Construction Certification Report
Pond 3 2014 Berm Addition

NPDES Permit No. 0002186
Sherburne County (Sherco) Generating Plant
Northern States Power Company (dba Xcel Energy, Inc.)
Becker, MN

Prepared for:

Xcel Energy, Inc.

December 8th, 2014

Prepared By:

CONSTRUCTION CERTIFICATION REPORT
POND 3 2014 BERM ADDITION

Sherburne County (Sherco) Generating Plant
Northern States Power Company
(dba Xcel Energy, Inc.)
Becker, Minnesota

Prepared For
Xcel Energy, Inc.

December 2014

Prepared by: Carlson McCain

CONSTRUCTION CERTIFICATION REPORT
2014 POND 3 BERM ADDITION

TABLE OF CONTENTS

SECTION 1.0 – CERTIFICATION 1

SECTION 2.0 - INTRODUCTION 1

SECTION 3.0 – CONSTRUCTION ACTIVITIES 2

3.1 SURVEYING 3
3.2 TOPSOIL, CLASS 5, AND CONTROLLED FILL STRIPPING 3
3.3 CLAY BARRIER 3
3.3.1 Clay Material Testing *4*
3.3.1.1 Pre-Qualification Testing 4
3.3.1.2 In-Place Density & Moisture Testing 4
3.3.1.3 In-Place Permeability 5
3.3.2 Verification Survey *5*
3.4 CONTROLLED FILL 6
3.5 CLASS 5 6
3.6 TOPSOIL 7
3.7 TURF ESTABLISHMENT 8
3.8 DEWATERING SYSTEM CLEANOUT EXTENSIONS 8

SECTION 4.0 - CONCLUSION 9

SECTION 5.0 - REFERENCES 9

LIST OF TABLES

Table 1	Sample / Test Information – Clay (Source Area Pre-Qualification)
Table 2	Sample / Test Information – Clay (In-Place Density)
Table 3	Sample / Test Information – Clay (In-Place Permeability and Index Testing)
Table 4	Sample / Test Information – Controlled fill

LIST OF FIGURES

Figure 1	Pond 3S Clay In-Place Density and Permeability/Atterberg Locations
Figure 2	Pond 3N Clay In-Place Density and Permeability/Atterberg Locations

LIST OF APPENDICES

Appendix A	**Record Drawings (As-Built)**
Appendix B	**Construction Photographs**
Appendix C	**Survey Information**
	Clay Survey Verification Data
	Finished Grade Survey Verification Data
	Survey Verification Drawing

Appendix D	**Clay Material Test Data / Reports**
	Clay Source Prequalification Test Reports
	Clay Source Standard Proctor Test Reports
	Clay In-place Density Test Reports
	Clay In-place Permeability and Index Property Test Reports
Appendix E	**Controlled fill Test Data / Reports**
	In-place Proctor Test Reports
	In-place Density Test Reports
Appendix F	**Turf Establishment Information**
	Seed Mix Tag, Fertilizer Tag, Mulch Information, Erosion Control Blanket Spec Sheet

CONSTRUCTION CERTIFICATION REPORT
2014 POND 3 BERM ADDITION

SECTION 1.0 – CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Daniel J. Riggs

Date: 12/17/2014 License No. 49559

SECTION 2.0 - INTRODUCTION

The purpose of this report is to present information associated with the construction of the 2014 Pond 3 Berm Addition at the Sherburne County Generating Plant (Sherco). Project activities began on September 15, 2014 and were completed on October 23, 2014. As-built Record Drawings are included in Appendix A and photographs of construction activities are included in Appendix B. The Sherco project number assigned to this work was SHC-18212.

The 2014 Pond 3 Berm Addition project consisted of raising the clay barrier 3-feet from an existing elevation of 995 to 998. The primary construction activities consisted of stripping the existing road material (class 5), topsoil, and subgrade material to the top of the existing clay barrier, and installing 3-feet of clay (8-feet wide), subgrade material (controlled fill), class 5 road material, topsoil, and establishing turf. The dewatering system cleanouts located along the east side of Pond 3 were also extended as part of the construction project.

The project was constructed in accordance with the 2014 Sherco Pond 3 Extension Project Technical Specifications, dated July 22, 2014 and the Sherburne County (Sherco) Generating Plant, 2014 Pond 3 Berm Addition Construction Drawings, dated July 23, 2014. Both documents were prepared by Carlson McCain. Deviations from the Technical Specifications are noted on the enclosed Record Drawings and/or described in this report.

Carlson McCain provided on-site construction quality assurance (CQA) management from September 15, 2014 through October 14, 2014. Information associated with activities completed after October 14, 2014 were provided by the general contractor and/or Xcel personnel. Activities completed without on-site CQA included class 5 installation, topsoil installation, turf establishment, and the construction of the Pond 3 clean-out extensions. Construction observation consisted of observing and recording activities of the general contractor and subcontractors, answering questions and interpreting information contained in the drawings and specifications, and assisting testing and quality control activities.

The following companies provided services to complete the project:

Company	**Activity or Products**
Xcel Energy	Owner/Project Management
Carlson McCain, Inc. (Carlson McCain)	Design/Construction Management – CQA
Veit & Company Inc. (Veit)	General Contractor & Earthwork Installation
Bogart, Pederson and Associates, Inc.	Survey Verification (Subcontractor to Veit)
Neaton Brothers Erosion	Turf Establishment (Subcontractor to Veit)
Soil Engineering Testing	Laboratory Soil Testing (Subcontractor to Veit)
American Engineering Testing, Inc.	Soil Testing (Subcontractor to Veit)

SECTION 3.0 – CONSTRUCTION ACTIVITIES

The following sections provide the general description of materials, construction methods, and quality control measures used to complete the project. For additional project details and information see the referenced Technical Specification Documents.

The primary construction activities consisted of stripping the existing road material (class 5), topsoil, and subgrade material to the top of the existing clay barrier, then installing 3-feet of clay (8-feet wide), subgrade material

(controlled fill), class 5 road material, topsoil, and establishing turf. The dewatering system cleanouts located along the east side of Pond 3 were also extended.

3.1 Surveying

Bogart, Pederson and Associates, Inc., was retained by the general contractor to provide surveying services for the project. The primary activities included completing survey activities associated with verifying the proper material thicknesses and elevations of the clay barrier, controlled fill, class 5, and topsoil, and providing an as-built survey drawing. Survey grid point locations were provided by Carlson McCain prior to initiating surveying activities. The survey activities were completed using 50 foot grid point locations for the clay, controlled fill, and class 5 and 100 foot grid point locations for the topsoil.

The survey verification data and as-built survey drawing are included in Appendix C.

3.2 Topsoil, Class 5, and Controlled fill Stripping

The existing topsoil, class 5, and controlled fill within the construction area was stripped by a dozer utilizing GPS and/or excavator utilizing GPS. The topsoil was placed along the outer edges of the construction area adjacent to the area it was removed. The class 5 road material was excavated and stockpiled at the base of the Pond 2 north slope near the existing rip-rap stockpile. The controlled fill was placed along the Pond 3 interior benches adjacent to the area that it was removed. All stripped material was re-used as part of the construction project.

3.3 Clay Barrier

Approximately 4,600 cubic yards of clay (in-place volume) was used to complete the clay barrier Berm Addition project. The in-place volume was determined by multiplying the clay barrier square footage by the expansion height (3-feet) and converting to cubic yards. The clay came from a pre-qualified off-site source (pit) located in Wright County, Minnesota and was hauled to the construction area and placed on the clay barrier over a 1 week period utilizing ten (10) to twenty (20) belly-dump semis.

The placed clay was connected to the top of the existing clay barrier at an elevation of 995 by scarifying and moistening the top of the existing clay barrier prior to placing the first lift of clay. Following placement, a dozer utilizing GPS spread the clay into 9-inch loose lifts approximately 10-feet wide (for semi travel) along the clay barrier alignment. The loose lifts were then compacted with a vibratory sheepsfoot roller. Each lift was maintained

in a rough and moistened condition to promote bonding between lifts and provide uniformity throughout the clay barrier. Once the barrier was approximately 2-feet thick, the GPS excavator shaped the exterior of the clay barrier by pulling up the extra clay along the outside 1.5 horizontal to 1 vertical slope and placing it on the top in six (6) inch lifts to a final height elevation of 998 and width of 8-feet. A vibratory sheepsfoot roller followed behind to compact each clay lift pulled up by the excavator. The top of the clay barrier was compacted with a smooth-drum roller to provide a smooth finish surface.

3.3.1 Clay Material Testing

3.3.1.1 Pre-Qualification Testing

To ensure the source area clay met the required project specifications, two (2) source area samples were collected from the proposed clay source pit. Each sample was collected by excavating down with an excavator approximately 10 feet and collecting multiple grab samples at various elevations and combining them into one (1) composite sample for analyses. One (1) composite sample was collected from a test pit excavated at the estimated north end of the clay source area and one (1) composite sample was collected from a test pit excavated at the estimated south end of the source area. The samples were analyzed for permeability, USCS classification, percent passing #200 sieve, and atterberg limits. The permeability samples were tested at 97 percent standard proctor density and at or above optimum moisture. Both samples met the minimum project specifications except for the percent passing the #200 sieve. The project specifications required the percent passing #200 sieve to be a minimum of 50 percent, however CLP-1 only had 49.3 percent passing. Given the relatively close margin of non-compliance, and history of acceptable in-place permeability results using this clay pit, the test results were deemed acceptable by Xcel and the clay source was approved for use.

Table 1 presents the clay source pre-qualification sample/test information such as sample ID., date, time, location, project requirements, and results and Appendix D contains the test/sample laboratory reports. The samples were collected by Veit personnel and were analyzed by Soil Engineering Testing Inc.

3.3.1.2 In-Place Density & Moisture Testing

To ensure proper soil compaction and moisture content, random in-place density and moisture tests using a nuclear density meter were completed on the placed clay at a minimum frequency of one test per 200 cubic yards. The density tests were compared to the standard proctor results to determine if the field density met the design

compaction criteria of 97 percent at 0 – 5 percent above optimum moisture content. There were two (2) proctor samples analyzed from the clay source material collected from the pre-qualification clay testing and twenty-four (24) in-place field density tests collected from the clay placed on the barrier. In general, there were four (4) tests performed on each 6-inch lift of compacted clay. Figures 1 and 2 depict the location of the in-place field density/moisture tests. All in-place tests passed the density and moisture requirements of the project.

Table 2 presents the in-place density and moisture sample/test information such as sample no., date, time, location, elevation, project requirements, and results and Appendix D contains the test/sample laboratory reports. All in-place density testing was performed by American Engineering Testing, Inc.

3.3.1.3 In-Place Permeability

To ensure the placed clay met the in-place permeability requirements, two (2) thin-wall samples were collected and analyzed. Figures 1 and 2 depict the location of the thin-wall samples. The samples were collected by pushing a standard thin-wall tube (30 inches long x 3 inches diameter) into the compacted clay material with a skid loader bucket and removing the thin-wall tube with the skid loader bucket. The thin-wall tube was positioned in a vertical alignment during installation and extraction. The samples were analyzed for permeability, USCS classification, passing #200 sieve, and atterberg limits. Both samples met the minimum project specifications except for the percent passing the #200 sieve. The project specifications required the percent passing #200 sieve to be a minimum of 50 percent. The percent passing for CL TW-1 was 47.1 and for CL TW-2 was 48.4. Given the acceptable permeability tests (CL TW-1 at 2.4×10^{-8} cm/sec and CL TW-2 at 1.3×10^{-8} cm/sec) the test results were deemed acceptable by Xcel.

Table 3 presents the in-place permeability sample/test information such as sample ID., date, time, location, project requirements, and results and Appendix D contains the test/sample laboratory reports. The samples were collected by American Engineering Testing, Inc. and were analyzed by Soil Engineering Testing Inc.

3.3.2 Verification Survey

The top of the existing clay barrier was exposed and surveyed to establish subgrade elevations. Once the clay barrier was installed, it was surveyed again to ensure the clay barrier met the project specifications for elevation (998) and minimum width (8-feet). Results of the survey indicate that the clay barrier was constructed in accordance with the required project specifications.

The results of the survey and as-built survey drawing are included in Appendix C.

3.4 Controlled fill

The road subgrade was re-constructed using the salvaged fill material and an additional source of controlled fill following installation of the clay barrier. The additional controlled fill came from the north end of the controlled fill borrow area located northeast of Pond 3N and was hauled to the construction area with side-dump trucks. The additional required volume of controlled fill was estimated at 20,400 cubic yards. The additional volume was calculated by determining the total volume of controlled fill required for the project and subtracting the volume of the initially stripped material. The location of the borrow area is referenced on the Record Drawings included in Appendix A.

The salvaged controlled fill and the additional controlled fill were graded into place by a dozer utilizing GPS. The material was graded into approximately 12-inch loose lifts and compacted with a smooth-drum vibratory roller prior to placement of additional fill material.

To ensure proper soil compaction of the controlled fill, eight (8) in-place field density tests using a nuclear density meter were completed on the compacted controlled fill material. The density tests were completed at a minimum frequency of one test per 3,000 cubic yards. The density tests were compared to the standard proctor results to determine if the field density met the 95 percent compaction criteria. All density tests passed the minimum specified compaction of 95 percent. Table 4 presents the sample/test information such as sample no., date, time, location, elevation, and results and Appendix E contains the test/sample laboratory reports. All sample analyses (proctor) and in-place density testing were performed by American Engineering Testing, Inc.

An elevation verification survey was completed to ensure the controlled fill met the minimum elevation tolerance of +/-0.1 foot. The results of the survey are included in Appendix C. Results of the survey indicate that the elevation tolerance was met at all controlled fill grid point locations.

3.5 Class 5

Class 5 aggregate was as road surface material over the controlled fill material. Approximately 2,700 cubic yards (in-place volume) of class 5 was used to construct the roads. The in-place volume was determined by multiplying

the estimated square footage of the road surface by the thickness of class 5 (6-inches) and converting to cubic yards. All class 5 was salvaged from the initial stripping process and no addition class 5 was required.

The class 5 was hauled to the construction area with dump trucks, graded into place by a dozer utilizing GPS to a depth of approximately 6-inches and compacted with a vibratory smooth-drum roller. No material and/or density tests were collected from the class 5 as they were not required as part of the project specifications.

A thickness verification survey was completed to ensure the placed class 5 met the minimum tolerance of 6-inches +0.0 – 0.1 foot (6.0 – 7.2 inches). Results of the survey indicate that the class 5 thickness ranged from 6.0 to 7.1 inches and the thickness tolerance was met at all class 5 grid point locations. The results of the survey are included in Appendix C.

3.6 Topsoil

Topsoil was placed along the road edges, embankments/slope areas, and all disturbed areas following installation of the controlled fill and class 5. The topsoil came from two sources, material salvaged during the beginning of the project and from a topsoil stockpile. The amount excavated from the stockpile was estimated at 650 cubic yards (hauled volume). This estimated volume was determined by multiplying the number of trucks by the estimated haul volume of each truck. The topsoil was hauled to from the stockpile, located east Pond 3, to the project area with dump trucks. The location of the east topsoil stockpile is referenced on the Record Drawings included in Appendix A.

The topsoil was graded by a dozer utilizing GPS to a depth of approximately 6-inches and/or to the design finished grade elevations.

No topsoil samples were collected and analyzed for nutrient content or fertilizer recommendations. The on-site topsoil has been sampled multiple times during previous construction projects and the most recent sampling results (summer 2014) were provided to the general contractor for nutrient content and fertilizer recommendations.

A thickness verification survey was completed to ensure the placed topsoil met the minimum tolerance of 6-inches +0.0 – 0.1 foot (6.0 – 7.2 inches). Results of the survey indicate that the topsoil thickness ranged from 6.0 to 7.0

inches and the thickness tolerance was met at all topsoil grid point locations. The results of the survey are included in Appendix C.

3.7 Turf Establishment

All topsoil and disturbed areas were seeded, fertilized and either mulched or covered with erosion control blankets. Drawing P4 of the Record Drawings included in Appendix A illustrates the areas that were seeded/fertilized and either mulched and disc anchored or covered with erosion control blankets. Neaton Brothers Erosion completed the turf establishment activities.

One modification to the original design included the interior slope areas of the raised berm. The interior slope of the raised berm was initially designed to contain topsoil and erosion control blankets. Based on site conditions and future use, it was determined that the topsoil and erosion control blankets were not necessary and the interior slopes were constructed with controlled fill.

The disturbed areas were dragged with a steel mechanical drag and seeded and fertilized all at the same time by using a 3-pt pendulum spreader attached to a tractor. The seeded areas where then mulched and disc anchored using a custom built large steel disc. The erosion control blankets were placed by a skid loader with a draw bar that unrolled the 8-foot wide blankets as the machine moved forward. The blankets were stapled in-place as they were being installed.

A copy of the seed mix tag, fertilizer tag, mulch information, and erosion control blanket spec. sheet used on the project are included in Appendix F.

3.8 Dewatering System Cleanout Extensions

As part of the Berm Addition project the existing cleanout pipes located along the east side of Pond 3 were extended and raised to provide future access. Each cleanout was extended approximately 10-feet using an 8-inch SDR 17 solid wall polyethylene pipe, and fused to the existing 8-inch SDR 17 cleanout pipe with an electrofusion coupling. The existing corrugated metal protective casings were salvaged and reinstalled on the extended cleanouts. Additional details associated with the cleanout extensions are illustrated on the Record Drawings included in Appendix A.

SECTION 4.0 - CONCLUSION

Construction of the 2014 Pond 3 Berm Addition Project has been completed in accordance with the goals and objectives of the construction activities presented within the referenced Technical Specification Documents and in compliance with the requirements contained in NPDES Permit No. 0002186.

SECTION 5.0 - REFERENCES

2014 Sherco Pond 3 Berm Addition Project Technical Spec., prepared by Carlson McCain dated July 22, 2015

2014 Sherco Pond 3 Berm Addition Construction Drawings, prepared by Carlson McCain dated July 23, 2015

Tables

TABLE 1

SAMPLE / TEST INFORMATION - CLAY (SOURCE AREA PRE-QUALIFICATION)

POND 3 2014 BERM ADDITION PROJECT

SAMPLE ID	SAMPLE COLL. DATE	SAMPLE COLL. TIME	SAMPLE LOCATION	PERMEABILITY @ 95% PROCTOR DRY DENSITY W/MOISTURE CONTENT @ 0-5% WET OF OPTIMUM (1x10-7 CM/SEC)	USCS CLASSIFICATION (SC/CL/CH)	% PASSING # 200 SIEVE (MIN 50%)	ATTERBERG LIMITS		TEST RESULT (PASS/FAIL)	COMMENTS
							LIQUID LIMIT (25% OR GREATER)	PLASTICITY INDEX (12% OR GREATER)		
CLP-1 (source)	09/02/24	0900	Veit Clay Pit - Wright County	6.7 x 10-9 cm/sec	SC	49.3	30.8	16.8	Pass	South end of pit
CLP-2 (source)	09/02/24	0900	Veit Clay Pit - Wright County	2.0 x 10-8 cm/sec	CL	50.3	30.4	17.2	Pass	North end of pit

NOTES:

1. Samples collected by Brian Lenneman, Veit & Company Inc., McCain field personnel present during sample collection
2. Required samples (1/3,000 cyds) : Project est. @ 4,500 cyds = 2 samples
3. See lab reports for additional information

TABLE 2
SAMPLE / TEST INFORMATION - CLAY (IN-PLACE DENSITY)
POND 3 2014 BERM ADDITION PROJECT

(1) SAMPLE NO.	SAMPLE COLL. DATE	SAMPLE COLL. TIME	SAMPLE COLLECTION / TEST LOCATION				(3) NUCLEAR IN-PLACE DRY DENSITY (LBS/CFT)	(3) NUCLEAR IN-PLACE MOISTURE (%)	SOIL PROCTOR ID	PROCTOR MAX DRY DENSITY (LBS/CFT)	PROCTOR OPT. MOISTURE (%)	PERM. MOISTURE (%)	REL. COMP. (%)	MIN. SPECIFIED COMPACT. (%)	TEST RESULT (PASS/FAIL)	# OF PASSING TESTS
			(2) NORTHING	(2) EASTING	(2) GROUND ELEVATION	TEST ELEVATION (PROBE)										
CLP-1	09/02/14	0900	---	---	---	---	---	---	---	115.8	14.7	16.1	---	---	---	---
CLP-2	09/02/14	0900	---	---	---	---	---	---	---	115.9	14.0	15.9	---	---	---	---
CL-1	09/22/14	1310	862402	2030846	995.7	995.7-994.7	117.1	15.4	CLP-2	115.9	14.0	15.9	101.0	97	Pass	1
CL-2	09/22/14	1500	862411	2031049	996.1	996.1-995.1	117.3	15.6	CLP-2	115.9	14.0	15.9	101.2	97	Pass	2
CL-3	09/22/14	1540	862427	2031305	995.8	995.8-994.8	116.6	17.0	CLP-2	115.9	14.0	15.9	100.6	97	Pass	3
CL-4	09/23/14	1145	862424	2031243	996.6	996.6-995.6	117.3	16.2	CLP-1	115.8	14.7	16.1	101.3	97	Pass	4
CL-5	09/23/14	1245	862404	2030884	997.1	997.1-996.1	115.0	18.3	CLP-1	115.8	14.7	16.1	99.3	97	Pass	5
CL-6	09/24/14	1030	862411	2030922	998.0	998.0-997.0	112.8	17.7	CLP-2	115.9	14.0	15.9	97.3	97	Pass	6
CL-7	09/24/14	1115	862699	2031998	995.9	995.9-994.9	118.0	15.3	CLP-2	115.9	14.0	15.9	101.8	97	Pass	7
CL-8	09/25/14	1020	863910	2031999	996.0	996.0-995.0	118.1	15.6	CLP-2	115.9	14.0	15.9	101.9	97	Pass	8
CL-9	09/25/14	1030	863026	2031997	997.1	997.1-996.1	115.9	17.3	CLP-2	115.9	14.0	15.9	100.0	97	Pass	9
CL-10	09/25/14	1100	863545	2031997	997.0	997.0-996.0	116.6	16.1	CLP-2	115.9	14.0	15.9	100.6	97	Pass	10
CL-11	09/25/14	1630	864045	2031998	997.1	997.1-996.1	116.0	15.7	CLP-2	115.9	14.0	15.9	100.1	97	Pass	11
CL-12	09/25/14	1650	864641	2031999	996.1	996.1-995.1	113.8	16.3	CLP-2	115.9	14.0	15.9	98.2	97	Pass	12
CL-13	09/25/14	1745	865108	2031998	996.0	996.0-995.0	113.0	17.2	CLP-2	115.9	14.0	15.9	97.5	97	Pass	13
CL-14	09/26/14	1445	865009	2031999	997.1	997.1-996.1	115.3	15.5	CLP-2	115.9	14.0	15.9	99.5	97	Pass	14
CL-15	09/26/14	1510	865364	2031033	996.1	996.1-995.1	113.1	18.0	CLP-2	115.9	14.0	15.9	97.6	97	Pass	15
CL-16	09/26/14	1420	865364	2031528	996.1	996.1-995.1	112.9	17.3	CLP-2	115.9	14.0	15.9	97.4	97	Pass	16
CL-17	09/29/14	1050	865363	2031602	997.0	997.0-996.0	113.6	18.0	CLP-2	115.9	14.0	15.9	98.0	97	Pass	17
CL-18	09/29/14	1100	865365	2031104	997.1	997.1-996.1	113.4	16.8	CLP-2	115.9	14.0	15.9	97.8	97	Pass	18
CL-19	09/29/14	1125	863032	2031992	998.4	998.4-997.4	117.8	15.6	CLP-2	115.9	14.0	15.9	101.6	97	Pass	19
CL-20	09/30/14	0935	863616	2031991	998.3	998.3-997.3	114.6	17.8	CLP-2	115.9	14.0	15.9	98.9	97	Pass	20
CL-21	09/30/14	0945	864300	2031993	998.2	998.2-997.2	117.6	15.5	CLP-2	115.9	14.0	15.9	101.5	97	Pass	21
CL-22	10/02/14	0920	864829	2031992	998.3	998.3-997.3	114.4	16.5	CLP-2	115.9	14.0	15.9	98.7	97	Pass	22
CL-23	10/02/14	0935	865361	2031689	998.2	998.2-997.2	119.7	15.7	CLP-2	115.9	14.0	15.9	103.3	97	Pass	23
CL-24	10/02/14	0945	865359	2031250	998.3	998.3-997.3	115.5	16.6	CLP-2	115.9	14.0	15.9	99.7	97	Pass	24

