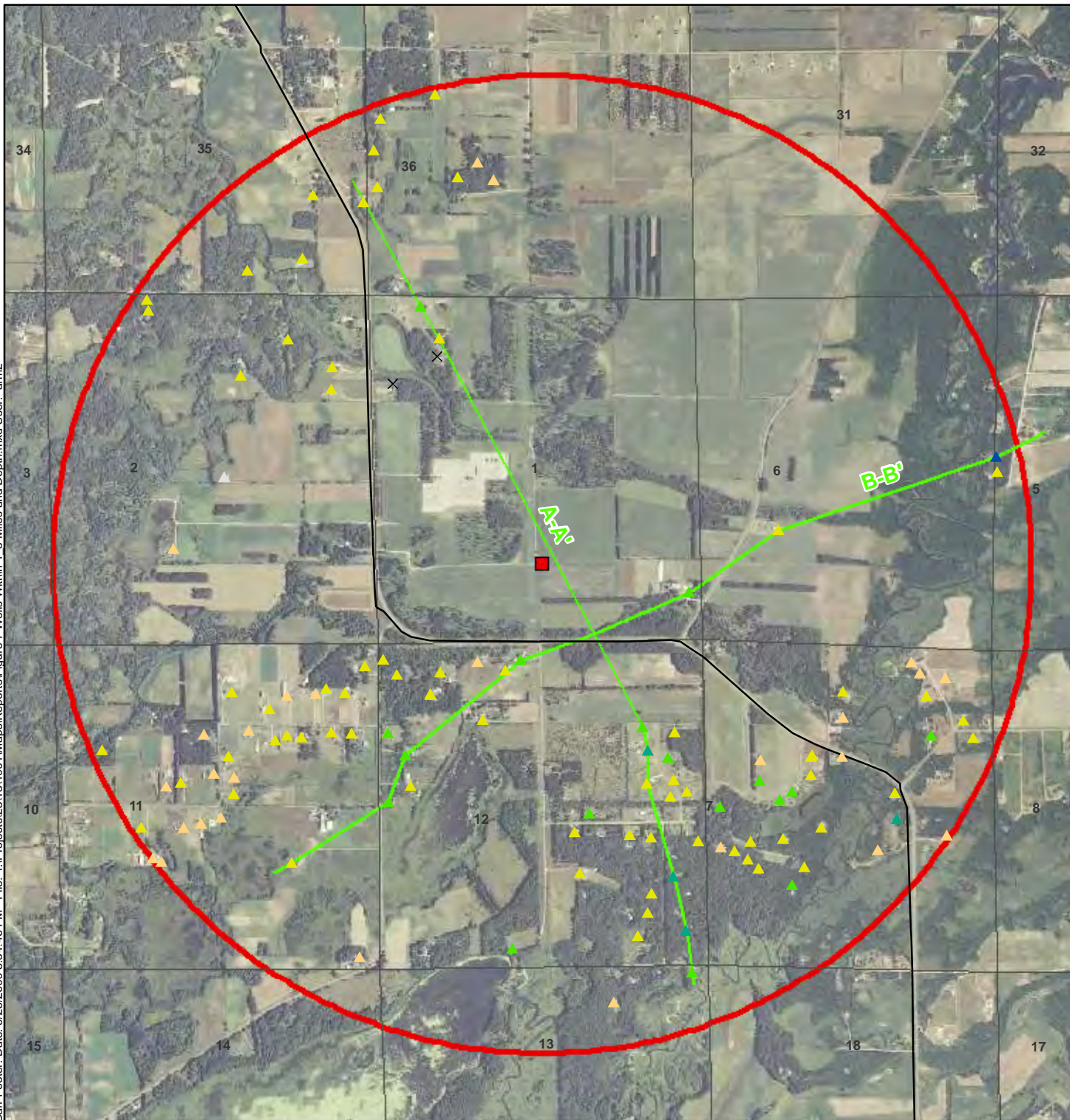


Figure 6
WELLS WITHIN 1.5 MILES OF
PROPOSED WATER SUPPLY WELL #1
Sunrise River Energy Station
LS Power Development, LLC
Chisago County, MN



- Proposed Test Well #1
- Private Well, Depth in Feet
 - × Unknown Depth
 - ▲ 10 - 49
 - ▲ 50 - 99
 - ▲ 100 - 199
 - ▲ 200 - 299
 - ▲ 300 - 399
 - ▲ 400 - 499
 - ▲ 500 - 600
 - ▲ 700 - 4000
- Section Lines
- ↗ Cross Section Location

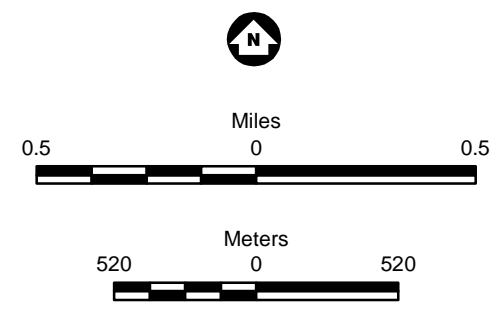


Figure 7
WELLS WITHIN 1.5 MILES OF
PROPOSED WATER SUPPLY WELL #1
WITH DEPTH OF WELL
Sunrise River Energy Station
LS Power Development, LLC
Chisago County, MN