NOTES:

1. All density tests performed by Alex Sterger w/AET, Gary Gilbert (Carlson McCain) present during sample collection
2. GPS coordinates obtained from GPS rover provided by Xcel
3. In-place density tests and moisture percentage obtained from Troxler 3440 density gauge
4. Required samples (1/200 cyds placed), total volume est. = 4,600 cyds = 4,600/200) = min 23 samples
5. See lab reports for additional information

TABLE 3
SAMPLE / TEST INFORMATION - CLAY (IN-PLACE PERMEABILITY & INDEX TESTING)
POND 3 2014 BERM ADDITION PROJECT

(1) SAMPLE ID	SAMPLE COLL. DATE	SAMPLE COLL. TIME	SAMPLE COLLECTION / TEST LOCATION			PERMEABILITY @ 95% PROCTOR DRY DENSITY W/MOISTURE CONTENT @ 0-5% WET OF OPTIMUM (1x10-7 CM/SEC)	USCS CLASSIFICATION (SC/CL/CH)	% PASSING # 200 SIEVE (MIN 50%)	ATTERBERG LIMITS		TEST RESULT (PASS/FAIL)
			(2) NORTHING	(2) EASTING	(2) GROUND ELEVATION				LIQUID LIMIT (25% OR GREATER)	PLASTICITY INDEX (12% OR GREATER)	
CL TW-1	09/25/14	1150	862429	2031302	998.0	2.4 x 10-8 cm/sec	CL	47.1	30.1	17.4	Pass
CL TW-2	10/02/14	1005	865359	2031243	998.3	1.3 x 10-8 cm/sec	CL	48.4	31.0	18.7	Pass

NOTES:

1. Samples collected by Alex Sterger w/AET, Gary Gilbert (Carlson McCain) present during sample collection
2. GPS coordinates obtained from GPS rover provided by Xcel
3. Sample CL TW-1 collected from Pond 3S south bench, sample CL TW-2 collected from Pond 3N north bench
4. See lab reports for additional information

TABLE 4

SAMPLE / TEST INFORMATION - CONTROLLED FILL

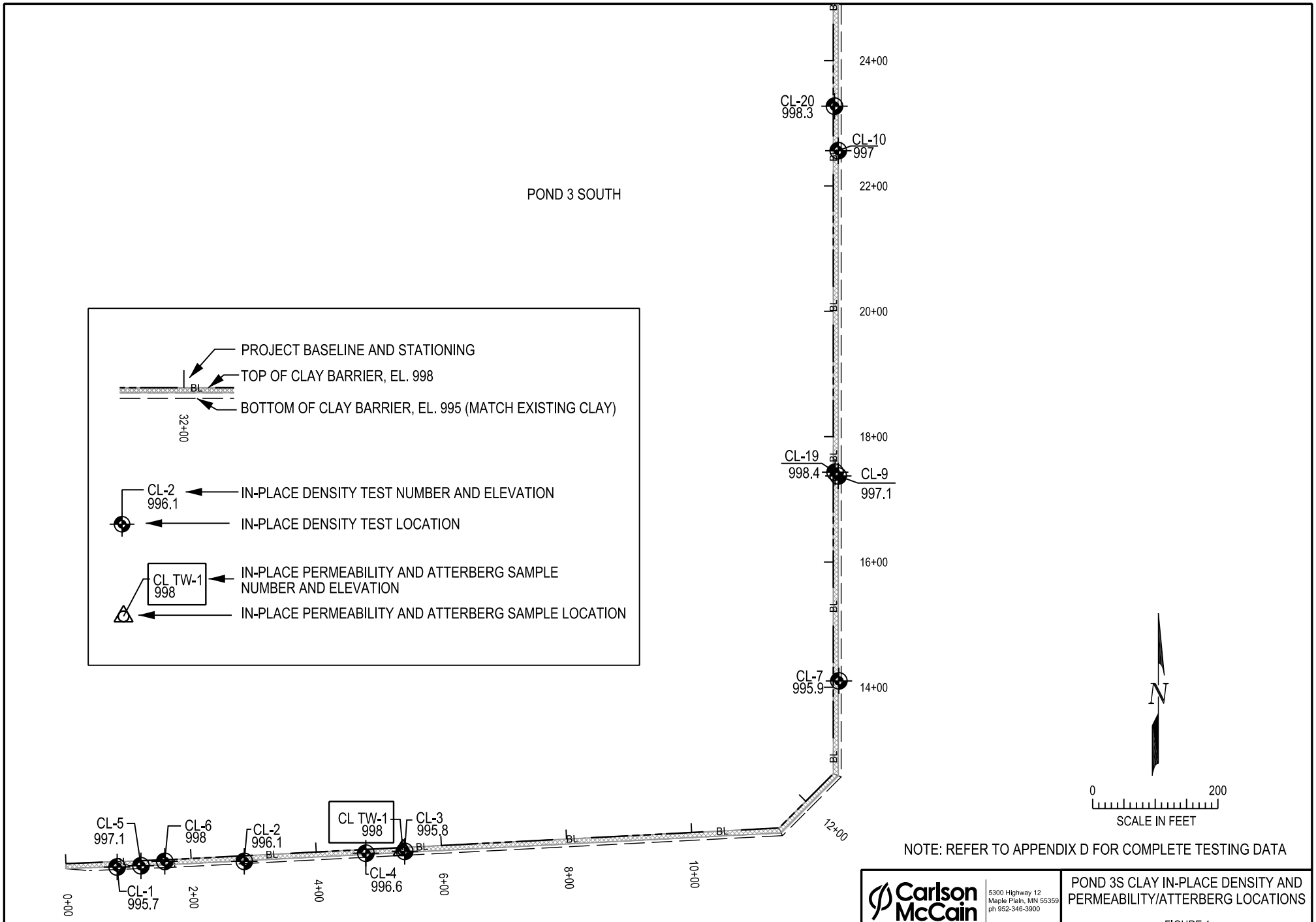
POND 3 2014 BERM ADDITION PROJECT

(1) SAMPLE NO.	SAMPLE COLL. DATE	SAMPLE COLL. TIME	SAMPLE COLLECTION / TEST LOCATION			(3) NUCLEAR IN-PLACE DRY DENSITY (LBS/CFT)	(3) IN-PLACE MOISTURE (%)	SOIL PROCTOR ID	PROCTOR MAX DRY DENSITY (LBS/CFT)	PROCTOR OPT. MOISTURE (%)	REL. COMP. (%)	MIN. SPECIFIED COMPACT. (%)	TEST RESULT (PASS/FAIL)	# OF PASSING TESTS	COMMENTS
			(2) NORTHING	(2) EASTING	(2) ELEVATION										
RFP-1	09/29/14	1130	---	---	---	---	---	---	119.7	11.0	---	---	---	---	Collected from north end of borrow area located west of construction trailer. 5 grab samples put into one composite sample.
RF-1	10/06/14	1615	862414	2031278	1000.5	120.8	4.6	RFP-1	119.7	11.0	101	95	Pass	1	
RF-2	10/06/14	1625	862426	2031277	1001.5	114.7	4.8	RFP-1	119.7	11.0	96	95	Pass	2	
RF-3	10/07/14	1720	863161	2032002	1000.5	118.9	5.5	RFP-1	119.7	11.0	99	95	Pass	3	
RF-4	10/07/14	1730	863162	2032000	1001.5	120.5	4.7	RFP-1	119.7	11.0	101	95	Pass	4	
RF-5	10/14/14	0945	864425	2031998	1000.5	116.5	3.6	RFP-1	119.7	11.0	97	95	Pass	5	
RF-6	10/14/14	0950	864446	2031996	1001.4	118.6	5.4	RFP-1	119.7	11.0	99	95	Pass	6	
RF-7	10/14/14	1010	865370	2031524	1000.4	114.4	3.3	RFP-1	119.7	11.0	96	95	Pass	7	
RF-8	10/14/14	1015	865364	2031413	1001.5	115.8	3.8	RFP-1	119.7	11.0	97	95	Pass	8	

NOTES:

1. Proctor sample and density tests collected by Alex Sterger w/AET, Gary Gilbert (Carlson McCain) present during sample collection
2. GPS coordinates obtained from GPS rover provided by Xcel
3. In-place density tests and moisture percentage obtained from Troxler 3440 density gauge
4. Required samples (1/3,000 cyds placed), total volume est. = 20,421 cyds = 20,421/3,000 = min 7 samples
5. See lab reports for additional information

Figures



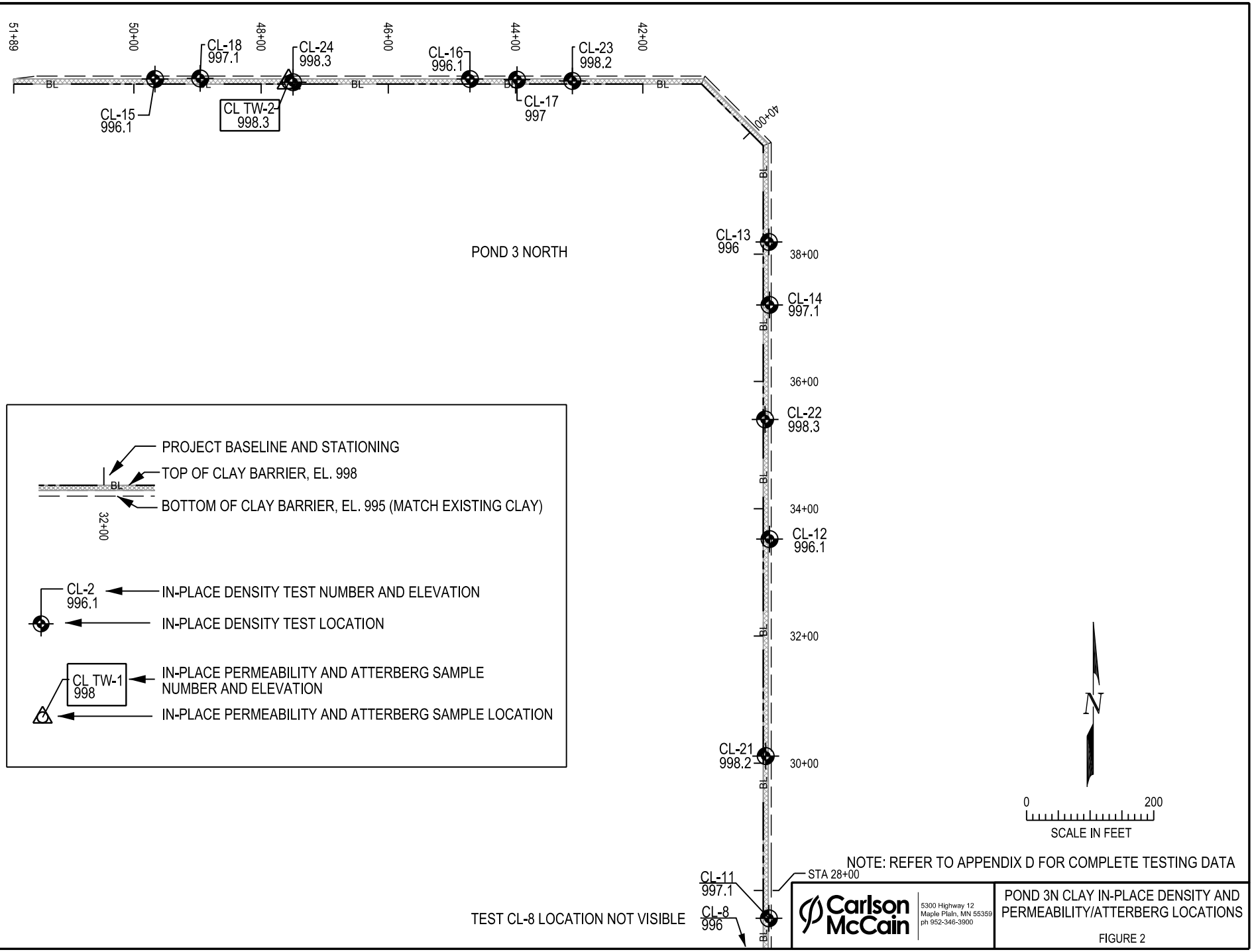
NOTE: REFER TO APPENDIX D FOR COMPLETE TESTING DATA

Carlson McCain
5300 Highway 12
Maple Plain, MN 55359
ph 952-346-3900

POND 3S CLAY IN-PLACE DENSITY AND PERMEABILITY/ATTERBERG LOCATIONS

FIGURE 1

File: P:\Projects\XCEL\3404-04 Pond 3S\2014 Pond 3 Vertical Extension\Cert Report\figures\Figure 1 and 2 - Pond 3S Clay density testing locations.dgn



Carlson McCain

5300 Highway 12
Maple Plain, MN 55359
ph 952-346-3900

POND 3N CLAY IN-PLACE DENSITY AND PERMEABILITY/ATTERBERG LOCATIONS

FIGURE 2

File: P:\Projects\XCEL\3404-04 Pond 3S\2014 Pond 3 Vertical Extension\Cert Report\figures\Figure 1 and 2 - Pond 3S Clay density testing locations.dgn

Appendix A – Record Drawings

RECORD DRAWINGS

POND 3 2014 BERM ADDITION

NPDES Permit No. 0002186
Sherburne County (Sherco) Generating Plant
Northern States Power Company (dba Xcel Energy, Inc.)
Becker, MN

Prepared for:

Xcel Energy, Inc.

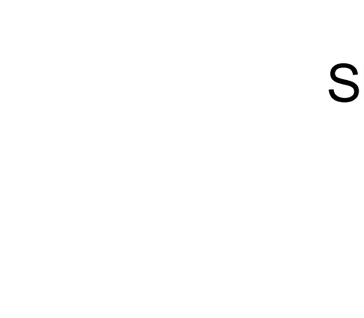
December 8th, 2014

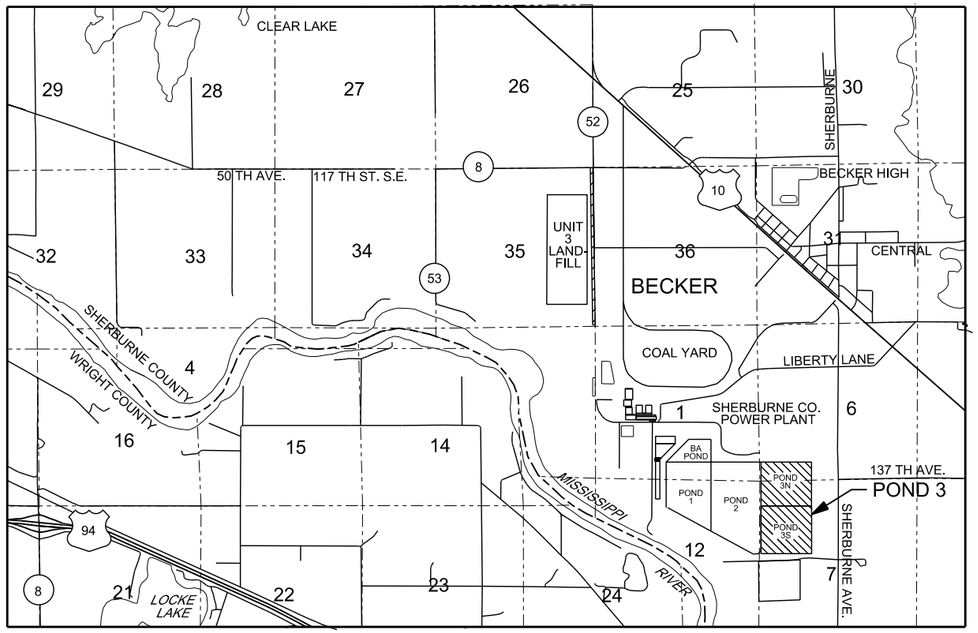
Prepared By:

Carlson McCain

RECORD DRAWINGS
SHERBURNE COUNTY (SHERCO) GENERATING PLANT
POND 3 2014 BERM ADDITION

NPDES PERMIT No. 0002186
BECKER, MINNESOTA
NORTHERN STATES POWER COMPANY
dba XCEL ENERGY, INC.





SITE LOCATION MAP

SHEET	DRAWING TITLE
	GENERAL
G1	INDEX SHEET
G2	PROJECT LAYOUT
	POND 3S VERTICAL EXPANSION
P1	PRE-CONSTRUCTION CONDITIONS
P2	CLAY BARRIER GRADING PLAN
P3	FINISHED GRADING PLAN
P4	RESTORATION PLAN
P5	EMBANKMENT SECTIONS
P6	CLEANOUT EXTENSION AND CLAY BARRIER SECTIONS

NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	ISSUED FOR BIDDING		7/23/2014	GDG	DJR	XCEL
0	ISSUED FOR CONSTRUCTION		9/2/2014	GDG	DJR	XCEL
▲	RECORD DRAWINGS		11/18/2014	GDG	DJR	XCEL

Carlson McCain • ENVIRONMENTAL • ENGINEERING • SURVEYING
5300 Highway 12, Maple Plain, MN 55369
Tel | (952) 346-3900 Fax | (952) 346-3901
www.CarlsonMcCain.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
FIRST NAME: DANIEL J. RIGGS
SIGNATURE:
DATE: 11/18/2014 LICENSE# 49559

Xcel Energy®
NORTHERN STATES POWER COMPANY
SHERCO GENERATING PLANT
BECKER, MINNESOTA

DWN: DJR	DATE: 11/18/14	CHK:	DATE:
ENG: DJR	DATE: 11/18/14	CHK:	DATE:
PM:	DATE:	PROJ. NO:	
APVD:	DATE:	SCALE: SEE DRAWING	

ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

2014 POND 3 VERTICAL EXPANSION

INDEX SHEET

G1 REV ▲

File: P:\Projects\XCEL\3404-04 Pond 3S\2014 Pond 3 Vertical Extension\Drawings\As-Built\2014 Pond 3 VE Const_G1_AB.dgn
Plotter_Driver: P:\MAI Standards\Microstation\Misc Standard\Plot Drivers\Ricoh6000_MAIstyle.pltcfg
Plotted: 12/17/2014 9:02:46 AM

BOTTOM ASH POND

POND 1

POND 2

POND 3N

POND 3S

RIP RAP STOCKPILE

TOPSOIL STOCKPILE (DO NOT USE)

PROTECT MONITORING WELL P130

POND 3N DISCHARGE STRUCTURES

POND 2 FINAL COVER AREA

EXISTING STAINLESS STEEL SCRUBBER SLUDGE PIPES

POND 3 VERTICAL EXPANSION CONSTRUCTION

N 865,578.90

CONTROLLED FILL BORROW AREA. STRIP TOPSOIL AND USE FOR POND 2 FINAL COVER AFTER SOUTH TOPSOIL STOCKPILE IS EXHAUSTED. CONTROLLED FILL EXCAVATION SOUTH OF N: 865,579 SHALL BE SLOPED UP (SOUTH) 3H:1V.

SURVEY MONUMENT
N 866,120.882
E 2,033,096.199
Elev. 961.699

MONITORING WELL, TYP. P131

CONSTRUCTION OFFICE TRAILER

SECURITY GATE NUMBER 20, CONTRACTOR'S ENTRANCE

BECKER SUB-STATION

CONTRACTOR'S PARKING AND EQUIPMENT STORAGE AREAS

SURVEY MONUMENT
N 864,720.822
E 2,033,076.435
Elev. 961.325

TEMPORARY POWER SOURCE

USE EAST TOPSOIL STOCKPILE AFTER BORROW TOPSOIL STOCKPILE IS EXHAUSTED

OVERHEAD ELECTRIC LINES, TYP

SECURITY FENCE

SURVEY MONUMENT
N 863,276.258
E 2,033,082.003
Elev. 962.861

EXHAUSTED DURING FINAL COVER CONSTRUCTION

N

0 250 500
SCALE IN FEET

NOTES:

REFER TO SECTION 01010 OF THE TECHNICAL SPECIFICATIONS FOR ADDITIONAL PHASING DETAILS.

EXISTING TOPOGRAPHY IN THE POND 2 AND POND 3 AREA IS FROM AERIAL SURVEY ON OCTOBER 16, 2013. EXISTING TOPOGRAPHY OUTSIDE OF THIS AREA IS COMPILED FROM A VARIETY OF SOURCES AND DATES, AND IS SHOWN HERE FOR GENERAL LAYOUT INFORMATION. TOPOGRAPHY OUTSIDE PROJECT AREAS MAY NOT REFLECT THE CURRENT CONDITIONS.

NOT ALL UNDERGROUND UTILITIES SHOWN.

ADDITIONAL SURVEY MONUMENTS NOT SHOWN ON THIS SHEET:
N 866,700.00 E 2,030,200.00 El. 964.77
N 866,700.00 E 2,030,592.72 El. 964.85
N 866,500.00 E 2,030,000.00 El. 963.72

File: P:\Projects\XCEL\3404-04 Pond 3S\2014 Pond 3 Vertical Extension\Drawings\As-Built\2014 Pond 3 VE Const_G2_AB.dgn
Plotter Driver: P:\MAI Standards\Microstation\Misc Standard\Plot Drivers\Ricoh6000_MAstyle.pltcfg
Plotted: 12/12/2014 3:50:44 PM

NO	REVISION	ZONE	DATE	BY	CHK	ENG

NO	REVISION	ZONE	DATE	BY	ENG	CHK
A	ISSUED FOR BIDDING		7/23/2014	GDG	DJR	XCEL
0	ISSUED FOR CONSTRUCTION		9/2/2014	GDG	DJR	XCEL
▲	RECORD DRAWINGS		11/18/2014	GDG	DJR	XCEL

Carlson McCain
• ENVIRONMENTAL
• ENGINEERING
• SURVEYING
5300 Highway 12, Maple Plain, MN 55369
Tel | (952) 346-3900 Fax | (952) 346-3901
www.CarlsonMcCain.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

FIRST NAME: DANIEL J. RIGGS

SIGNATURE:

DATE: 11/18/2014 LICENSE# 49559

Xcel Energy®
NORTHERN STATES POWER COMPANY
SHERCO GENERATING PLANT
BECKER, MINNESOTA

DWN: DJR	DATE: 11/18/14	CHK:	DATE:
ENG: DJR	DATE: 11/18/14	CHK:	DATE:
PM:	DATE:	PROJ. NO:	
APVD:	DATE:	SCALE: SEE DRAWING	

ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

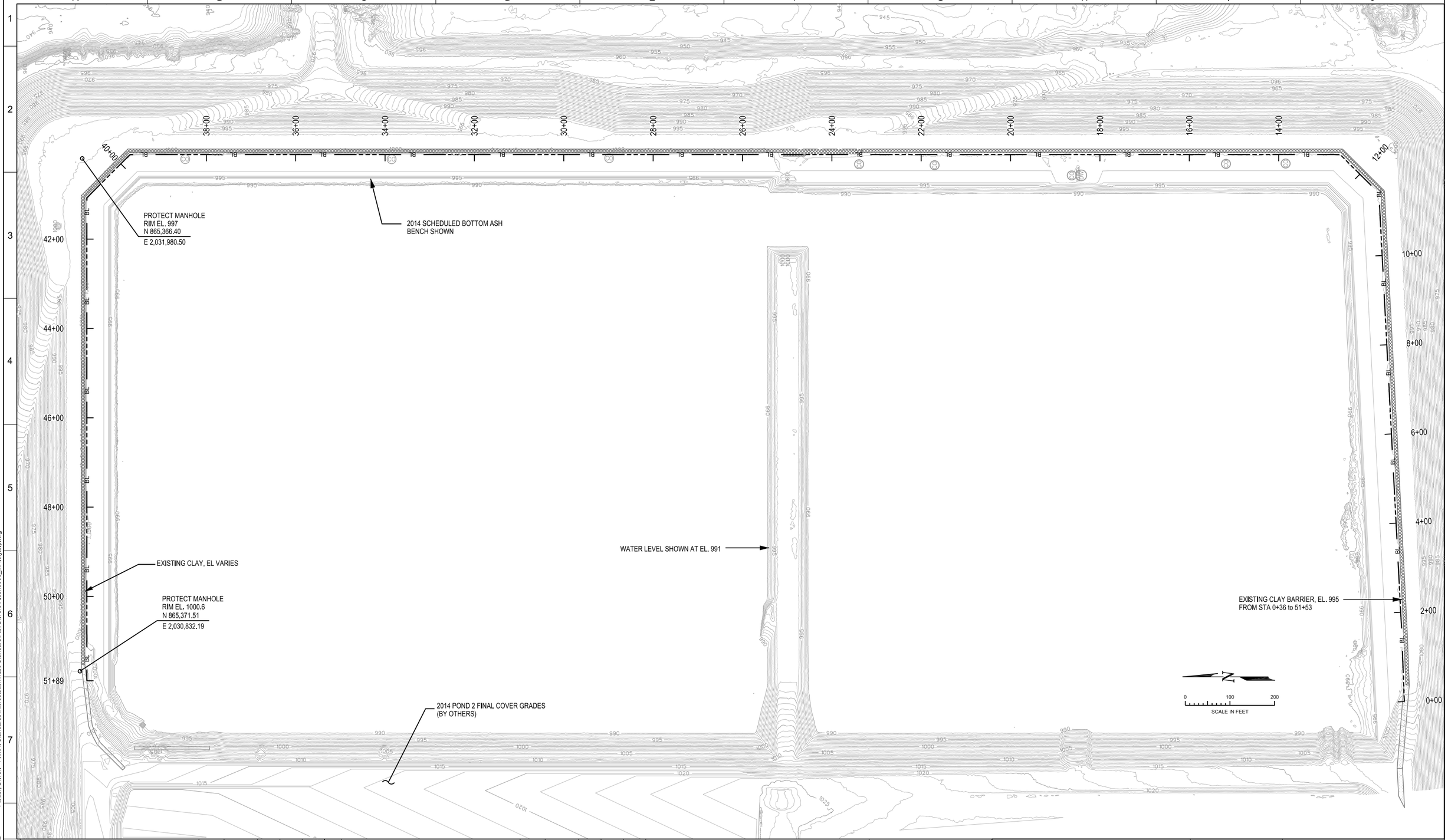
THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

2014 POND 3 VERTICAL EXPANSION

PROJECT LAYOUT

G2

REV ▲



File: P:\Projects\XCEL\3404-04 Pond 3S\2014 Pond 3 Vertical Extension\Drawings\As-Built\2014 Pond 3 VE Const_P1_AB.dgn
Plotter, Driver: P:\MAI Standards\Microstation\Misc Standard\Plot Drivers\Ricoh6000_MAIstyle.pltcfg
Plotted: 11/18/2014 7:36:32 PM

NO	REVISION	ZONE	DATE	BY	CHK	ENG

NO	REVISION	ZONE	DATE	BY	ENG	CHK
A	ISSUED FOR BIDDING		7/23/2014	GDG	DJR	XCEL
0	ISSUED FOR CONSTRUCTION		9/2/2014	GDG	DJR	XCEL
▲	RECORD DRAWINGS		11/18/2014	GDG	DJR	XCEL

Carlson McCain
• ENVIRONMENTAL
• ENGINEERING
• SURVEYING
5300 Highway 12, Maple Plain, MN 55369
Tel | (952) 346-3900 Fax | (952) 346-3901
www.CarlsonMcCain.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

FIRST NAME: DANIEL J. RIGGS

SIGNATURE:

DATE: 11/18/2014 LICENSE# 49559

Xcel Energy®
NORTHERN STATES POWER COMPANY
SHERCO GENERATING PLANT
BECKER, MINNESOTA

DWN: DJR	DATE: 11/18/14	CHK:	DATE:
ENG: DJR	DATE: 11/18/14	CHK:	DATE:
PM:	DATE:	PROJ. NO:	
APVD:	DATE:	SCALE: SEE DRAWING	

THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

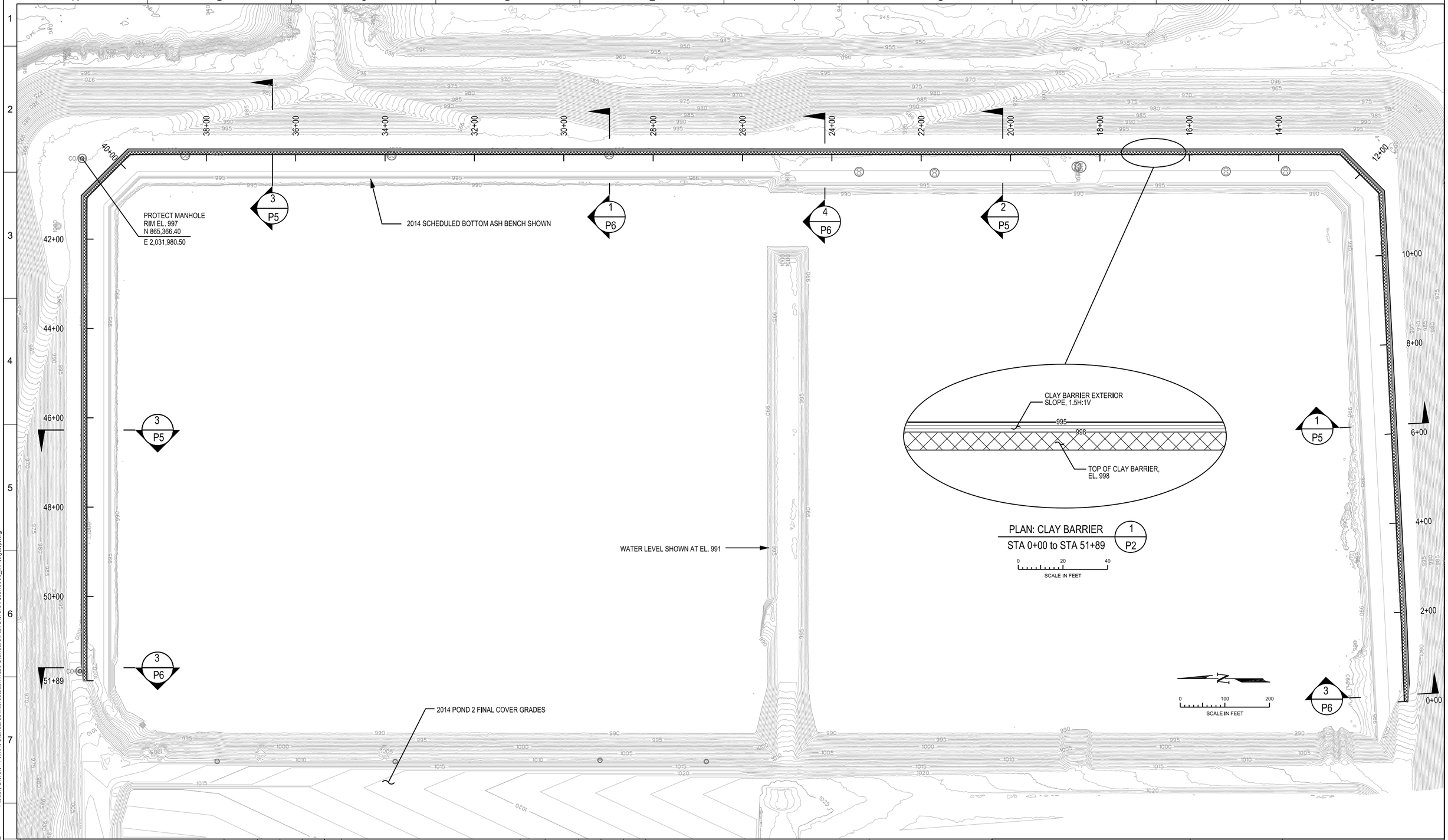
ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

2014 POND 3 VERTICAL EXPANSION

PRE-CONSTRUCTION CONDITIONS

P1

REV ▲



File: P:\Projects\XCEL\3404-04 Pond 3S\2014 Pond 3 Vertical Extension\Drawings\As-Built\2014 Pond 3 VE Const_P2_AB.dgn
Plotter, Driver: P:\MAI Standards\Microstation\Misc Standard\Plot Drivers\Ricoh6000_MAIstyle.pltcfg
Plotted: 11/18/2014 7:37:39 PM

NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	ISSUED FOR BIDDING		7/23/2014	GDG	DJR	XCEL
0	ISSUED FOR CONSTRUCTION		9/2/2014	GDG	DJR	XCEL
▲	RECORD DRAWINGS		11/18/2014	GDG	DJR	XCEL

Carlson McCain
• ENVIRONMENTAL
• ENGINEERING
• SURVEYING
5300 Highway 12, Maple Plain, MN 55369
Tel | (952) 346-3900 Fax | (952) 346-3901
www.CarlsonMcCain.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

FIRST NAME: DANIEL J. RIGGS

SIGNATURE:

DATE: 11/18/2014 LICENSE# 49559

Xcel Energy®
NORTHERN STATES POWER COMPANY
SHERCO GENERATING PLANT
BECKER, MINNESOTA

DWN: DJR	DATE: 11/18/14	CHK:	DATE:
ENG: DJR	DATE: 11/18/14	CHK:	DATE:
PM:	DATE:	PROJ. NO:	
APVD:	DATE:	SCALE: SEE DRAWING	

THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

2014 POND 3 VERTICAL EXPANSION

CLAY BARRIER GRADING PLAN

P2

REV ▲

File: P:\Projects\XCEL\3404-04 Pond 3S\2014 Pond 3 Vertical Extension\Drawings\As-Built\Merged for Xcel\2014 Pond 3 VE Const_P3_AB.dgn
Plotter, Driver: P:\MAI Standards\Microstation\Misc Standard\Plot Drivers\Ricoh6000_MAStyle.plt.cfg
Plotted: 11/20/2014 2:03:21 PM

NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	ISSUED FOR BIDDING		7/23/2014	GDG	DJR	XCEL
0	ISSUED FOR CONSTRUCTION		9/2/2014	GDG	DJR	XCEL
▲	RECORD DRAWINGS		11/18/2014	GDG	DJR	XCEL

Carlson McCain
• ENVIRONMENTAL
• ENGINEERING
• SURVEYING
5300 Highway 12, Maple Plain, MN 55369
Tel | (952) 346-3900 Fax | (952) 346-3901
www.CarlsonMcCain.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
FIRST NAME: DANIEL J. RIGGS
SIGNATURE:
DATE: 11/18/2014 LICENSE# 49559

Xcel Energy®
NORTHERN STATES POWER COMPANY
SHERCO GENERATING PLANT
BECKER, MINNESOTA

DWN: DJR	DATE: 11/18/14	CHK:	DATE:
ENG: DJR	DATE: 11/18/14	CHK:	DATE:
PM:	DATE:	PROJ. NO:	
APVD:	DATE:	SCALE: SEE DRAWING	

THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

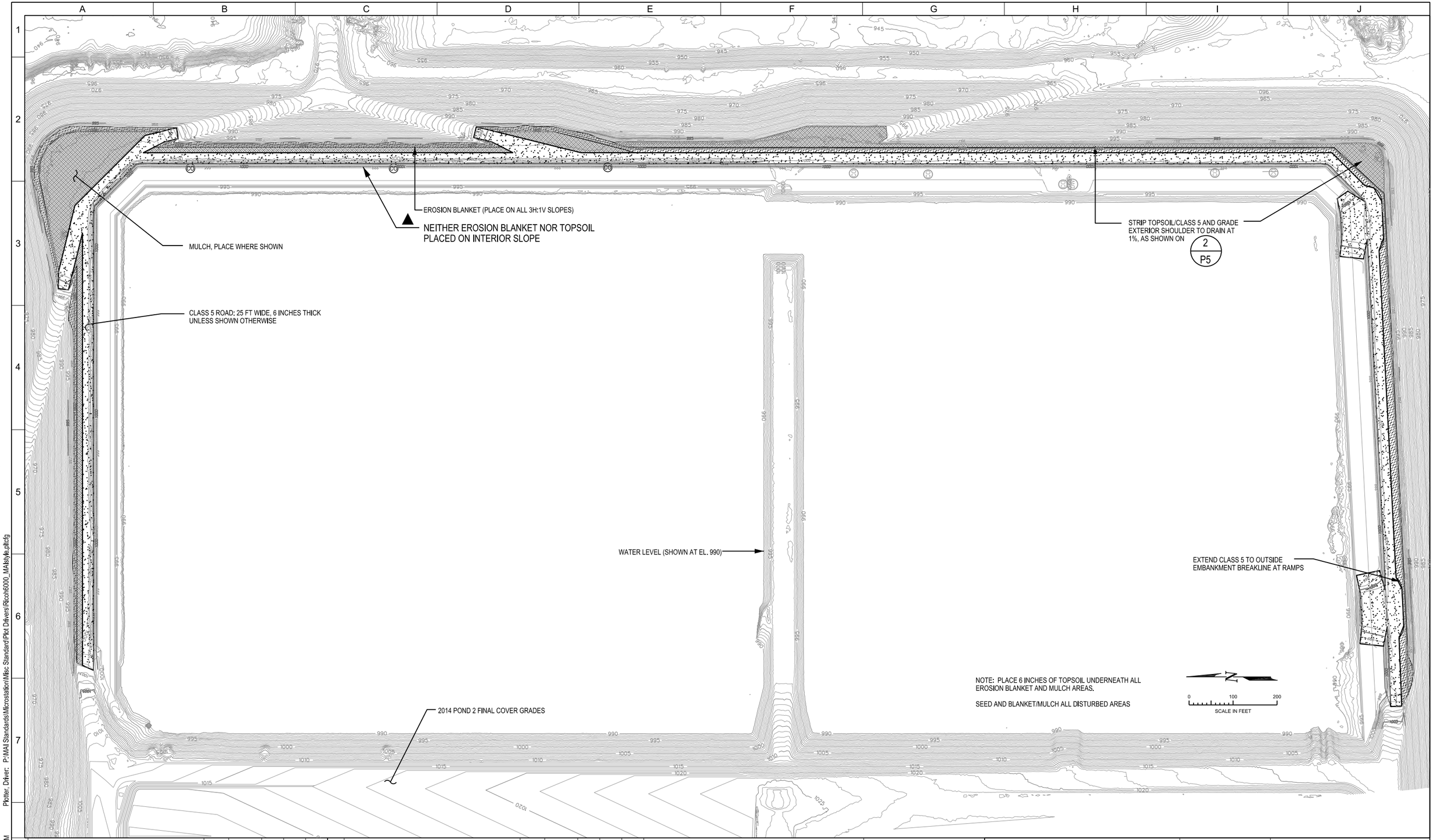
ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

2014 POND 3 VERTICAL EXPANSION

FINISHED GRADING PLAN

P3

REV ▲



File: P:\Projects\XCEL\3404-04 Pond 3S\2014 Pond 3 Vertical Extension\Drawings\As-Built\2014 Pond 3 VE Const_P4_AB.dgn
Plotter, Driver: P:\MAI Standards\Microstation\Misc Standard\Plot Drivers\Ricoh6000_MAIstyle.pltcfg
Plotted: 11/20/2014 2:53:36 PM

NO	REVISION	ZONE	DATE	BY	CHK	ENG

NO	REVISION	ZONE	DATE	BY	ENG	CHK
A	ISSUED FOR BIDDING		7/23/2014	GDG	DJR	XCEL
0	ISSUED FOR CONSTRUCTION		9/2/2014	GDG	DJR	XCEL
▲	RECORD DRAWINGS		11/18/2014	GDG	DJR	XCEL

Carlson McCain
• ENVIRONMENTAL
• ENGINEERING
• SURVEYING
5300 Highway 12, Maple Plain, MN 55369
Tel | (952) 346-3900 Fax | (952) 346-3901
www.CarlsonMcCain.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

FIRST NAME: DANIEL J. RIGGS

SIGNATURE:

DATE: 11/18/2014 LICENSE# 49559

Xcel Energy®
NORTHERN STATES POWER COMPANY
SHERCO GENERATING PLANT
BECKER, MINNESOTA

DWN: DJR	DATE: 11/18/14	CHK:	DATE:
ENG: DJR	DATE: 11/18/14	CHK:	DATE:
PM:	DATE:	PROJ. NO:	
APVD:	DATE:	SCALE: SEE DRAWING	

THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

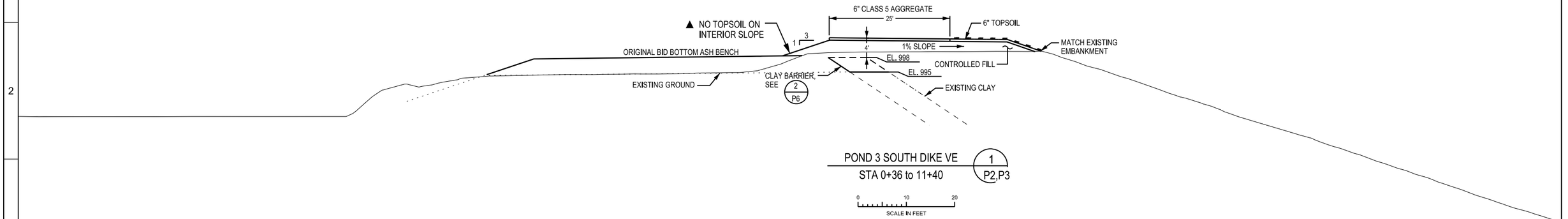
ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

2014 POND 3 VERTICAL EXPANSION

RESTORATION PLAN

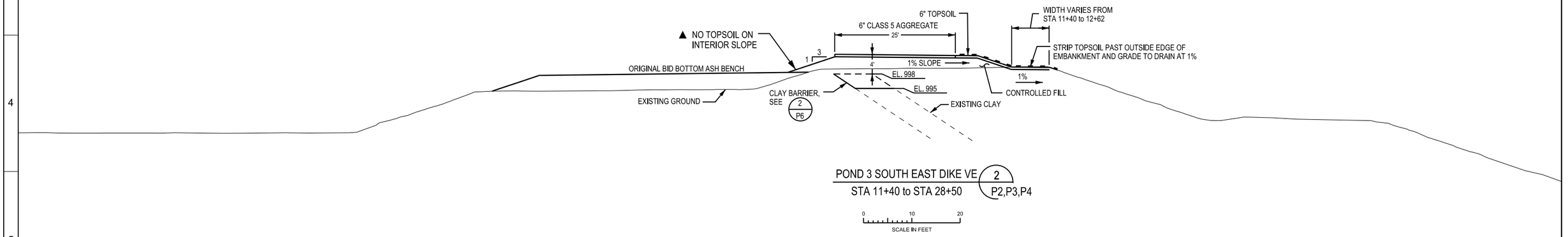
P4

REV ▲



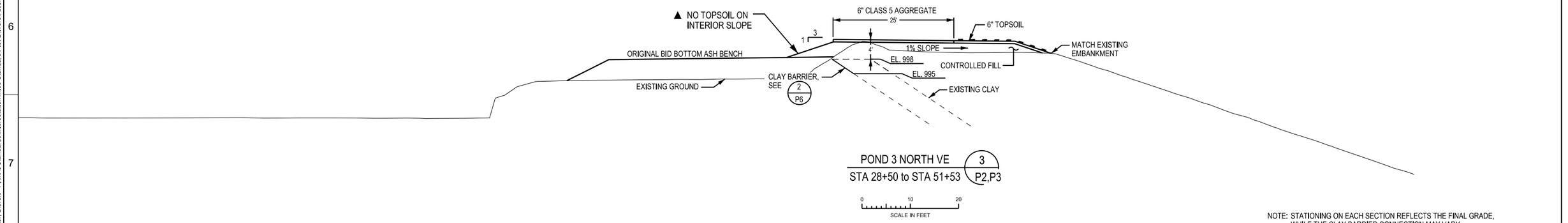
POND 3 SOUTH DIKE VE — 1 — P2,P3
STA 0+36 to 11+40

0 10 20
SCALE IN FEET



POND 3 SOUTH EAST DIKE VE — 2 — P2,P3,P4
STA 11+40 to STA 28+50

0 10 20
SCALE IN FEET



POND 3 NORTH VE — 3 — P2,P3
STA 28+50 to STA 51+53

0 10 20
SCALE IN FEET

NOTE: STATIONING ON EACH SECTION REFLECTS THE FINAL GRADE, WHILE THE CLAY BARRIER CONNECTION MAY VARY. REFER TO SHEET P6 FOR CLAY CONNECTION DETAILS.

NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	ISSUED FOR BIDDING		7/23/2014	GDG	DJR	XCEL
0	ISSUED FOR CONSTRUCTION		9/2/2014	GDG	DJR	XCEL
▲	RECORD DRAWINGS		11/18/2014	GDG	DJR	XCEL

Carlson McCain
• ENVIRONMENTAL
• ENGINEERING
• SURVEYING
5300 Highway 12, Maple Plain, MN 55369
Tel | (952) 346-3900 Fax | (952) 346-3901
www.CarlsonMcCain.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

FIRST NAME: DANIEL J. RIGGS

SIGNATURE:

DATE: 11/18/2014 LICENSE# 49559

Xcel Energy®
NORTHERN STATES POWER COMPANY
SHERCO GENERATING PLANT
BECKER, MINNESOTA

DWN: DJR	DATE: 11/18/14	CHK:	DATE:
ENG: DJR	DATE: 11/18/14	CHK:	DATE:
PM:	DATE:	PROJ. NO:	
APVD:	DATE:	SCALE: SEE DRAWING	

THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

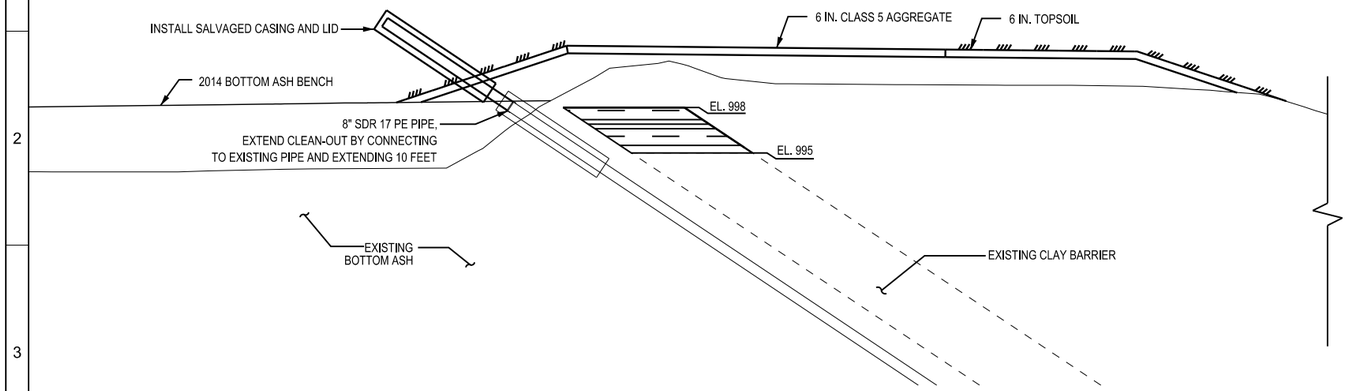
2014 POND 3 VERTICAL EXPANSION

EMBANKMENT SECTIONS

P5

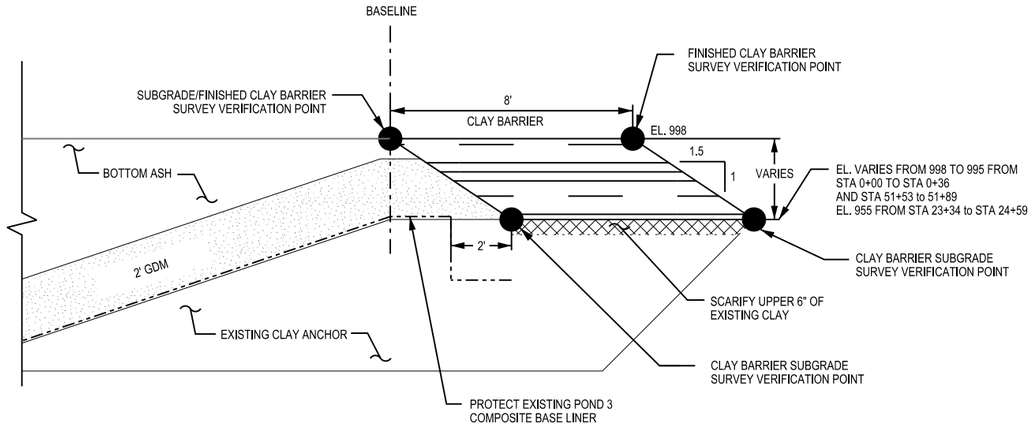
REV ▲

File: P:\Projects\XCEL\3404-04 Pond 3S\2014 Pond 3 Vertical Extension\Drawings\As-Built\2014 Pond 3 VE Const_P5_AB.dgn
Plotter_Driver: P:\MAI Standards\Microstation\Misc Standard\Plot Drivers\Ricoh6000_MAIstyle.pltcfg
Plotted: 11/18/2014 7:31:22 PM



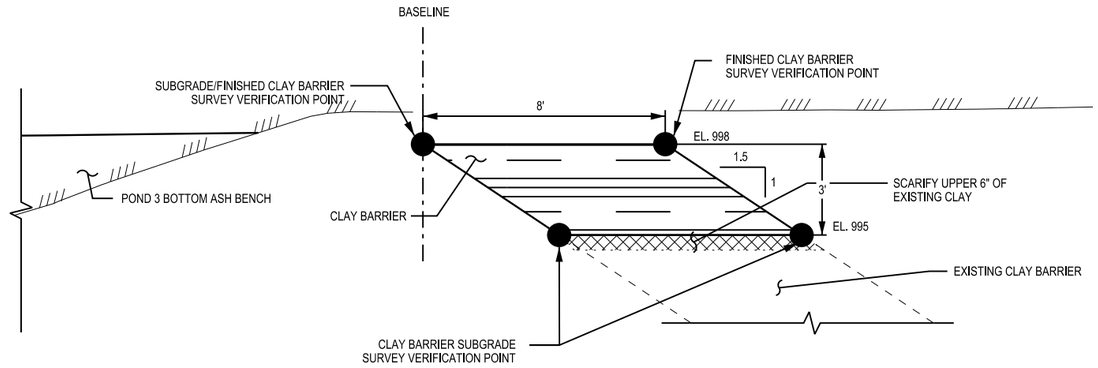
POND 3N CLEANOUT EXTENSION (1 / P3)
3 TOTAL

0 5 10
SCALE IN FEET



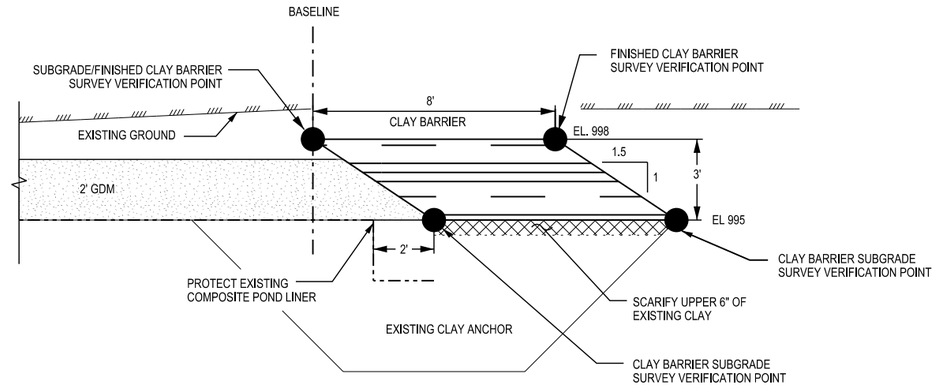
CLAY BARRIER TRANSITION (3 / P2)
STA 0+00 to 0+36 AND STA 51+53 to 51+89

0 2,5 5
SCALE IN FEET



CLAY BARRIER TYP (2 / P5)

0 2,5 5
SCALE IN FEET



POND 3 WEIR CLAY ANCHOR (4 / P2)
STA 23+34 to STA 25+09

0 2,5 5
SCALE IN FEET

File: P:\Projects\XCEL\3404-04 Pond 3S\2014 Pond 3 Vertical Extension\Drawings\As-Built\2014 Pond 3 VE Const_P6_AB.dgn
Plotter_Driver: P:\MAI Standards\Microstation\Misc Standard\Plot Drivers\Ricoh6000_MAIstyle.pltcfg
Plotted: 12/12/2014 3:56:27 PM

NO	REVISION	ZONE	DATE	BY	CHK	ENG
A	ISSUED FOR BIDDING		7/23/2014	GDG	DJR	XCEL
0	ISSUED FOR CONSTRUCTION		9/2/2014	GDG	DJR	XCEL
▲	RECORD DRAWINGS		11/18/2014	GDG	DJR	XCEL

Carlson McCain
• ENVIRONMENTAL
• ENGINEERING
• SURVEYING
5300 Highway 12, Maple Plain, MN 55369
Tel | (952) 346-3900 Fax | (952) 346-3901
www.CarlsonMcCain.com

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
FIRST NAME: DANIEL J. RIGGS
SIGNATURE:
DATE: 11/18/2014 LICENSE# 49559

Xcel Energy®
NORTHERN STATES POWER COMPANY
SHERCO GENERATING PLANT
BECKER, MINNESOTA

DWN: DJR	DATE: 11/18/14	CHK:	DATE:
ENG: DJR	DATE: 11/18/14	CHK:	DATE:
PM:	DATE:	PROJ. NO:	
APVD:	DATE:	SCALE: SEE DRAWING	

THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

ENERGY SUPPLY
ENGINEERING & CONSTRUCTION

2014 POND 3 VERTICAL EXPANSION

CLEANOUT EXTENSION AND
CLAY BARRIER SECTIONS

P6

REV ▲

Appendix B – Construction Photographs

POND 3 2014 BERM ADDITION PROJECT
CONSTRUCTION PHOTOGRAPHS

Photo 1: Clay Pit – Clay Removal – 9/23/14

Photo 2: Clay Pit – Clay Removal – 9/23/14

POND 3 BERM ADDITION PROJECT
CONSTRUCTION PHOTOGRAPHS

Photo 3: Exposing Existing Clay Barrier – Southwest Corner - Looking East – 9/15/14

Photo 4: Scarifying Clay – South Berm Section - Looking East – 9/22/14

POND 3 BERM ADDITION PROJECT
CONSTRUCTION PHOTOGRAPHS

Photo 5: Placing Clay – South Berm Section – Looking West - 9/22/14

Photo 6: Compacting Placed Clay – South Berm Section – 9/22/14

POND 3 BERM ADDITION PROJECT
CONSTRUCTION PHOTOGRAPHS

Photo 7: Grading Placed Clay – South Berm Section – Looking West - 9/22/14

Photo 8: Lifting Outer Clay – Southeast Corner – Looking North – 9/23/14

POND 3 BERM ADDITION PROJECT
CONSTRUCTION PHOTOGRAPHS

Photo 9: In-Place Clay Density Testing – East Berm Section - Looking North - 9/25/14

Photo 10: Watering Placed Clay - 9/26/14

POND 3 BERM ADDITION PROJECT
CONSTRUCTION PHOTOGRAPHS

Photo 11: Clay Thin-Wall Sample Collection (CL TW-1) – Looking East - 9/25/14

Photo 12: Clay Thin-Wall Sample Extraction (CL TW-2) – Looking West - 10/2/14

POND 3 BERM ADDITION PROJECT
CONSTRUCTION PHOTOGRAPHS

Photo 13: Smooth Rolling Top of Final Lift – East Section - 10/1/14

Photo 14: Placing Controlled Fill – South Berm Section - 10/3/14

POND 3 BERM ADDITION PROJECT
CONSTRUCTION PHOTOGRAPHS

Photo 15: Compacting Controlled Fill – South Berm Section - 10/3/14

Photo 16: In-Place Controlled cvFill Density Testing – 10/7/14

POND 3 BERM ADDITION PROJECT
CONSTRUCTION PHOTOGRAPHS

Photo 17: Finished North Berm Section – Looking East - 10/29/14

Photo 18: Finished East Berm Section – Looking South - 10/29/14

Appendix C - Survey Verification Data

Clay Survey Verification Data
Finished Grade Survey Verification Data
Survey Verification Drawing

Clay Survey Verification Data

POND 3 2014 BERM ADDITION - CLAY BARRIER VERIFICATION

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
1	862,399.34	2,030,763.81	998	FIN1	862399.28	2030763.81	999.60		
2	862,407.36	2,030,764.15	998	FIN2	862407.43	2030764.12	999.96	8.16	
3	862,396.31	2,030,801.28	995	SG1	862396.25	2030801.27	995.21		
4	862,400.80	2,030,801.10	998	FIN1	862400.75	2030801.07	998.21		
5	862,404.38	2,030,800.96	995	SG2	862404.42	2030800.97	995.00		
6	862,408.80	2,030,800.79	998	SG3/FIN2	862408.86	2030800.81	998.49	8.11	3.22
7	862,398.27	2,030,851.24	995	SG1	862398.21	2030851.23	995.35		
8	862,402.76	2,030,851.06	998	FIN1	862402.71	2030851.03	998.03		
9	862,406.26	2,030,850.92	995	SG2	862406.32	2030850.98	994.96		
10	862,410.76	2,030,850.75	998	SG3/FIN2	862410.83	2030850.73	998.23	8.13	3.07
11	862,400.23	2,030,901.20	995	SG1	862400.17	2030901.21	995.22		
12	862,404.72	2,030,901.02	998	FIN1	862404.65	2030901.02	998.06		
13	862,408.22	2,030,900.89	995	SG2	862408.28	2030900.89	994.96		
14	862,412.72	2,030,900.71	998	SG3/FIN2	862412.78	2030900.74	998.25	8.13	3.10
15	862,402.36	2,030,951.31	995	SG1	862402.30	2030951.33	995.22		
16	862,406.86	2,030,951.08	998	FIN1	862406.81	2030951.05	998.24		
17	862,410.35	2,030,950.90	995	SG2	862410.42	2030950.90	994.91		
18	862,414.84	2,030,950.66	998	SG3/FIN2	862414.90	2030950.71	998.15	8.10	3.33
19	862,404.95	2,031,001.25	995	SG1	862404.88	2031001.24	995.32		
20	862,409.45	2,031,001.01	998	FIN1	862409.38	2031001.01	998.22		
21	862,412.94	2,031,000.83	995	SG2	862412.98	2031000.84	994.78		
22	862,417.44	2,031,000.60	998	SG3/FIN2	862417.49	2031000.60	998.17	8.12	3.44
23	862,407.55	2,031,051.18	995	SG1	862407.49	2031051.16	995.07		
24	862,412.04	2,031,050.94	998	FIN1	862411.98	2031050.91	998.56		
25	862,415.54	2,031,050.76	995	SG2	862415.59	2031050.79	994.89		
26	862,420.03	2,031,050.53	998	SG3/FIN2	862420.09	2031050.51	998.14	8.12	3.68

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

POND 3 2014 BERM ADDITION - CLAY BARRIER VERIFICATION

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
27	862,410.14	2,031,101.11	995	SG1	862410.08	2031101.12	995.12		
28	862,414.63	2,031,100.88	998	FIN1	862414.58	2031100.89	998.34		
29	862,418.13	2,031,100.70	995	SG2	862418.18	2031100.71	994.88		
30	862,422.62	2,031,100.46	998	SG3/FIN2	862422.68	2031100.47	998.41	8.11	3.46
31	862,412.73	2,031,151.04	995	SG1	862412.67	2031151.07	995.37		
32	862,417.23	2,031,150.81	998	FIN1	862417.17	2031150.81	998.28		
33	862,420.72	2,031,150.63	995	SG2	862420.79	2031150.64	994.85		
34	862,425.22	2,031,150.40	998	SG3/FIN2	862425.27	2031150.40	998.57	8.11	3.43
35	862,415.33	2,031,200.98	995	SG1	862415.28	2031200.97	995.25		
36	862,419.82	2,031,200.74	998	FIN1	862419.75	2031200.73	998.06		
37	862,423.31	2,031,200.56	995	SG2	862423.38	2031200.58	994.80		
38	862,427.81	2,031,200.33	998	SG3/FIN2	862427.86	2031200.33	998.34	8.12	3.26
39	862,417.92	2,031,250.91	995	SG1	862417.87	2031250.93	995.03		
40	862,422.41	2,031,250.68	998	FIN1	862422.35	2031250.68	998.16		
41	862,425.91	2,031,250.49	995	SG2	862425.96	2031250.46	994.86		
42	862,430.40	2,031,250.26	998	SG3/FIN2	862430.46	2031250.28	998.65	8.11	3.29
43	862,420.51	2,031,300.84	995	SG1	862420.44	2031300.85	995.33		
44	862,425.01	2,031,300.61	998	FIN1	862424.94	2031300.60	998.12		
45	862,428.50	2,031,300.43	995	SG2	862428.57	2031300.44	994.83		
46	862,432.99	2,031,300.19	998	SG3/FIN2	862433.05	2031300.21	998.35	8.12	3.29
47	862,423.10	2,031,350.77	995	SG1	862423.05	2031350.76	995.13		
48	862,427.60	2,031,350.54	998	FIN1	862427.54	2031350.54	998.02		
49	862,431.09	2,031,350.36	995	SG2	862431.16	2031350.37	994.85		
50	862,435.59	2,031,350.13	998	SG3/FIN2	862435.65	2031350.13	998.46	8.12	3.17

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

POND 3 2014 BERM ADDITION - CLAY BARRIER VERIFICATION

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
51	862,425.70	2,031,400.71	995	SG1	862425.65	2031400.70	995.34		
52	862,430.19	2,031,400.47	998	FIN1	862430.13	2031400.50	998.33		
53	862,433.69	2,031,400.29	995	SG2	862433.75	2031400.26	994.74		
54	862,438.18	2,031,400.06	998	SG3/FIN2	862438.23	2031400.05	998.53	8.12	3.59
55	862,428.29	2,031,450.64	995	SG1	862428.23	2031450.67	995.16		
56	862,432.78	2,031,450.41	998	FIN1	862432.72	2031450.43	998.17		
57	862,436.28	2,031,450.22	995	SG2	862436.35	2031450.22	994.86		
58	862,440.77	2,031,449.99	998	SG3/FIN2	862440.83	2031450.00	998.59	8.12	3.30
59	862,430.88	2,031,500.57	995	SG1	862430.82	2031500.57	995.55		
60	862,435.38	2,031,500.34	998	FIN1	862435.32	2031500.34	998.10		
61	862,438.87	2,031,500.16	995	SG2	862438.93	2031500.16	994.90		
62	862,443.37	2,031,499.92	998	SG3/FIN2	862443.43	2031499.92	998.17	8.11	3.19
63	862,433.48	2,031,550.51	995	SG1	862433.42	2031550.53	995.34		
64	862,437.97	2,031,550.27	998	FIN1	862437.92	2031550.27	998.22		
65	862,441.46	2,031,550.09	995	SG2	862441.53	2031550.08	994.93		
66	862,445.96	2,031,549.86	998	SG3/FIN2	862446.01	2031549.87	998.53	8.10	3.30
67	862,436.07	2,031,600.44	995	SG1	862436.02	2031600.44	995.52		
68	862,440.56	2,031,600.20	998	FIN1	862440.50	2031600.20	998.07		
69	862,444.06	2,031,600.02	995	SG2	862444.07	2031600.05	994.92		
70	862,448.55	2,031,599.79	998	SG3/FIN2	862448.61	2031599.79	998.50	8.13	3.15
71	862,438.66	2,031,650.37	995	SG1	862438.60	2031650.33	995.23		
72	862,443.15	2,031,650.14	998	FIN1	862443.09	2031650.11	998.13		
73	862,446.65	2,031,649.96	995	SG2	862446.72	2031649.97	994.91		
74	862,451.14	2,031,649.72	998	SG3/FIN2	862451.19	2031649.73	998.32	8.11	3.22

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

POND 3 2014 BERM ADDITION - CLAY BARRIER VERIFICATION

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
75	862,441.25	2,031,700.30	995	SG1	862441.19	2031700.28	995.36		
76	862,445.75	2,031,700.07	998	FIN1	862445.69	2031700.06	998.12		
77	862,449.24	2,031,699.89	995	SG2	862449.31	2031699.90	994.86		
78	862,453.74	2,031,699.66	998	SG3/FIN2	862453.80	2031699.66	998.39	8.12	3.27
79	862,443.85	2,031,750.24	995	SG1	862443.79	2031750.21	995.44		
80	862,448.34	2,031,750.00	998	FIN1	862448.29	2031750.00	998.00		
81	862,451.84	2,031,749.82	995	SG2	862451.90	2031749.84	994.95		
82	862,456.33	2,031,749.59	998	SG3/FIN2	862456.39	2031749.59	998.26	8.10	3.05
83	862,446.44	2,031,800.17	995	SG1	862446.38	2031800.18	995.55		
84	862,450.93	2,031,799.94	998	FIN1	862450.87	2031799.94	998.06		
85	862,454.43	2,031,799.75	995	SG2	862454.49	2031799.75	994.87		
86	862,458.92	2,031,799.52	998	SG3/FIN2	862458.97	2031799.53	998.32	8.11	3.19
87	862,449.03	2,031,850.10	995	SG1	862448.98	2031850.07	995.39		
88	862,453.53	2,031,849.87	998	FIN1	862453.46	2031849.85	998.42		
89	862,457.02	2,031,849.69	995	SG2	862457.07	2031849.70	994.85		
90	862,461.52	2,031,849.45	998	SG3/FIN2	862461.58	2031849.46	998.45	8.13	3.57
91	862,452.03	2,031,907.88	995	SG1	862451.96	2031907.94	995.35		
92	862,456.44	2,031,905.92	998	FIN1	862456.38	2031905.97	998.07		
93	862,459.86	2,031,904.40	995	SG2	862459.92	2031904.35	994.79		
94	862,464.27	2,031,902.44	998	SG3/FIN2	862464.34	2031902.39	998.27	8.73	3.28
95	862,490.78	2,031,946.63	995	SG1	862490.71	2031946.68	995.49		
96	862,493.96	2,031,943.45	998	FIN1	862493.90	2031943.50	998.47		
97	862,496.44	2,031,940.97	995	SG2	862496.52	2031940.91	994.76		
98	862,499.62	2,031,937.79	998	SG3/FIN2	862499.69	2031937.74	998.54	8.17	3.71
99	862,526.14	2,031,981.99	995	SG1	862526.08	2031982.05	995.15		
100	862,529.32	2,031,978.80	998	FIN1	862529.25	2031978.87	998.31		
101	862,531.80	2,031,976.33	995	SG2	862531.87	2031976.27	994.83		
102	862,534.98	2,031,973.15	998	SG3/FIN2	862535.03	2031973.09	998.25	8.18	3.48

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
103	862,545.75	2,032,001.60	995	SG1	862545.70	2032001.66	995.67		
104	862,547.61	2,031,997.10	998	FIN1	862547.56	2031997.18	998.19		
105	862,549.06	2,031,993.60	995	SG2	862549.12	2031993.55	994.83		
106	862,550.93	2,031,989.10	998	SG3/FIN2	862550.99	2031989.05	998.29	8.82	3.37
107	862,600.93	2,032,001.60	995	SG1	862600.92	2032001.65	995.39		
108	862,600.93	2,031,997.10	998	FIN1	862600.91	2031997.16	998.10		
109	862,600.93	2,031,993.60	995	SG2	862600.97	2031993.53	994.68		
110	862,600.93	2,031,989.10	998	SG3/FIN2	862600.91	2031989.04	998.13	8.11	3.42
111	862,650.93	2,032,001.60	995	SG1	862650.92	2032001.66	995.25		
112	862,650.93	2,031,997.10	998	FIN1	862650.96	2031997.15	998.22		
113	862,650.93	2,031,993.60	995	SG2	862650.93	2031993.53	994.83		
114	862,650.93	2,031,989.10	998	SG3/FIN2	862650.92	2031989.03	998.42	8.12	3.39
115	862,700.93	2,032,001.60	995	SG1	862700.93	2032001.66	995.34		
116	862,700.93	2,031,997.10	998	FIN1	862700.92	2031997.16	998.23		
117	862,700.93	2,031,993.60	995	SG2	862700.93	2031993.52	994.85		
118	862,700.93	2,031,989.10	998	SG3/FIN2	862700.95	2031989.04	998.30	8.12	3.38
119	862,750.93	2,032,001.60	995	SG1	862750.94	2032001.66	995.20		
120	862,750.93	2,031,997.10	998	FIN1	862750.93	2031997.16	998.22		
121	862,750.93	2,031,993.60	995	SG2	862750.93	2031993.55	994.91		
122	862,750.93	2,031,989.10	998	SG3/FIN2	862750.93	2031989.05	998.32	8.11	3.31
123	862,800.93	2,032,001.60	995	SG1	862800.94	2032001.66	995.36		
124	862,800.93	2,031,997.10	998	FIN1	862800.90	2031997.16	998.05		
125	862,800.93	2,031,993.60	995	SG2	862800.92	2031993.56	994.88		
126	862,800.93	2,031,989.10	998	SG3/FIN2	862800.94	2031989.05	998.08	8.11	3.17
127	862,850.93	2,032,001.60	995	SG1	862850.93	2032001.66	995.31		
128	862,850.93	2,031,997.10	998	FIN1	862850.92	2031997.16	998.18		
129	862,850.93	2,031,993.60	995	SG2	862850.95	2031993.54	994.86		
130	862,850.93	2,031,989.10	998	SG3/FIN2	862850.91	2031989.05	998.06	8.11	3.32

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
131	862,900.93	2,032,001.60	995	SG1	862900.95	2032001.65	995.40		
132	862,900.93	2,031,997.10	998	FIN1	862900.92	2031997.15	998.27		
133	862,900.93	2,031,993.60	995	SG2	862900.93	2031993.55	994.88		
134	862,900.93	2,031,989.10	998	SG3/FIN2	862900.92	2031989.04	998.20	8.11	3.39
135	862,950.93	2,032,001.60	995	SG1	862950.89	2032001.66	995.57		
136	862,950.93	2,031,997.10	998	FIN1	862950.92	2031997.16	998.38		
137	862,950.93	2,031,993.60	995	SG2	862950.92	2031993.53	994.81		
138	862,950.93	2,031,989.10	998	SG3/FIN2	862950.94	2031989.05	998.35	8.12	3.57
139	863,000.93	2,032,001.60	995	SG1	863000.93	2032001.65	995.77		
140	863,000.93	2,031,997.10	998	FIN1	863000.90	2031997.16	998.37		
141	863,000.93	2,031,993.60	995	SG2	863000.94	2031993.53	994.86		
142	863,000.93	2,031,989.10	998	SG3/FIN2	863000.93	2031989.05	998.34	8.11	3.51
143	863,050.93	2,032,001.60	995	SG1	863050.95	2032001.66	995.56		
144	863,050.93	2,031,997.10	998	FIN1	863050.95	2031997.15	998.51		
145	863,050.93	2,031,993.60	995	SG2	863050.89	2031993.54	994.89		
146	863,050.93	2,031,989.10	998	SG3/FIN2	863050.94	2031989.04	998.37	8.11	3.62
147	863,100.93	2,032,001.60	995	SG1	863100.93	2032001.65	995.42		
148	863,100.93	2,031,997.10	998	FIN1	863100.95	2031997.16	998.25		
149	863,100.93	2,031,993.60	995	SG2	863100.94	2031993.55	994.87		
150	863,100.93	2,031,989.10	998	SG3/FIN2	863100.94	2031989.03	998.47	8.13	3.38
151	863,150.93	2,032,001.60	995	SG1	863150.92	2032001.66	995.41		
152	863,150.93	2,031,997.10	998	FIN1	863150.95	2031997.16	998.43		
153	863,150.93	2,031,993.60	995	SG2	863150.89	2031993.54	994.89		
154	863,150.93	2,031,989.10	998	SG3/FIN2	863150.93	2031989.04	998.48	8.11	3.54
155	863,200.93	2,032,001.60	995	SG1	863200.94	2032001.67	995.40		
156	863,200.93	2,031,997.10	998	FIN1	863200.91	2031997.17	998.48		
157	863,200.93	2,031,993.60	995	SG2	863200.95	2031993.55	994.88		
158	863,200.93	2,031,989.10	998	SG3/FIN2	863200.92	2031989.04	998.56	8.13	3.61

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
159	863,250.93	2,032,001.60	995	SG1	863250.91	2032001.66	995.27		
160	863,250.93	2,031,997.10	998	FIN1	863250.92	2031997.16	998.25		
161	863,250.93	2,031,993.60	995	SG2	863250.92	2031993.54	994.91		
162	863,250.93	2,031,989.10	998	SG3/FIN2	863250.93	2031989.03	998.38	8.13	3.34
163	863,300.93	2,032,001.60	995	SG1	863300.94	2032001.66	995.74		
164	863,300.93	2,031,997.10	998	FIN1	863300.90	2031997.16	998.36		
165	863,300.93	2,031,993.60	995	SG2	863300.94	2031993.53	994.90		
166	863,300.93	2,031,989.10	998	SG3/FIN2	863300.94	2031989.03	998.41	8.12	3.46
167	863,350.93	2,032,001.60	995	SG1	863350.94	2032001.66	995.49		
168	863,350.93	2,031,997.10	998	FIN1	863350.93	2031997.15	998.41		
169	863,350.93	2,031,993.60	995	SG2	863350.90	2031993.55	994.93		
170	863,350.93	2,031,989.10	998	SG3/FIN2	863350.91	2031989.04	998.47	8.11	3.49
171	863,400.93	2,032,001.60	995	SG1	863400.93	2032001.66	995.41		
172	863,400.93	2,031,997.10	998	FIN1	863400.95	2031997.16	998.30		
173	863,400.93	2,031,993.60	995	SG2	863400.94	2031993.53	994.91		
174	863,400.93	2,031,989.10	998	SG3/FIN2	863400.93	2031989.04	998.43	8.12	3.39
175	863,450.93	2,032,001.60	995	SG1	863450.91	2032001.65	995.27		
176	863,450.93	2,031,997.10	998	FIN1	863450.91	2031997.15	998.21		
177	863,450.93	2,031,993.60	995	SG2	863450.96	2031993.54	995.00		
178	863,450.93	2,031,989.10	998	SG3/FIN2	863450.95	2031989.05	998.53	8.11	3.21
179	863,500.93	2,032,001.60	995	SG1	863500.94	2032001.65	995.55		
180	863,500.93	2,031,997.10	998	FIN1	863500.95	2031997.16	998.31		
181	863,500.93	2,031,993.60	995	SG2	863500.92	2031993.55	994.87		
182	863,500.93	2,031,989.10	998	SG3/FIN2	863500.94	2031989.03	998.32	8.13	3.43
183	863,550.93	2,032,001.60	995	SG1	863550.98	2032001.66	995.90		
184	863,550.93	2,031,997.10	998	FIN1	863550.91	2031997.15	998.46		
185	863,550.93	2,031,993.60	995	SG2	863550.95	2031993.54	994.96		
186	863,550.93	2,031,989.10	998	SG3/FIN2	863550.93	2031989.04	998.44	8.11	3.50

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
187	863,600.93	2,032,001.60	995	SG1	863600.93	2032001.66	995.66		
188	863,600.93	2,031,997.10	998	FIN1	863600.90	2031997.17	998.35		
189	863,600.93	2,031,993.60	995	SG2	863600.88	2031993.55	994.99		
190	863,600.93	2,031,989.10	998	SG3/FIN2	863600.94	2031989.05	998.37	8.12	3.35
191	863,650.93	2,032,001.60	995	SG1	863650.95	2032001.65	995.29		
192	863,650.93	2,031,997.10	998	FIN1	863650.95	2031997.16	998.51		
193	863,650.93	2,031,993.60	995	SG2	863650.92	2031993.52	994.91		
194	863,650.93	2,031,989.10	998	SG3/FIN2	863650.89	2031989.05	998.80	8.12	3.60
195	863,700.93	2,032,001.60	995	SG1	863700.94	2032001.66	995.77		
196	863,700.93	2,031,997.10	998	FIN1	863700.92	2031997.17	998.28		
197	863,700.93	2,031,993.60	995	SG2	863700.92	2031993.56	994.92		
198	863,700.93	2,031,989.10	998	SG3/FIN2	863700.94	2031989.05	998.36	8.12	3.35
199	863,750.93	2,032,001.60	995	SG1	863750.94	2032001.66	995.45		
200	863,750.93	2,031,997.10	998	FIN1	863750.94	2031997.16	998.27		
201	863,750.93	2,031,993.60	995	SG2	863750.92	2031993.55	994.97		
202	863,750.93	2,031,989.10	998	SG3/FIN2	863750.93	2031989.04	998.42	8.12	3.29
203	863,800.93	2,032,001.60	995	SG1	863800.94	2032001.66	995.51		
204	863,800.93	2,031,997.10	998	FIN1	863800.96	2031997.17	998.52		
205	863,800.93	2,031,993.60	995	SG2	863800.95	2031993.54	994.99		
206	863,800.93	2,031,989.10	998	SG3/FIN2	863800.92	2031989.04	998.86	8.13	3.53
207	863,850.93	2,032,001.60	995	SG1	863850.94	2032001.66	995.82		
208	863,850.93	2,031,997.10	998	FIN1	863850.96	2031997.15	998.46		
209	863,850.93	2,031,993.60	995	SG2	863850.93	2031993.54	994.97		
210	863,850.93	2,031,989.10	998	SG3/FIN2	863850.95	2031989.04	998.59	8.12	3.49
211	863,900.93	2,032,001.60	995	SG1	863900.93	2032001.66	995.34		
212	863,900.93	2,031,997.10	998	FIN1	863900.95	2031997.15	998.32		
213	863,900.93	2,031,993.60	995	SG2	863900.94	2031993.54	995.48		
214	863,900.93	2,031,989.10	998	SG3/FIN2	863900.90	2031989.04	998.65	8.11	2.85

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
215	863,950.93	2,032,001.60	995	SG1	863950.90	2032001.65	995.68		
216	863,950.93	2,031,997.10	998	FIN1	863950.94	2031997.17	998.29		
217	863,950.93	2,031,993.60	995	SG2	863950.91	2031993.57	995.38		
218	863,950.93	2,031,989.10	998	SG3/FIN2	863950.95	2031989.04	998.77	8.13	2.91
219	864,000.93	2,032,001.60	995	SG1	864000.91	2032001.65	995.67		
220	864,000.93	2,031,997.10	998	FIN1	864000.93	2031997.15	998.18		
221	864,000.93	2,031,993.60	995	SG2	864000.95	2031993.55	995.26		
222	864,000.93	2,031,989.10	998	SG3/FIN2	864000.95	2031989.04	998.53	8.12	2.91
223	864,050.93	2,032,001.60	995	SG1	864050.92	2032001.65	995.68		
224	864,050.93	2,031,997.10	998	FIN1	864050.92	2031997.16	998.38		
225	864,050.93	2,031,993.60	995	SG2	864050.91	2031993.56	995.31		
226	864,050.93	2,031,989.10	998	SG3/FIN2	864050.94	2031989.04	998.71	8.12	3.08
227	864,100.93	2,032,001.60	995	SG1	864100.95	2032001.66	995.92		
228	864,100.93	2,031,997.10	998	FIN1	864100.94	2031997.16	998.41		
229	864,100.93	2,031,993.60	995	SG2	864100.95	2031993.54	995.13		
230	864,100.93	2,031,989.10	998	SG3/FIN2	864100.94	2031989.05	998.65	8.12	3.28
231	864,150.93	2,032,001.60	995	SG1	864150.95	2032001.67	995.51		
232	864,150.93	2,031,997.10	998	FIN1	864150.94	2031997.16	998.36		
233	864,150.93	2,031,993.60	995	SG2	864150.91	2031993.53	995.39		
234	864,150.93	2,031,989.10	998	SG3/FIN2	864150.95	2031989.03	998.57	8.13	2.97
235	864,200.93	2,032,001.60	995	SG1	864200.94	2032001.65	995.41		
236	864,200.93	2,031,997.10	998	FIN1	864200.93	2031997.16	998.20		
237	864,200.93	2,031,993.60	995	SG2	864200.92	2031993.53	995.25		
238	864,200.93	2,031,989.10	998	SG3/FIN2	864200.91	2031989.04	998.25	8.11	2.95
239	864,250.93	2,032,001.60	995	SG1	864250.92	2032001.66	995.93		
240	864,250.93	2,031,997.10	998	FIN1	864250.95	2031997.16	998.22		
241	864,250.93	2,031,993.60	995	SG2	864250.96	2031993.55	994.94		
242	864,250.93	2,031,989.10	998	SG3/FIN2	864250.95	2031989.04	998.35	8.12	3.28

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
243	864,300.93	2,032,001.60	995	SG1	864300.95	2032001.65	995.55		
244	864,300.93	2,031,997.10	998	FIN1	864300.94	2031997.16	998.19		
245	864,300.93	2,031,993.60	995	SG2	864300.90	2031993.53	995.00		
246	864,300.93	2,031,989.10	998	SG3/FIN2	864300.89	2031989.05	998.19	8.11	3.19
247	864,350.93	2,032,001.60	995	SG1	864350.96	2032001.66	995.27		
248	864,350.93	2,031,997.10	998	FIN1	864350.90	2031997.16	998.33		
249	864,350.93	2,031,993.60	995	SG2	864350.91	2031993.52	995.31		
250	864,350.93	2,031,989.10	998	SG3/FIN2	864350.95	2031989.03	998.71	8.13	3.02
251	864,400.93	2,032,001.60	995	SG1	864400.93	2032001.66	995.61		
252	864,400.93	2,031,997.10	998	FIN1	864400.95	2031997.16	998.19		
253	864,400.93	2,031,993.60	995	SG2	864400.92	2031993.53	995.34		
254	864,400.93	2,031,989.10	998	SG3/FIN2	864400.94	2031989.04	998.25	8.11	2.85
255	864,450.93	2,032,001.60	995	SG1	864450.92	2032001.66	995.75		
256	864,450.93	2,031,997.10	998	FIN1	864450.93	2031997.16	998.19		
257	864,450.93	2,031,993.60	995	SG2	864450.91	2031993.53	995.53		
258	864,450.93	2,031,989.10	998	SG3/FIN2	864450.93	2031989.04	998.42	8.12	2.66
259	864,500.93	2,032,001.60	995	SG1	864500.95	2032001.67	995.60		
260	864,500.93	2,031,997.10	998	FIN1	864500.94	2031997.17	998.07		
261	864,500.93	2,031,993.60	995	SG2	864500.94	2031993.54	995.50		
262	864,500.93	2,031,989.10	998	SG3/FIN2	864500.92	2031989.03	998.37	8.14	2.57
263	864,550.93	2,032,001.60	995	SG1	864550.91	2032001.65	995.21		
264	864,550.93	2,031,997.10	998	FIN1	864550.91	2031997.16	998.54		
265	864,550.93	2,031,993.60	995	SG2	864550.95	2031993.54	995.52		
266	864,550.93	2,031,989.10	998	SG3/FIN2	864550.92	2031989.03	998.50	8.13	3.02
267	864,600.93	2,032,001.60	995	SG1	864600.92	2032001.67	995.12		
268	864,600.93	2,031,997.10	998	FIN1	864600.93	2031997.16	998.37		
269	864,600.93	2,031,993.60	995	SG2	864600.95	2031993.54	995.50		
270	864,600.93	2,031,989.10	998	SG3/FIN2	864600.91	2031989.04	998.47	8.12	2.86

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
271	864,650.93	2,032,001.60	995	SG1	864650.94	2032001.66	995.40		
272	864,650.93	2,031,997.10	998	FIN1	864650.93	2031997.16	998.15		
273	864,650.93	2,031,993.60	995	SG2	864650.93	2031993.53	995.46		
274	864,650.93	2,031,989.10	998	SG3/FIN2	864650.94	2031989.04	998.24	8.12	2.69
275	864,700.93	2,032,001.60	995	SG1	864700.95	2032001.66	995.37		
276	864,700.93	2,031,997.10	998	FIN1	864700.95	2031997.16	998.08		
277	864,700.93	2,031,993.60	995	SG2	864700.91	2031993.54	995.42		
278	864,700.93	2,031,989.10	998	SG3/FIN2	864700.92	2031989.04	998.39	8.12	2.66
279	864,750.93	2,032,001.60	995	SG1	864750.95	2032001.66	995.62		
280	864,750.93	2,031,997.10	998	FIN1	864750.94	2031997.15	998.20		
281	864,750.93	2,031,993.60	995	SG2	864750.92	2031993.54	995.31		
282	864,750.93	2,031,989.10	998	SG3/FIN2	864750.93	2031989.05	998.44	8.11	2.89
283	864,800.93	2,032,001.60	995	SG1	864800.92	2032001.66	995.47		
284	864,800.93	2,031,997.10	998	FIN1	864800.90	2031997.16	998.21		
285	864,800.93	2,031,993.60	995	SG2	864800.94	2031993.54	995.47		
286	864,800.93	2,031,989.10	998	SG3/FIN2	864800.90	2031989.04	998.31	8.12	2.74
287	864,850.93	2,032,001.60	995	SG1	864850.94	2032001.66	995.78		
288	864,850.93	2,031,997.10	998	FIN1	864850.95	2031997.15	998.36		
289	864,850.93	2,031,993.60	995	SG2	864850.94	2031993.54	995.45		
290	864,850.93	2,031,989.10	998	SG3/FIN2	864850.95	2031989.04	998.39	8.11	2.90
291	864,900.93	2,032,001.60	995	SG1	864900.93	2032001.66	995.38		
292	864,900.93	2,031,997.10	998	FIN1	864900.94	2031997.16	998.12		
293	864,900.93	2,031,993.60	995	SG2	864900.92	2031993.55	995.33		
294	864,900.93	2,031,989.10	998	SG3/FIN2	864900.94	2031989.05	998.10	8.11	2.78
295	864,950.93	2,032,001.60	995	SG1	864950.92	2032001.66	995.39		
296	864,950.93	2,031,997.10	998	FIN1	864950.93	2031997.15	998.24		
297	864,950.93	2,031,993.60	995	SG2	864950.93	2031993.55	995.29		
298	864,950.93	2,031,989.10	998	SG3/FIN2	864950.93	2031989.04	998.40	8.11	2.95

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
299	865,000.93	2,032,001.60	995	SG1	865000.94	2032001.66	995.53		
300	865,000.93	2,031,997.10	998	FIN1	865000.93	2031997.16	998.30		
301	865,000.93	2,031,993.60	995	SG2	865000.91	2031993.55	995.37		
302	865,000.93	2,031,989.10	998	SG3/FIN2	865000.90	2031989.03	998.46	8.12	2.93
303	865,050.93	2,032,001.60	995	SG1	865050.92	2032001.66	995.07		
304	865,050.93	2,031,997.10	998	FIN1	865050.94	2031997.16	998.29		
305	865,050.93	2,031,993.60	995	SG2	865050.94	2031993.54	995.33		
306	865,050.93	2,031,989.10	998	SG3/FIN2	865050.92	2031989.04	998.63	8.12	2.96
307	865,100.93	2,032,001.60	995	SG1	865100.94	2032001.66	995.74		
308	865,100.93	2,031,997.10	998	FIN1	865100.93	2031997.15	998.31		
309	865,100.93	2,031,993.60	995	SG2	865100.92	2031993.55	995.10		
310	865,100.93	2,031,989.10	998	SG3/FIN2	865100.93	2031989.04	998.61	8.11	3.21
311	865,150.93	2,032,001.60	995	SG1	865150.94	2032001.65	995.44		
312	865,150.93	2,031,997.10	998	FIN1	865150.93	2031997.15	998.31		
313	865,150.93	2,031,993.60	995	SG2	865150.92	2031993.54	994.99		
314	865,150.93	2,031,989.10	998	SG3/FIN2	865150.93	2031989.05	998.36	8.11	3.32
315	865,200.93	2,032,001.60	995	SG1	865200.93	2032001.66	995.84		
316	865,200.93	2,031,997.10	998	FIN1	865200.93	2031997.16	998.35		
317	865,200.93	2,031,993.60	995	SG2	865200.93	2031993.54	994.96		
318	865,200.93	2,031,989.10	998	SG3/FIN2	865200.95	2031989.04	998.45	8.12	3.38
319	865,264.35	2,032,001.60	995	SG1	865264.41	2032001.66	995.69		
320	865,262.49	2,031,997.10	998	FIN1	865262.55	2031997.16	998.23		
321	865,261.04	2,031,993.60	995	SG2	865260.98	2031993.53	995.16		
322	865,259.17	2,031,989.10	998	SG3/FIN2	865259.11	2031989.04	998.40	8.82	3.07
323	865,303.37	2,031,962.58	995	SG1	865303.42	2031962.65	995.61		
324	865,300.19	2,031,959.40	998	FIN1	865300.25	2031959.46	998.45		
325	865,297.71	2,031,956.93	995	SG2	865297.65	2031956.88	995.17		
326	865,294.53	2,031,953.74	998	SG3/FIN2	865294.48	2031953.68	998.40	8.17	3.27

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
327	865,338.72	2,031,927.23	995	SG1	865338.77	2031927.28	995.51		
328	865,335.54	2,031,924.05	998	FIN1	865335.60	2031924.11	998.32		
329	865,333.07	2,031,921.57	995	SG2	865333.02	2031921.51	995.11		
330	865,329.89	2,031,918.39	998	SG3/FIN2	865329.82	2031918.33	998.65	8.18	3.21
331	865,368.60	2,031,897.35	995	SG1	865368.66	2031897.41	995.81		
332	865,364.10	2,031,895.49	998	FIN1	865364.17	2031895.55	998.02		
333	865,360.60	2,031,894.04	995	SG2	865360.55	2031893.98	995.35		
334	865,356.10	2,031,892.17	998	SG3/FIN2	865356.04	2031892.12	998.12	8.82	2.66
335	865,368.60	2,031,842.17	995	SG1	865368.65	2031842.17	995.58		
336	865,364.10	2,031,842.17	998	FIN1	865364.15	2031842.16	998.17		
337	865,360.60	2,031,842.17	995	SG2	865360.54	2031842.14	995.45		
338	865,356.10	2,031,842.17	998	SG3/FIN2	865356.05	2031842.17	998.39	8.11	2.72
339	865,368.60	2,031,792.17	995	SG1	865368.65	2031792.16	995.27		
340	865,364.10	2,031,792.17	998	FIN1	865364.17	2031792.17	998.27		
341	865,360.60	2,031,792.17	995	SG2	865360.55	2031792.17	995.67		
342	865,356.10	2,031,792.17	998	SG3/FIN2	865356.04	2031792.16	998.28	8.13	2.60
343	865,368.60	2,031,742.17	995	SG1	865368.66	2031742.14	995.11		
344	865,364.10	2,031,742.17	998	FIN1	865364.16	2031742.18	998.12		
345	865,360.60	2,031,742.17	995	SG2	865360.55	2031742.17	995.39		
346	865,356.10	2,031,742.17	998	SG3/FIN2	865356.04	2031742.17	998.20	8.12	2.73
347	865,368.61	2,031,692.17	995	SG1	865368.67	2031692.17	995.29		
348	865,364.11	2,031,692.17	998	FIN1	865364.17	2031692.18	998.31		
349	865,360.61	2,031,692.17	995	SG2	865360.55	2031692.15	995.18		
350	865,356.11	2,031,692.17	998	SG3/FIN2	865356.05	2031692.19	998.37	8.13	3.13
351	865,368.61	2,031,642.17	995	SG1	865368.66	2031642.17	995.32		
352	865,364.11	2,031,642.17	998	FIN1	865364.16	2031642.12	998.15		
353	865,360.61	2,031,642.17	995	SG2	865360.55	2031642.14	995.18		
354	865,356.11	2,031,642.17	998	SG3/FIN2	865356.06	2031642.19	998.43	8.10	2.97

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
355	865,368.61	2,031,592.17	995	SG1	865368.67	2031592.16	995.76		
356	865,364.11	2,031,592.17	998	FIN1	865364.16	2031592.17	998.16		
357	865,360.61	2,031,592.17	995	SG2	865360.54	2031592.15	995.27		
358	865,356.11	2,031,592.17	998	SG3/FIN2	865356.06	2031592.20	998.52	8.10	2.89
359	865,368.61	2,031,542.17	995	SG1	865368.66	2031542.16	995.60		
360	865,364.11	2,031,542.17	998	FIN1	865364.16	2031542.17	998.25		
361	865,360.61	2,031,542.17	995	SG2	865360.55	2031542.19	995.11		
362	865,356.11	2,031,542.17	998	SG3/FIN2	865356.05	2031542.19	998.50	8.11	3.14
363	865,368.61	2,031,492.17	995	SG1	865368.68	2031492.16	995.62		
364	865,364.11	2,031,492.17	998	FIN1	865364.17	2031492.17	998.18		
365	865,360.61	2,031,492.17	995	SG2	865360.55	2031492.17	995.23		
366	865,356.11	2,031,492.17	998	SG3/FIN2	865356.06	2031492.17	998.46	8.11	2.95
367	865,368.61	2,031,442.17	995	SG1	865368.67	2031442.15	995.70		
368	865,364.11	2,031,442.17	998	FIN1	865364.17	2031442.18	998.14		
369	865,360.61	2,031,442.17	995	SG2	865360.55	2031442.16	995.42		
370	865,356.11	2,031,442.17	998	SG3/FIN2	865356.06	2031442.18	998.47	8.11	2.72
371	865,368.61	2,031,392.17	995	SG1	865368.67	2031392.16	995.56		
372	865,364.11	2,031,392.17	998	FIN1	865364.18	2031392.17	998.21		
373	865,360.61	2,031,392.17	995	SG2	865360.55	2031392.16	995.44		
374	865,356.11	2,031,392.17	998	SG3/FIN2	865356.05	2031392.16	998.41	8.12	2.77
375	865,368.62	2,031,342.17	995	SG1	865368.68	2031342.17	995.48		
376	865,364.12	2,031,342.17	998	FIN1	865364.17	2031342.15	998.43		
377	865,360.62	2,031,342.17	995	SG2	865360.56	2031342.20	995.45		
378	865,356.12	2,031,342.17	998	SG3/FIN2	865356.06	2031342.18	998.66	8.11	2.98
379	865,368.62	2,031,292.17	995	SG1	865368.69	2031292.18	995.37		
380	865,364.12	2,031,292.17	998	FIN1	865364.18	2031292.18	998.14		
381	865,360.62	2,031,292.17	995	SG2	865360.56	2031292.17	995.66		
382	865,356.12	2,031,292.17	998	SG3/FIN2	865356.06	2031292.18	998.40	8.12	2.48

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
383	865,368.62	2,031,242.17	995	SG1	865368.68	2031242.16	995.47		
384	865,364.12	2,031,242.17	998	FIN1	865364.17	2031242.16	998.54		
385	865,360.62	2,031,242.17	995	SG2	865360.57	2031242.17	995.63		
386	865,356.12	2,031,242.17	998	SG3/FIN2	865356.06	2031242.18	998.47	8.11	2.91
387	865,368.62	2,031,192.17	995	SG1	865368.69	2031192.16	995.52		
388	865,364.12	2,031,192.17	998	FIN1	865364.17	2031192.18	998.57		
389	865,360.62	2,031,192.17	995	SG2	865360.57	2031192.18	995.60		
390	865,356.12	2,031,192.17	998	SG3/FIN2	865356.06	2031192.14	998.46	8.11	2.96
391	865,368.62	2,031,142.17	995	SG1	865368.69	2031142.20	995.49		
392	865,364.12	2,031,142.17	998	FIN1	865364.17	2031142.20	998.45		
393	865,360.62	2,031,142.17	995	SG2	865360.57	2031142.16	995.48		
394	865,356.12	2,031,142.17	998	SG3/FIN2	865356.06	2031142.16	998.76	8.11	2.97
395	865,368.62	2,031,092.17	995	SG1	865368.69	2031092.17	995.25		
396	865,364.12	2,031,092.17	998	FIN1	865364.17	2031092.16	998.65		
397	865,360.62	2,031,092.17	995	SG2	865360.56	2031092.14	995.35		
398	865,356.12	2,031,092.17	998	SG3/FIN2	865356.07	2031092.16	998.70	8.10	3.30
399	865,368.62	2,031,042.17	995	SG1	865368.68	2031042.14	995.95		
400	865,364.12	2,031,042.17	998	FIN1	865364.17	2031042.16	998.30		
401	865,360.62	2,031,042.17	995	SG2	865360.56	2031042.18	995.24		
402	865,356.12	2,031,042.17	998	SG3/FIN2	865356.06	2031042.15	998.43	8.12	3.06
403	865,368.62	2,030,992.17	995	SG1	865368.69	2030992.17	996.49		
404	865,364.12	2,030,992.17	998	FIN1	865364.17	2030992.18	998.66		
405	865,360.62	2,030,992.17	995	SG2	865360.56	2030992.16	995.42		
406	865,356.12	2,030,992.17	998	SG3/FIN2	865356.06	2030992.16	998.67	8.11	3.23
407	865,368.63	2,030,942.17	995	SG1	865368.69	2030942.16	996.21		
408	865,364.13	2,030,942.17	998	FIN1	865364.18	2030942.18	998.58		
409	865,360.63	2,030,942.17	995	SG2	865360.57	2030942.16	995.26		
410	865,356.13	2,030,942.17	998	SG3/FIN2	865356.07	2030942.15	998.66	8.12	3.33

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Verification Point No.	Northing (Design)	Easting (Design)	Elevation (Design)	Location Description	Northing (As-built)	Easting (As-built)	Elevation (As-built)	Clay Width (8' MIN)	Clay Thickness (3' MIN)*
411	865,368.63	2,030,892.17	995	SG1	865368.68	2030892.16	996.92		
412	865,364.13	2,030,892.17	998	FIN1	865364.18	2030892.18	998.39		
413	865,360.63	2,030,892.17	995	SG2	865360.56	2030892.15	995.56		
414	865,356.13	2,030,892.17	998	SG3/FIN2	865356.07	2030892.17	998.33	8.10	2.83
415	865,368.63	2,030,846.80	995	SG1	865368.69	2030846.81	996.80		
416	865,364.13	2,030,847.07	998	FIN1	865364.18	2030847.08	998.05		
417	865,360.63	2,030,847.28	995	SG2	865360.56	2030847.28	995.37		
418	865,356.13	2,030,847.55	998	SG3/FIN2	865356.08	2030847.55	998.38	8.11	2.68
420	865,364.13	2,030,810.40	998	FIN1	865364.18	2030810.40	998.56		
421	865,356.13	2,030,810.88	998	SG3/FIN2	865356.08	2030810.89	998.64	8.12	

*Thicknesses less than 3.0 feet are from existing clay constructed higher than elevation 995 during previous projects. Rather than excavate good clay, the existing clay was left in and surveyed.

Finished Grade Survey Verification Data

	Design F/G			S/G As-built		S/G to Design Difference	F/G As-built		S/G to F/G Difference
Point	Northing	Easting	Elevation	Elevation	Desc.		Elevation	Desc.	
501	862,370.74	2,030,777.55	1001.71	1001.75	cont fill match	0.04	1001.76	topsoil match	0.01
502	862,373.90	2,030,858.32	1001.71	1001.14	cont fill	-0.57	1001.67	topsoil	0.53
503	862,377.07	2,030,939.08	1001.71	1001.17	cont fill	-0.54	1001.68	CL 5	0.51
504	862,382.16	2,031,037.03	1001.71	1001.13	cont fill	-0.58	1001.66	topsoil	0.54
505	862,387.24	2,031,134.99	1001.71	1001.20	cont fill	-0.51	1001.72	topsoil	0.53
506	862,392.32	2,031,232.94	1001.71	1001.15	cont fill	-0.56	1001.65	topsoil	0.50
507	862,397.41	2,031,330.89	1001.71	1001.15	cont fill	-0.57	1001.65	topsoil	0.51
508	862,402.49	2,031,428.85	1001.71	1001.15	cont fill	-0.56	1001.68	topsoil	0.53
509	862,407.58	2,031,526.80	1001.71	1001.20	cont fill	-0.51	1001.70	topsoil	0.50
510	862,412.66	2,031,624.75	1001.71	1001.13	cont fill	-0.58	1001.64	topsoil	0.51
511	862,417.75	2,031,722.71	1001.71	1001.12	cont fill	-0.59	1001.62	topsoil	0.50
512	862,422.83	2,031,820.66	1001.71	1001.13	cont fill	-0.58	1001.64	CL 5	0.51
513	862,427.91	2,031,918.61	1001.71	1001.18	cont fill	-0.53	1001.71	topsoil	0.53
514	862,483.24	2,031,968.79	1001.75	1001.22	cont fill	-0.53	1001.74	topsoil	0.52
515	862,538.56	2,032,018.97	1001.78	1001.19	cont fill	-0.59	1001.72	topsoil	0.53
516	862,638.57	2,032,018.97	1001.78	1001.20	cont fill	-0.58	1001.72	topsoil	0.51
517	862,738.59	2,032,018.97	1001.78	1001.26	cont fill	-0.52	1001.77	topsoil	0.51
518	862,838.61	2,032,018.97	1001.78	1001.26	cont fill	-0.52	1001.77	topsoil	0.51
519	862,938.63	2,032,018.97	1001.78	1001.22	cont fill	-0.56	1001.73	topsoil	0.51
520	863,038.64	2,032,018.97	1001.78	1001.20	cont fill	-0.58	1001.72	topsoil	0.53
521	863,138.66	2,032,018.97	1001.78	1001.21	cont fill	-0.57	1001.73	topsoil	0.52
522	863,238.68	2,032,018.97	1001.78	1001.24	cont fill	-0.54	1001.75	topsoil	0.51
523	863,338.69	2,032,018.97	1001.78	1001.25	cont fill	-0.53	1001.76	topsoil	0.51
524	863,438.71	2,032,018.97	1001.78	1001.24	cont fill	-0.54	1001.75	topsoil	0.51
525	863,538.73	2,032,018.97	1001.78	1001.21	cont fill	-0.57	1001.74	topsoil	0.53
526	863,638.75	2,032,018.97	1001.78	1001.23	cont fill	-0.55	1001.74	topsoil	0.51
527	863,738.76	2,032,018.97	1001.78	1001.28	cont fill	-0.50	1001.82	topsoil	0.54
528	863,838.78	2,032,018.97	1001.78	1001.25	cont fill	-0.53	1001.77	topsoil	0.52
529	863,938.80	2,032,018.97	1001.78	1001.26	cont fill	-0.52	1001.76	topsoil	0.50
530	864,038.82	2,032,018.97	1001.78	1001.25	cont fill	-0.53	1001.76	topsoil	0.51
531	862,359.06	2,030,805.67	997.30	997.03	g existing	-0.27	997.08	g existing	0.06
532	862,355.78	2,030,828.15	995.87	995.66	g existing	-0.21	995.66	topsoil match	0.00
533	862,358.21	2,030,850.41	996.41	996.21	g existing	-0.20	996.30	topsoil match	0.09
534	862,368.41	2,030,872.36	999.62	999.07	cont fill	-0.55	999.63	topsoil	0.56
535	862,370.72	2,030,939.41	999.52	998.98	cont fill	-0.54	999.51	topsoil	0.53
536	862,374.77	2,031,038.69	999.14	998.63	cont fill	-0.51	999.15	topsoil	0.51
537	862,380.45	2,031,137.66	999.33	998.75	cont fill	-0.58	999.30	topsoil	0.54
538	862,385.17	2,031,236.66	999.18	998.64	cont fill	-0.54	999.18	topsoil	0.54
539	862,390.42	2,031,335.65	999.21	998.69	cont fill	-0.52	999.26	topsoil	0.57
540	862,396.09	2,031,434.61	999.40	998.85	cont fill	-0.55	999.38	topsoil	0.54
541	862,401.21	2,031,533.60	999.39	998.84	cont fill	-0.55	999.35	topsoil	0.51
542	862,405.33	2,031,632.64	999.04	998.60	cont fill	-0.44	999.11	topsoil	0.50
543	862,411.16	2,031,731.59	999.28	998.76	cont fill	-0.52	999.27	topsoil	0.51
544	862,416.46	2,031,830.57	999.33	998.83	cont fill	-0.50	999.40	topsoil	0.57
545	862,422.02	2,031,922.19	999.61	999.08	cont fill	-0.53	999.61	topsoil	0.54
546	862,478.86	2,031,974.25	999.42	998.91	cont fill	-0.51	999.45	topsoil	0.54
547	862,535.71	2,032,026.30	999.34	998.80	cont fill	-0.54	999.38	topsoil	0.57
548	862,635.71	2,032,026.34	999.33	998.83	cont fill	-0.50	999.37	topsoil	0.54
549	862,735.71	2,032,026.38	999.31	998.78	cont fill	-0.53	999.28	topsoil	0.50
550	862,835.71	2,032,026.42	999.30	998.78	cont fill	-0.52	999.30	topsoil	0.52
551	862,935.71	2,032,026.47	999.29	998.77	cont fill	-0.52	999.31	topsoil	0.54
552	863,035.71	2,032,026.51	999.27	998.75	cont fill	-0.52	999.31	topsoil	0.56
553	863,135.71	2,032,026.55	999.26	998.76	cont fill	-0.50	999.31	topsoil	0.55
554	863,235.71	2,032,026.59	999.24	998.74	cont fill	-0.50	999.28	topsoil	0.55
555	863,335.71	2,032,026.63	999.23	998.71	cont fill	-0.52	999.25	topsoil	0.54
556	863,435.71	2,032,026.67	999.22	998.70	cont fill	-0.52	999.25	topsoil	0.54
557	863,535.71	2,032,026.71	999.20	998.67	cont fill	-0.53	999.22	topsoil	0.55
558	863,635.71	2,032,026.75	999.19	998.68	cont fill	-0.52	999.18	topsoil	0.50
559	863,735.71	2,032,026.79	999.18	998.67	cont fill	-0.51	999.21	topsoil	0.54
560	863,835.71	2,032,026.83	999.16	998.66	cont fill	-0.50	999.20	topsoil	0.54
561	863,935.71	2,032,026.87	999.15	998.64	cont fill	-0.51	999.19	topsoil	0.54
562	864,035.71	2,032,026.91	999.13	998.62	cont fill	-0.51	999.13	topsoil	0.51
563	864,137.79	2,032,026.95	999.12	998.61	cont fill	-0.51	999.16	topsoil	0.54
564	862,421.71	2,031,971.38	999.10	998.59	cont fill	-0.51	999.09	topsoil	0.50
565	862,425.46	2,032,011.34	998.80	998.22	cont fill	-0.58	998.75	topsoil	0.53
566	864,138.83	2,032,018.97	1001.78	1001.26	cont fill	-0.52	1001.77	topsoil	0.51

	Design F/G			S/G As-built		S/G to Design Difference	F/G As-built		S/G to F/G Difference
Point	Northing	Easting	Elevation	Elevation	Desc.		Elevation	Desc.	
567	862,447.29	2,032,032.32	998.76	998.18	cont fill	-0.58	998.68	topsoil	0.50
568	862,467.40	2,032,035.69	998.85	998.28	cont fill	-0.57	998.78	topsoil	0.50
569	862,528.91	2,032,033.72	999.23	998.70	cont fill	-0.53	999.21	topsoil	0.51
570	862,634.30	2,032,032.41	999.26				999.29	topsoil	0.03
571	862,732.89	2,032,033.21	999.24				999.25	topsoil	0.01
572	862,831.48	2,032,032.81	999.23				999.25	topsoil	0.02
573	862,930.07	2,032,034.03	999.21				999.22	topsoil	0.01
574	863,028.65	2,032,033.94	999.20				999.23	topsoil	0.03
575	863,127.24	2,032,032.90	999.19				999.19	topsoil	0.00
576	863,225.83	2,032,034.27	999.17				999.19	topsoil	0.02
577	863,324.42	2,032,033.47	999.16				999.21	topsoil	0.05
578	863,423.01	2,032,033.95	999.14				999.17	topsoil	0.03
579	863,521.60	2,032,034.75	999.12				999.12	topsoil	0.00
580	863,620.19	2,032,036.03	999.10	998.58	cont fill match	-0.52	999.09	topsoil	0.51
581	863,669.48	2,032,036.54	999.09	998.58	cont fill match	-0.51	999.13	topsoil	0.55
582	863,718.77	2,032,055.32	998.89	998.69	cont fill match	-0.20	998.80	topsoil match	0.11
583	863,792.71	2,032,052.45	998.91	998.80	cont fill match	-0.11	998.84	topsoil match	0.04
584	863,842.01	2,032,040.08	999.03	998.91	cont fill match	-0.12	999.03	topsoil match	0.12
585	863,940.61	2,032,032.14	999.09	998.54	cont fill	-0.55	999.05	topsoil	0.51
586	864,039.20	2,032,033.99	999.06	998.55	cont fill	-0.51	999.09	topsoil	0.54
724	862,381.80	2,030,756.15	1001.83	1001.26	cont fill	-0.57			
725	862,383.82	2,030,807.84	1001.83	1001.32	cont fill	-0.51	1001.89	CL 5	0.57
726	862,385.85	2,030,859.52	1001.83	1001.28	cont fill	-0.55	1001.81	CL 5	0.53
727	862,387.88	2,030,911.21	1001.83	1001.31	cont fill	-0.53	1001.84	CL 5	0.53
728	862,379.25	2,030,980.70	1001.71	1001.18	cont fill	-0.53	1001.70	CL 5	0.52
729	862,381.41	2,031,022.48	1001.71	1001.20	cont fill	-0.51	1001.73	CL 5	0.52
730	862,394.68	2,031,048.98	1001.83	1001.31	cont fill	-0.52	1001.82	CL 5	0.51
731	862,429.63	2,031,722.02	1001.83	1001.28	cont fill	-0.56	1001.79	CL 5	0.51
732	862,427.08	2,031,672.89	1001.83	1001.32	cont fill	-0.51	1001.83	CL 5	0.50
733	862,424.53	2,031,623.75	1001.83	1001.33	cont fill	-0.50	1001.83	CL 5	0.51
734	862,421.98	2,031,574.62	1001.83	1001.31	cont fill	-0.52	1001.83	CL 5	0.52
735	862,419.43	2,031,525.48	1001.83	1001.32	cont fill	-0.51	1001.84	CL 5	0.52
736	862,416.88	2,031,476.35	1001.83	1001.32	cont fill	-0.51	1001.82	CL 5	0.50
737	862,414.32	2,031,427.22	1001.83	1001.32	cont fill	-0.51	1001.83	CL 5	0.50
738	862,411.77	2,031,378.08	1001.83	1001.32	cont fill	-0.51	1001.85	CL 5	0.53
739	862,409.22	2,031,328.95	1001.83	1001.30	cont fill	-0.53	1001.82	CL 5	0.52
740	862,406.67	2,031,279.81	1001.83	1001.28	cont fill	-0.56	1001.82	CL 5	0.54
741	862,404.12	2,031,230.68	1001.83	1001.32	cont fill	-0.51	1001.85	CL 5	0.53
742	862,401.57	2,031,181.55	1001.83	1001.30	cont fill	-0.53	1001.81	CL 5	0.51
743	862,399.02	2,031,132.41	1001.83	1001.31	cont fill	-0.52	1001.83	CL 5	0.51
744	862,396.46	2,031,083.28	1001.83	1001.31	cont fill	-0.52	1001.82	CL 5	0.51
745	862,431.55	2,031,758.89	1001.83	1001.32	cont fill	-0.51	1001.85	CL 5	0.53
746	862,433.27	2,031,792.14	1001.83	1001.31	cont fill	-0.52	1001.82	CL 5	0.51
747	862,425.00	2,031,862.23	1001.71	1001.12	cont fill	-0.59	1001.63	CL 5	0.51
748	862,427.20	2,031,904.43	1001.71	1001.12	cont fill	-0.59	1001.63	CL 5	0.51
749	862,445.08	2,031,934.18	1001.72	1001.20	cont fill	-0.52	1001.70	CL 5	0.50
750	862,465.54	2,031,939.40	1001.83	1001.24	cont fill	-0.59	1001.77	CL 5	0.53
751	862,503.01	2,031,976.86	1001.83	1001.33	cont fill	-0.50	1001.88	CL 5	0.56
752	862,540.48	2,032,014.33	1001.83	1001.32	cont fill	-0.51	1001.85	CL 5	0.52
753	862,590.48	2,032,014.33	1001.83	1001.29	cont fill	-0.54	1001.82	CL 5	0.52
754	862,640.48	2,032,014.33	1001.83	1001.32	cont fill	-0.51	1001.86	CL 5	0.54
755	862,690.48	2,032,014.33	1001.83	1001.25	cont fill	-0.58	1001.75	CL 5	0.51
756	862,740.48	2,032,014.33	1001.83	1001.27	cont fill	-0.56	1001.79	CL 5	0.52
757	862,790.48	2,032,014.33	1001.83	1001.26	cont fill	-0.57	1001.76	CL 5	0.50
758	862,840.48	2,032,014.33	1001.83	1001.25	cont fill	-0.59	1001.77	CL 5	0.52
759	862,890.48	2,032,014.33	1001.83	1001.29	cont fill	-0.54	1001.83	CL 5	0.54
760	862,940.48	2,032,014.33	1001.83	1001.29	cont fill	-0.54	1001.80	CL 5	0.51
761	862,990.48	2,032,014.33	1001.83	1001.27	cont fill	-0.56	1001.80	CL 5	0.52
762	863,040.48	2,032,014.33	1001.83	1001.28	cont fill	-0.55	1001.80	CL 5	0.52
763	863,090.48	2,032,014.33	1001.83	1001.29	cont fill	-0.54	1001.81	CL 5	0.51
764	863,140.48	2,032,014.33	1001.83	1001.28	cont fill	-0.55	1001.78	CL 5	0.50
765	863,190.48	2,032,014.33	1001.83	1001.30	cont fill	-0.54	1001.81	CL 5	0.51
766	863,240.48	2,032,014.33	1001.83	1001.29	cont fill	-0.55	1001.79	CL 5	0.51
767	863,290.48	2,032,014.33	1001.83	1001.33	cont fill	-0.50	1001.86	CL 5	0.53
768	863,340.48	2,032,014.33	1001.83	1001.28	cont fill	-0.55	1001.80	CL 5	0.52
769	863,390.48	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.81	CL 5	0.51

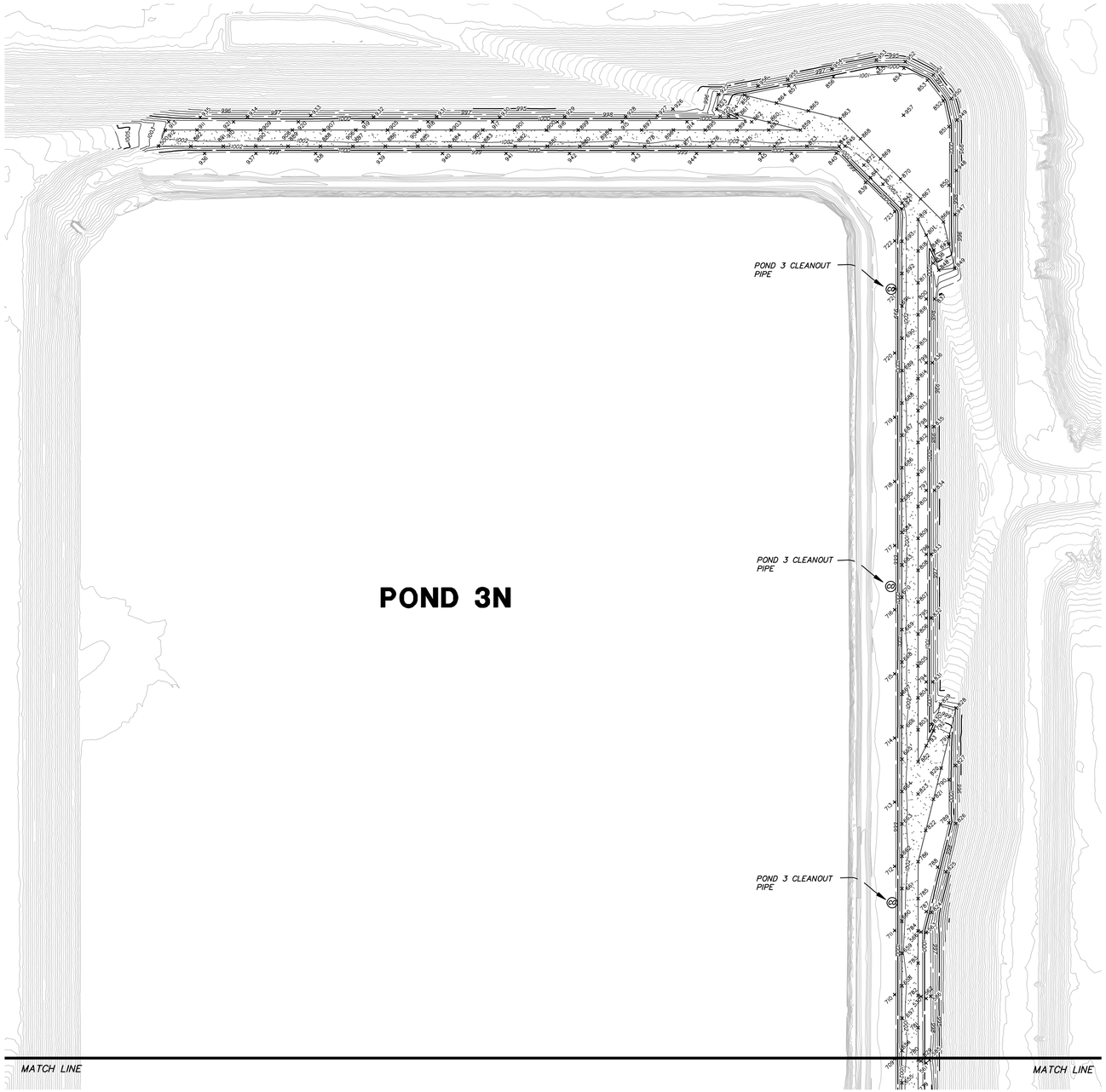
	Design F/G			S/G As-built		S/G to Design Difference	F/G As-built		S/G to F/G Difference
Point	Northing	Easting	Elevation	Elevation	Desc.		Elevation	Desc.	
770	863,440.48	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.80	CL 5	0.50
771	863,490.48	2,032,014.33	1001.83	1001.32	cont fill	-0.51	1001.83	CL 5	0.51
772	863,540.48	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.81	CL 5	0.51
773	863,590.48	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.84	CL 5	0.54
774	863,640.48	2,032,014.33	1001.83	1001.32	cont fill	-0.51	1001.83	CL 5	0.51
775	863,690.48	2,032,014.33	1001.83	1001.31	cont fill	-0.52	1001.81	CL 5	0.50
776	863,740.48	2,032,014.33	1001.83	1001.27	cont fill	-0.56	1001.80	CL 5	0.52
777	863,790.48	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.81	CL 5	0.51
778	863,840.48	2,032,014.33	1001.83	1001.31	cont fill	-0.52	1001.84	CL 5	0.53
779	863,890.48	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.82	CL 5	0.52
780	863,940.48	2,032,014.33	1001.83	1001.31	cont fill	-0.52	1001.83	CL 5	0.52
781	863,990.48	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.82	CL 5	0.52
782	864,040.48	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.87	CL 5	0.57
783	864,090.48	2,032,014.33	1001.83	1001.28	cont fill	-0.55	1001.81	CL 5	0.52
784	864,140.48	2,032,014.33	1001.83	1001.32	cont fill	-0.51	1001.84	CL 5	0.52
785	864,190.48	2,032,014.33	1001.83	1001.27	cont fill	-0.56	1001.79	CL 5	0.52
786	864,247.81	2,032,014.33	1001.83	1001.31	cont fill	-0.52	1001.83	CL 5	0.52
787	864,170.29	2,032,027.00	1001.70	1001.19	cont fill	-0.51	1001.71	topsoil	0.52
788	864,239.15	2,032,044.56	1001.53	1000.97	cont fill	-0.56	1001.50	topsoil	0.53
789	864,308.01	2,032,062.13	1001.35	1000.76	cont fill	-0.59	1001.27	topsoil	0.51
790	864,374.57	2,032,062.13	1001.35	1000.77	cont fill	-0.58	1001.27	topsoil	0.50
791	864,441.14	2,032,062.13	1001.35	1000.84	cont fill	-0.51	1001.35	CL 5	0.51
792	864,450.36	2,032,038.65	1001.58	1000.99	cont fill	-0.59	1001.53	CL 5	0.54
793	864,427.47	2,032,027.00	1001.70	1001.19	cont fill	-0.51	1001.70	CL 5	0.51
794	864,526.34	2,032,027.00	1001.70	1001.13	cont fill	-0.57	1001.64	topsoil	0.51
795	864,625.22	2,032,027.00	1001.70	1001.16	cont fill	-0.54	1001.68	topsoil	0.52
796	864,724.10	2,032,027.00	1001.70	1001.13	cont fill	-0.57	1001.68	topsoil	0.55
797	864,822.97	2,032,027.00	1001.70	1001.18	cont fill	-0.52	1001.68	topsoil	0.51
798	864,921.85	2,032,027.00	1001.70	1001.18	cont fill	-0.53	1001.69	topsoil	0.51
799	865,020.72	2,032,027.00	1001.70	1001.15	cont fill	-0.55	1001.69	topsoil	0.54
800	865,119.60	2,032,027.00	1001.70	1001.18	cont fill	-0.52	1001.72	topsoil	0.54
801	865,218.47	2,032,027.00	1001.70	1001.18	cont fill	-0.52	1001.68	CL 5	0.50
802	864,402.61	2,032,014.33	1001.83	1001.32	cont fill	-0.51	1001.83	CL 5	0.51
803	864,452.06	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.83	CL 5	0.52
804	864,501.52	2,032,014.33	1001.83	1001.32	cont fill	-0.51	1001.87	CL 5	0.56
805	864,550.97	2,032,014.33	1001.83	1001.29	cont fill	-0.54	1001.80	CL 5	0.50
806	864,600.42	2,032,014.33	1001.83	1001.32	cont fill	-0.51	1001.83	CL 5	0.50
807	864,649.88	2,032,014.33	1001.83	1001.31	cont fill	-0.52	1001.85	CL 5	0.54
808	864,699.33	2,032,014.33	1001.83	1001.28	cont fill	-0.55	1001.83	CL 5	0.55
809	864,748.79	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.82	CL 5	0.52
810	864,798.24	2,032,014.33	1001.83	1001.27	cont fill	-0.56	1001.85	CL 5	0.58
811	864,847.70	2,032,014.33	1001.83	1001.30	cont fill	-0.54	1001.84	CL 5	0.54
812	864,897.15	2,032,014.33	1001.83	1001.25	cont fill	-0.58	1001.81	CL 5	0.57
813	864,946.61	2,032,014.33	1001.83	1001.29	cont fill	-0.54	1001.86	CL 5	0.57
814	864,996.06	2,032,014.33	1001.83	1001.29	cont fill	-0.54	1001.82	CL 5	0.53
815	865,045.52	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.81	CL 5	0.51
816	865,094.97	2,032,014.33	1001.83	1001.26	cont fill	-0.57	1001.79	CL 5	0.53
817	865,144.43	2,032,014.33	1001.83	1001.30	cont fill	-0.53	1001.82	CL 5	0.51
818	865,193.88	2,032,014.33	1001.83	1001.31	cont fill	-0.52	1001.83	CL 5	0.52
819	865,243.34	2,032,014.33	1001.83	1001.30	cont fill	-0.54	1001.81	CL 5	0.52
820	864,392.80	2,032,050.18	1001.47	1000.96	cont fill	-0.51	1001.46	CL 5	0.50
821	864,344.47	2,032,038.23	1001.59	1001.07	cont fill	-0.52	1001.58	CL 5	0.51
822	864,296.14	2,032,026.28	1001.71	1001.20	cont fill	-0.51	1001.70	CL 5	0.50
823	864,352.61	2,032,014.33	1001.83	1001.33	cont fill	-0.50	1001.86	CL 5	0.53
824	864,169.31	2,032,035.10	999.00	998.49	cont fill	-0.51	999.00	topsoil	0.51
825	864,231.98	2,032,057.47	996.78	996.68	cont fill match	-0.10	997.20	topsoil	0.52
826	864,306.74	2,032,072.58	997.87	997.44	cont fill match	-0.43	997.98	topsoil	0.54
827	864,396.76	2,032,072.07	998.04	997.51	cont fill	-0.53	998.01	topsoil	0.51
828	864,485.92	2,032,073.20	997.66	997.14	cont fill	-0.52	997.64	CL 5	0.51
829	864,491.92	2,032,048.93	997.66	997.15	cont fill	-0.51	997.74	CL 5	0.59
830	864,460.34	2,032,035.12	998.99	998.47	cont fill	-0.52	999.01	topsoil	0.55
831	864,526.34	2,032,037.08	998.34	997.80	cont fill	-0.54	998.33	topsoil	0.53
832	864,625.22	2,032,034.87	999.08	998.55	cont fill	-0.53	999.06	topsoil	0.50
833	864,724.10	2,032,034.99	999.04	998.53	cont fill	-0.51	999.06	topsoil	0.54
834	864,822.97	2,032,039.88	997.41	997.39	cont fill match	-0.02	997.43	topsoil match	0.04
835	864,921.85	2,032,038.61	997.83	997.79	cont fill match	-0.04	997.87	topsoil match	0.08

	Design F/G			S/G As-built		S/G to Design Difference	F/G As-built		S/G to F/G Difference
Point	Northing	Easting	Elevation	Elevation	Desc.		Elevation	Desc.	
836	865,020.72	2,032,036.34	998.59	998.04	cont fill	-0.55	998.55	topsoil	0.50
837	865,119.60	2,032,039.94	997.39	997.37	cont fill match	-0.02	997.37	topsoil match	0.01
838	865,175.09	2,032,037.72	998.13	997.66	cont fill	-0.48	998.18	topsoil	0.53
846	865,195.59	2,032,038.65	1001.58	1001.05	cont fill	-0.53	1001.58	CL 5	0.53
847	865,204.80	2,032,062.13	1001.35	1000.85	cont fill	-0.50	1001.36	CL 5	0.51
848	865,164.22	2,032,046.41	999.00	998.43	cont fill	-0.57	998.94	CL 5	0.51
849	865,167.27	2,032,071.41	998.26	997.74	cont fill	-0.52	998.25	CL 5	0.51
850	865,295.66	2,032,062.13	1001.35	1000.77	cont fill	-0.58	1001.28	topsoil	0.50
851	865,386.51	2,032,062.13	1001.35	1000.82	cont fill	-0.53	1001.34	topsoil	0.52
852	865,426.23	2,032,053.47	1001.23	1000.72	cont fill	-0.51	1001.24	topsoil	0.52
853	865,458.43	2,032,028.64	1001.10	1000.56	cont fill	-0.54	1001.08	topsoil	0.52
854	865,476.90	2,031,992.43	1000.98	1000.43	cont fill	-0.55	1000.93	topsoil	0.50
855	865,478.10	2,031,951.79	1000.86	1000.35	cont fill	-0.51	1000.86	topsoil	0.51
856	865,463.87	2,031,883.06	1001.00	1000.49	cont fill	-0.52	1000.99	topsoil	0.50
857	865,449.63	2,031,814.32	1001.15	1000.58	cont fill	-0.57	1001.09	topsoil	0.51
858	865,435.40	2,031,745.58	1001.29	1000.74	cont fill	-0.55	1001.27	CL 5	0.53
859	865,381.33	2,031,832.28	1001.83	1001.31	cont fill	-0.52	1001.82	CL 5	0.50
860	865,393.33	2,031,783.74	1001.71	1001.20	cont fill	-0.51	1001.70	CL 5	0.51
861	865,405.66	2,031,733.90	1001.58	1001.02	cont fill	-0.56	1001.53	CL 5	0.51
862	865,394.00	2,031,756.78	1001.70	1001.20	cont fill	-0.50	1001.70	topsoil	0.50
863	865,398.69	2,031,894.07	1001.65	1001.14	cont fill	-0.51	1001.66	CL 5	0.51
864	865,423.16	2,031,795.08	1001.41	1000.88	cont fill	-0.53	1001.39	CL 5	0.51
865	865,410.93	2,031,844.57	1001.53	1001.01	cont fill	-0.52	1001.53	CL 5	0.53
866	865,239.11	2,032,053.65	1001.43	1000.92	cont fill	-0.51	1001.45	CL 5	0.54
867	865,274.46	2,032,018.29	1001.77	1001.24	cont fill	-0.53	1001.79	CL 5	0.55
868	865,367.63	2,031,925.12	1001.89	1001.39	cont fill	-0.50	1001.94	CL 5	0.55
869	865,336.58	2,031,956.18	1001.89	1001.38	cont fill	-0.51	1001.91	CL 5	0.53
870	865,305.52	2,031,987.24	1001.89	1001.39	cont fill	-0.50	1001.92	CL 5	0.52
893	865,381.33	2,031,783.09	1001.83	1001.29	cont fill	-0.54	1001.82	CL 5	0.52
894	865,381.33	2,031,733.89	1001.83	1001.29	cont fill	-0.54	1001.83	CL 5	0.54
895	865,381.33	2,031,684.70	1001.83	1001.29	cont fill	-0.54	1001.80	CL 5	0.51
896	865,381.33	2,031,635.51	1001.83	1001.31	cont fill	-0.53	1001.81	CL 5	0.50
897	865,381.33	2,031,586.31	1001.83	1001.31	cont fill	-0.52	1001.81	CL 5	0.50
898	865,381.33	2,031,537.12	1001.83	1001.33	cont fill	-0.50	1001.84	CL 5	0.51
899	865,381.33	2,031,487.93	1001.83	1001.32	cont fill	-0.51	1001.85	CL 5	0.53
900	865,381.33	2,031,438.74	1001.83	1001.31	cont fill	-0.52	1001.84	CL 5	0.52
901	865,381.33	2,031,389.54	1001.83	1001.31	cont fill	-0.52	1001.83	CL 5	0.52
902	865,381.33	2,031,340.35	1001.83	1001.30	cont fill	-0.54	1001.81	CL 5	0.51
903	865,381.33	2,031,291.16	1001.83	1001.32	cont fill	-0.51	1001.84	CL 5	0.53
904	865,381.33	2,031,241.96	1001.83	1001.31	cont fill	-0.52	1001.82	CL 5	0.52
905	865,381.33	2,031,192.77	1001.83	1001.30	cont fill	-0.53	1001.84	CL 5	0.54
906	865,381.33	2,031,143.58	1001.83	1001.30	cont fill	-0.53	1001.81	CL 5	0.51
907	865,381.33	2,031,094.38	1001.83	1001.31	cont fill	-0.52	1001.83	CL 5	0.51
908	865,381.33	2,031,045.19	1001.83	1001.31	cont fill	-0.52	1001.83	CL 5	0.52
909	865,381.33	2,030,996.00	1001.83	1001.28	cont fill	-0.55	1001.81	CL 5	0.53
910	865,381.33	2,030,946.81	1001.83	1001.32	cont fill	-0.51	1001.83	CL 5	0.52
911	865,381.33	2,030,897.61	1001.83	1001.32	cont fill	-0.51	1001.83	CL 5	0.52
912	865,381.33	2,030,848.42	1001.83	1001.33	cont fill	-0.50	1001.90	CL 5	0.57
913	865,394.07	2,030,853.82	1001.70	1001.20	cont fill	-0.50	1001.75	topsoil	0.55
914	865,394.01	2,031,656.45	1001.70	1001.17	cont fill	-0.53	1001.69	topsoil	0.52
915	865,394.01	2,031,556.12	1001.70	1001.13	cont fill	-0.57	1001.63	topsoil	0.50
916	865,394.02	2,031,455.80	1001.70	1001.11	cont fill	-0.59	1001.63	topsoil	0.52
917	865,394.03	2,031,355.47	1001.70	1001.17	cont fill	-0.53	1001.68	topsoil	0.51
918	865,394.04	2,031,255.14	1001.70	1001.17	cont fill	-0.53	1001.69	topsoil	0.52
919	865,394.04	2,031,154.81	1001.70	1001.18	cont fill	-0.52	1001.70	topsoil	0.52
920	865,394.05	2,031,054.48	1001.70	1001.17	cont fill	-0.54	1001.69	topsoil	0.52
921	865,394.06	2,030,954.15	1001.70	1001.14	cont fill	-0.56	1001.69	topsoil	0.55
922	865,436.41	2,031,705.37	998.32	997.82	cont fill	-0.50	998.32	CL 5	0.50
923	865,413.41	2,031,702.54	999.00	998.46	cont fill	-0.54	999.00	CL 5	0.54
924	865,402.81	2,031,721.16	998.77	998.31	cont fill	-0.46	998.87	topsoil	0.56
925	865,402.65	2,031,707.97	998.82	998.31	cont fill	-0.51	998.86	topsoil	0.55
926	865,413.66	2,031,634.76	995.15	995.05	cont fill match	-0.10	995.08	topsoil match	0.03
927	865,403.16	2,031,610.36	998.65	998.13	cont fill	-0.52	998.65	topsoil	0.52
928	865,401.89	2,031,561.55	999.07	998.55	cont fill	-0.52	999.10	topsoil	0.54
929	865,402.10	2,031,466.94	999.02	998.49	cont fill	-0.53	999.04	topsoil	0.54
930	865,401.28	2,031,366.31	999.27	998.69	cont fill	-0.58	999.25	topsoil	0.56

	Design F/G			S/G As-built		S/G to Design Difference	F/G As-built		S/G to F/G Difference
Point	Northing	Easting	Elevation	Elevation	Desc.		Elevation	Desc.	
931	865,401.98	2,031,268.70	999.04	998.51	cont fill	-0.53	999.02	topsoil	0.51
932	865,401.47	2,031,171.08	999.21	998.64	cont fill	-0.57	999.16	topsoil	0.51
933	865,404.03	2,031,073.46	998.36	997.94	cont fill	-0.42	998.46	topsoil	0.52
934	865,401.76	2,030,975.85	999.11	998.59	cont fill	-0.52	999.09	topsoil	0.50
935	865,400.87	2,030,902.63	999.41	998.90	cont fill	-0.51	999.45	topsoil	0.54
947	865,250.23	2,032,071.76	998.14	997.63	cont fill	-0.51	998.20	topsoil	0.57
948	865,318.37	2,032,073.46	997.57	997.62	cont fill match	0.05	997.62	topsoil match	0.00
949	865,396.86	2,032,074.50	997.05	997.11	cont fill match	0.06	997.13	topsoil match	0.02
950	865,429.93	2,032,065.77	997.00	996.49	cont fill	-0.51	997.07	topsoil	0.58
951	865,466.65	2,032,038.01	997.00	997.03	cont fill match	0.03	997.08	topsoil match	0.05
952	865,487.44	2,031,994.39	997.40	996.89	cont fill	-0.51	997.41	topsoil	0.52
953	865,489.48	2,031,949.64	997.00	996.78	cont fill match	-0.22	996.79	topsoil match	0.01
954	865,475.71	2,031,881.04	997.00	997.11	cont fill match	0.11	997.14	topsoil match	0.03
955	865,459.31	2,031,812.31	997.85	997.41	cont fill	-0.44	997.94	topsoil	0.53
956	865,449.54	2,031,766.55	998.04	997.53	cont fill	-0.51	998.04	topsoil	0.51
957	865,404.37	2,031,991.88	1001.45	1000.94	cont fill	-0.51	1001.46	topsoil	0.52
				1000.45	cont fill toe		1001.00	topsoil	0.55
				1000.62	cont fill toe		1000.78	topsoil match	0.16
				997.48	cont fill toe		998.04	topsoil	0.56
				998.49	cont fill match		999.02	topsoil	0.53
				998.50	cont fill match		999.05	topsoil	0.54
				997.69	cont fill toe		998.26	topsoil	0.57
				998.38	cont fill toe		998.94	topsoil	0.56
				997.93	cont fill toe		998.51	topsoil	0.58
				998.08	cont fill toe		998.60	topsoil	0.52
				998.29	cont fill toe		998.82	topsoil	0.53
				997.72	cont fill toe		998.23	topsoil	0.51
				997.30	cont fill toe		997.83	topsoil	0.53
				996.83	cont fill toe		997.34	topsoil	0.51
				997.02	cont fill toe		997.55	topsoil	0.53
				997.31	cont fill toe		997.88	topsoil	0.57

Survey Verification Drawings

AS-BUILT SURVEY
2014 POND 3 VERTICAL EXPANSION
SHERCO GENERATING PLANT BECKER, MN



N

100 0 100
SCALE IN FEET

SCALE: 1" = 100'

LEGEND:

- Denotes dewatering riser
- Denotes cleanout pipe
- Denotes 6" bollard
- Denotes survey verification point
- Denotes gravel surface
- Denotes major contour
- Denotes minor contour

REV NO.	DATE	DESCRIPTION

DATE: 10/31/14
DESIGN BY:
DRAWN BY: DJ
CHECKED BY: CW
DWG FILE: VertExpAsblt
FILE NO.: 14-0200.00

I hereby certify that this survey, plan, or report was prepared by me or under my my direct supervision, and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.

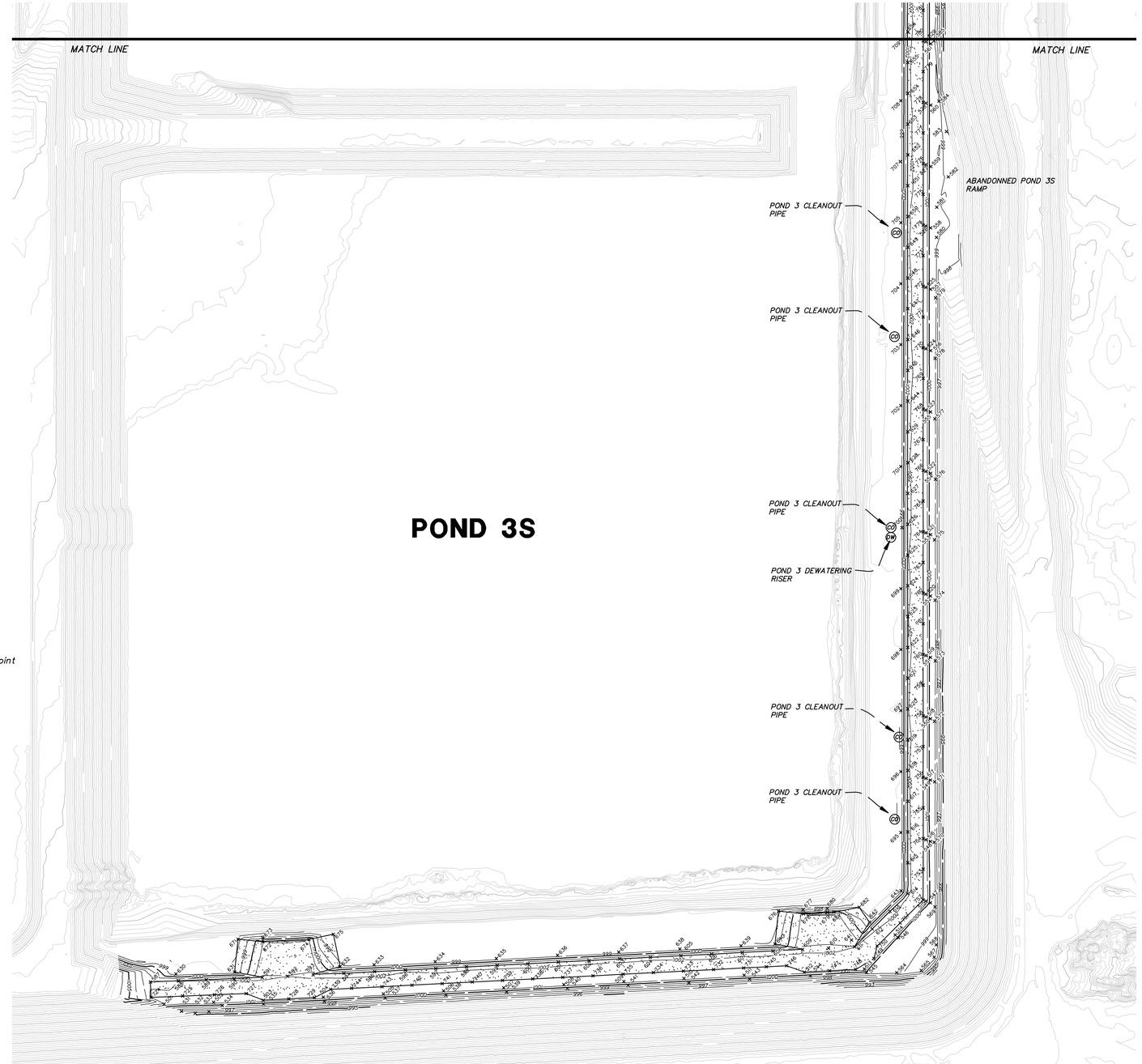
Signed: Craig Wensmann
Craig WENSMANN
Date: 11-4-14 Reg. No. 47466

BOGART, PEDERSON & ASSOCIATES, INC.
LAND SURVEYING
CIVIL ENGINEERING
MAPPING
13076 FIRST STREET, BECKER, MN 55308-9322
TEL: 763-262-8822 FAX: 763-262-8844

VEIT & COMPANY, INC.
SHERO PLANT
POND 3 VERT. EXPANSION
BECKER, MN

SHEET NO.
—
2

AS-BUILT SURVEY
2014 POND 3 VERTICAL EXPANSION
SHERCO GENERATING PLANT BECKER, MN



N

100 0 100
SCALE IN FEET

SCALE: 1" = 100'

LEGEND:

- DW — *Denotes dewatering riser*
- CO — *Denotes cleanout pipe*
- B — *Denotes 6" bollard*
- +123 — *Denotes survey verification point*
- *Denotes gravel surface*
- *Denotes major contour*
- *Denotes minor contour*

REV NO.	DATE	DESCRIPTION

DATE: 10/31/14
DESIGN BY:
DRAWN BY: DJ
CHECKED BY: CW
DWG FILE: VertExpAsblt
FILE NO.: 14-0200.00

I hereby certify that this survey, plan, or report was prepared by me or under my my direct supervision, and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.

Signed: Craig Wensmann
Date: 11-4-14 Reg. No. 47466

BOGART, PEDERSON & ASSOCIATES, INC.
LAND SURVEYING
CIVIL ENGINEERING
MAPPING
13076 FIRST STREET, BECKER, MN 55308-9322
TEL: 763-262-8822 FAX: 763-262-8844

VEIT & COMPANY, INC.
SHERO PLANT
POND 3 VERT. EXPANSION
BECKER, MN

SHEET NO. 2 / 2

Appendix D - Clay Test Reports

Clay Source Prequalification Test Reports
Clay Source Standard Proctor Test Reports
Clay In-place Density Test Reports
Clay In-place Permeability and Index Property Test Reports

Clay Source Prequalification Test Reports

Hydraulic Conductivity Test Data ASTM D5084

Project: Sherco Pond Date: 9/17/2014

Reported To: Veit & Company, Inc. Job No.: 9548

Boring No.:	CLP-1	CLP-2					
Sample No.:							
Date Sampled:							
Location:							
Sample Type:	Bulk	Bulk					
Soil Type:	Clayey Sand w/a little gravel (SC)	Sandy Lean Clay w/a little gravel (CL)					
Atterberg Limits							
LL							
PL							
PI							
Permeability Test	Reconstituted	Reconstituted					
Before Test Conditions: Saturation %:							
Porosity:							
Ht. (in):	3.00	3.00					
Dia. (in):	2.85	2.85					
Dry Density (pcf):	113.0	112.7					
Water Content:	16.1%	15.9%					
Test Type:	Falling	Falling					
Max Head (ft):	5.0	5.0					
Confining press. (Effective-psi):	2.0	2.0					
Trial No.:	4-8	4-8					
Water Temp °C:	22.0	22.0					
% Compaction	97.6%	97.2%					
% Saturation (After Test)	95.4%	95.4%					
Coefficient of Permeability							
K @ 20 °C (cm/sec)	**6.7×10^{-9}**	**2.0×10^{-8}**					
K @ 20 °C (ft/min)	**1.3×10^{-8}**	**3.9×10^{-8}**					
Notes:							

2401 W 66th Street SOIL ENGINEERING TESTING, INC. Richfield, Minnesota 55423-2031

Laboratory Test Summary

Project: Sherco Pond Job: 9548-A

Client: Veit & Company, Inc. Date: 9/24/2014

Sample Information & Classification

Boring #	CLP-1	CLP-2						
Sample #								
Depth (ft)								
Location								
Material Classification	Clayey Sand with a little gravel (SC/CL)	Sandy Lean Clay with a little gravel (CL/SC)						

Atterberg Limits

Liquid Limit (%)	30.8	30.4						
Plastic Limit (%)	14.0	13.2						
Plasticity Index (%)	16.8	17.2						

Sample Information & Classification

Boring #								
Location								
Depth (ft)								
Type or BPF								
Material Classification								

Atterberg Limits

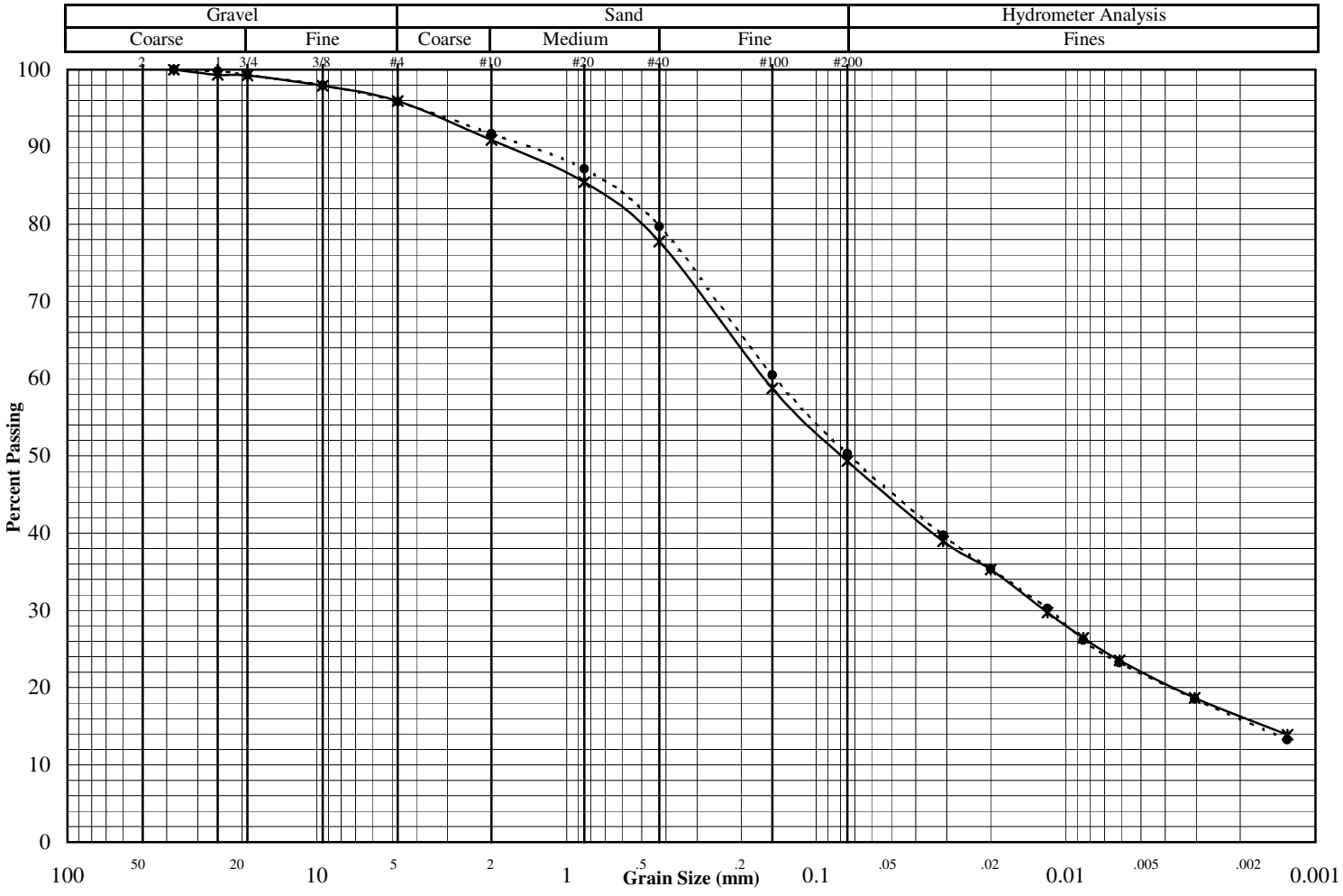
Liquid Limit (%)								
Plastic Limit (%)								
Plasticity Index (%)								

Grain Size Distribution ASTM D422

Job No. : **9548**

Project:	Sherco Pond	Test Date:	9/4/14
Reported To:	Veit & Company, Inc.	Report Date:	9/8/14

	Location / Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Classification
*	CLP-1			Bulk	Clayey Sand w/a little gravel (SC)
●	CLP-2			Bulk	Sandy Lean Clay w/a little gravel (CL)
◇					



Other Tests	*	●	◇
Liquid Limit			
Plastic Limit			
Plasticity Index			
Water Content	15.5	17.1	
Dry Density (pcf)			
Specific Gravity	2.69*	2.69*	
Porosity			
Organic Content			
pH			
Shrinkage Limit			
Penetrometer			
Qu (psf)			

(* = assumed)

Percent Passing	*	●	◇
Mass (g)	18927.0	18916.0	
2"			
1.5"	100.0	100.0	
1"	99.3	99.8	
3/4"	99.3	99.3	
3/8"	97.9	98.0	
#4	95.9	95.8	
#10	90.9	91.7	
#20	85.4	87.2	
#40	77.7	79.7	
#100	58.7	60.4	
#200	49.3	50.3	

	*	●	◇
D_{60}			
D_{30}			
D_{10}			
C_U			
C_C			

Remarks:

2401 W 66th Street

SOIL ENGINEERING TESTING, INC.

Richfield, Minnesota 55423-2031

Clay Source Standard Proctor Test Reports

Moisture Density Curve ASTM: D698, Method B

Project: **Sherco Pond** Date: **9/4/14**

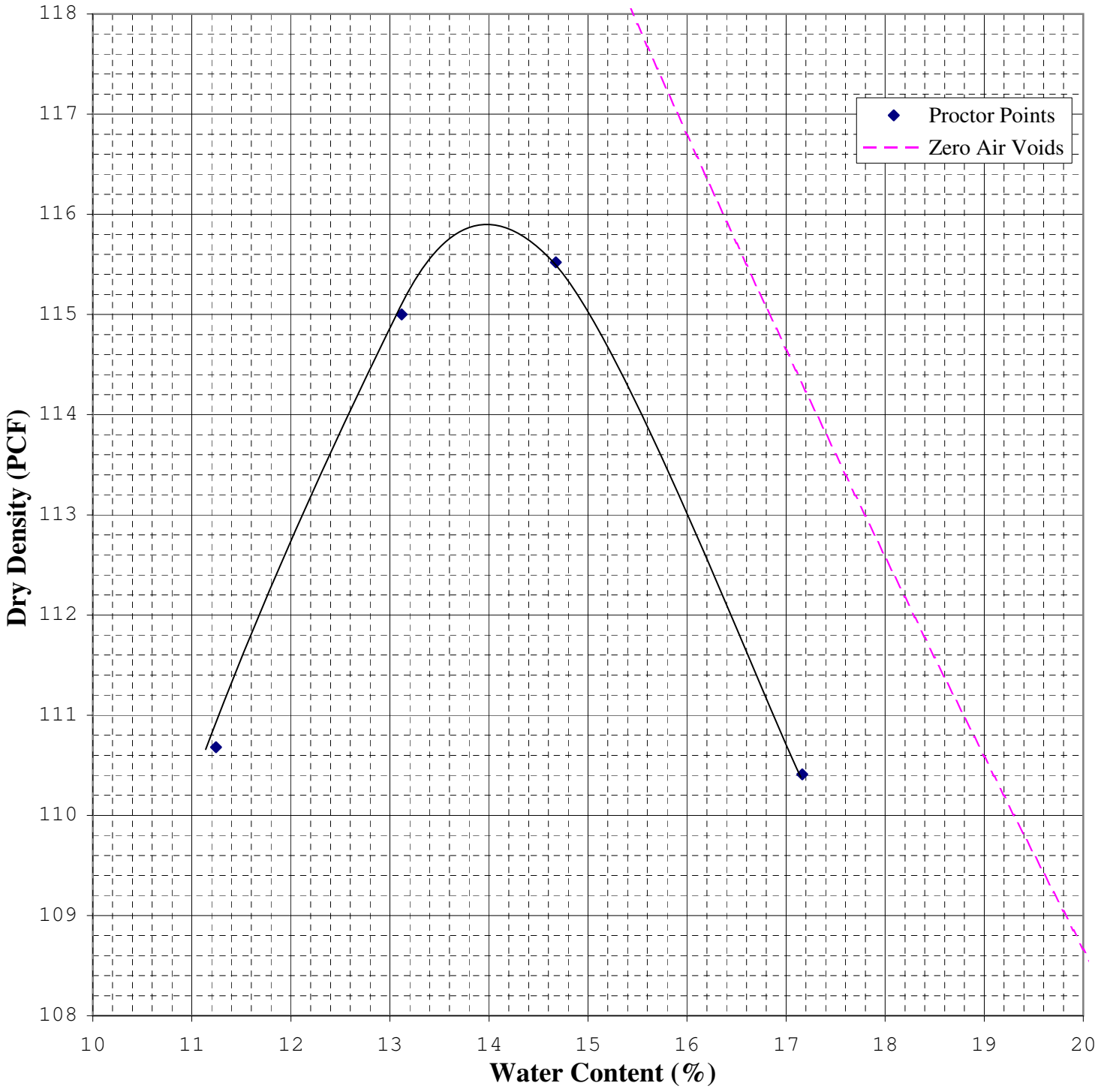
Client: **Veit & Company, Inc.** Job No. **9548**

Boring No. **CLP-2** Sample: Depth(ft): Location:

Soil Type: **Sandy Lean Clay w/a little gravel (CL)**

As Received W.C. (%): **17.1** LL: PL: PI: Specific Gravity: **2.67** *Assumed

Maximum Dry Density (pcf): **115.9** Opt. Water Content (%): **14.0**



2401 W 66th Street

SOIL ENGINEERING TESTING, INC.

Richfield, Minnesota 55423-2031

SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Sherco Pond** Date: **9/4/14**

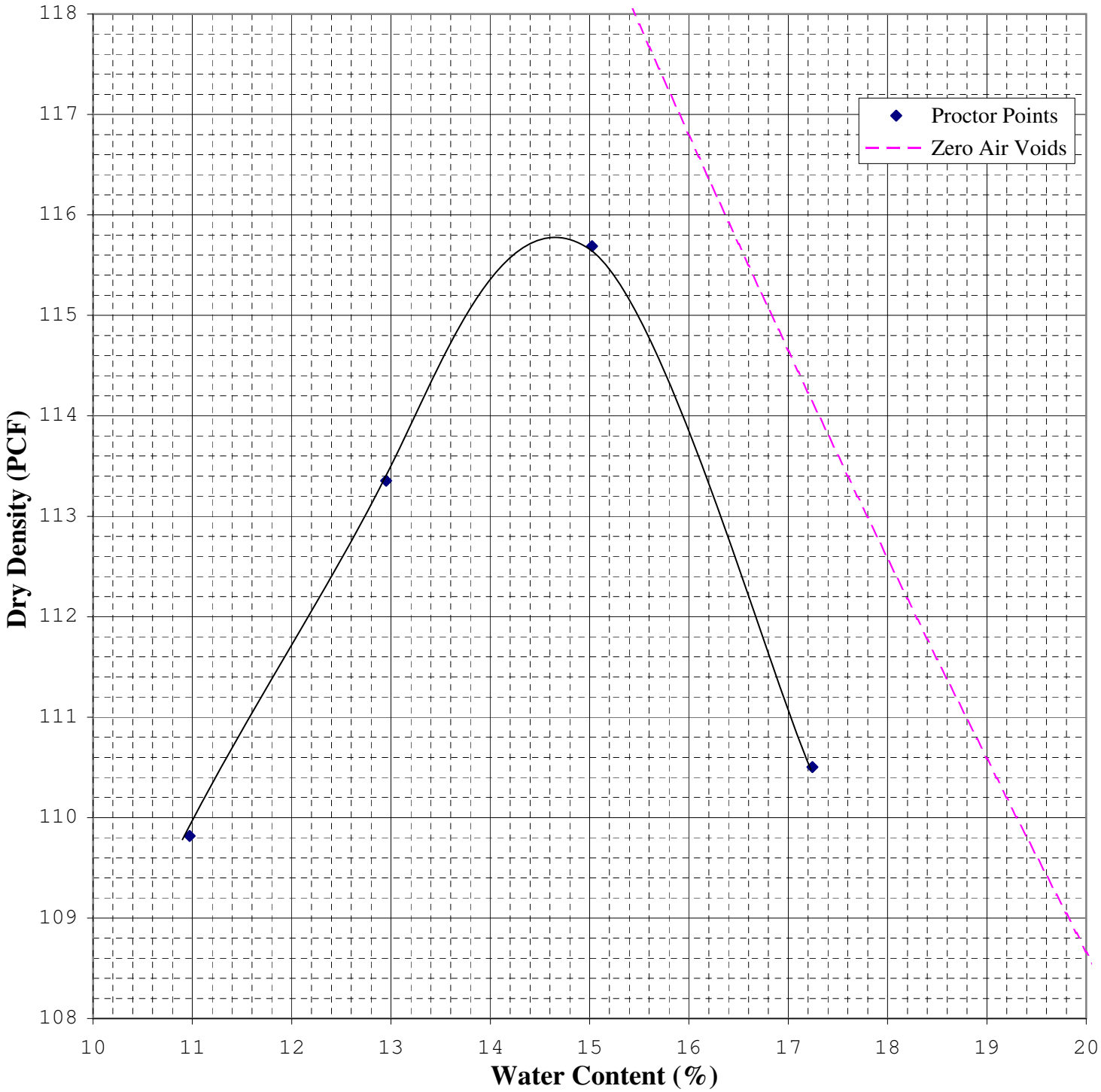
Client: **Veit & Company, Inc.** Job No. **9548**

Boring No. **CLP-1** Sample: Depth(ft): Location:

Soil Type: **Clayey Sand w/a little gravel (SC)**

As Received	W.C. (%):	LL:	PL:	PI:	Specific Gravity:	*Assumed
◆	**15.5**				**2.67**	
△						

Maximum Dry Density (pcf): **115.8** Opt. Water Content (%): **14.7**



2401 W 66th Street

SOIL ENGINEERING TESTING, INC.

Richfield, Minnesota 55423-2031

SET-R18a

Clay In-place Density Test Reports

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Field Density Test Report

Report No: ND:26-00822-W5
Issue No: 1

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

Becker, MN

Date of Issue: 9/30/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Testing Details

Tested By:	ALEX STERGER		
Date Tested:	9/22/2014		
Field Methods:	ASTM D 6938		
Gauge Type:	Troxler 3440 (NUCLEAR DENSITY GAUGE)	**Test Mode:**	Direct Transmission
Model Number:	3440	**Standard Count: Density:**	714
Serial Number:	36458	**Standard Count: Moisture:**	2543

Proctor Information

Sample ID	Material	Method	MDD (lb/ft³)	OMC (%)
26-00822-W4-S2 (SO)	Sandy Lean Clay, a little gravel, brown (CL)	ASTM D 698 (B)	115.9	14.0

Test Results

Test No.	Field Sample ID	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft³)	Comp (%)	Comp Spec	Results
1	CL-1	26-00822-W4-S2	12	135.1	15.4	+1.4	117.1	**101.0**	≥97	OK
2	CL-2	26-00822-W4-S2	12	135.6	15.6	+1.6	117.3	**101.2**	≥97	OK
3	CL-3	26-00822-W4-S2	12	136.4	17.0	+3.0	116.6	**100.6**	≥97	OK

Location

General Location: Pond 3 Clay

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
1	CL-1	N 862402, E 2030846, Elev: 995.7	995.7'	Elevation
2	CL-2	N 862411, E 2031049, Elev: 996.1	996.1'	Elevation
3	CL-3	N 862427, E 2031305, Elev: 995.8	995.8'	Elevation

Comments

(SO) = Sampled By Others
Our compaction testing was done on a will-call basis; therefore, AET cannot comment on the materials used or preparation of the fill, the lift thicknesses, or the compactive effort applied. Our tests only provide the percent compaction level and soil type data at the specific locations and elevations tested.
The Proctor value utilized to obtain the percent compaction is based upon the proctor provided by SET (Soil Engineering Testing).

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density
OK = All Results Meet Specification

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Field Density Test Report

Report No: ND:26-00822-W2
Issue No: 1

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

Becker, MN

Date of Issue: 9/30/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Testing Details

Tested By:	ALEX STERGER		
Date Tested:	9/23/2014		
Field Methods:	ASTM D 6938		
Gauge Type:	Troxler 3440 (NUCLEAR DENSITY GAUGE)	**Test Mode:**	
Model Number:	3440	**Standard Count: Density:**	714
Serial Number:	36458	**Standard Count: Moisture:**	2543

Proctor Information

Sample ID	Material	Method	MDD (lb/ft³)	OMC (%)
26-00822-W4-S1 (SO)	Clayey Sand, a little gravel, brown (SC)	ASTM D 698 (B)	115.8	14.7

Test Results

Test No.	Field Sample ID	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft³)	Comp (%)	Comp Spec	Results
1	CL-4	26-00822-W4-S1	12	136.3	16.2	+1.5	117.3	**101.3**	≥97	OK
2	CL-5	26-00822-W4-S1	12	136.1	18.3	+3.6	115.0	**99.3**	≥97	OK

Location

General Location: Pond 3 Clay

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
1	CL-4	N 862424, E 2031243, Elev: 996.6	996.6'	Elevation
2	CL-5	N 862404, E 2030884, Elev: 997.1	997.1'	Elevation

Comments

(SO) = Sampled By Others
Our compaction testing was done on a will-call basis; therefore, AET cannot comment on the materials used or preparation of the fill, the lift thicknesses, or the compactive effort applied. Our tests only provide the percent compaction level and soil type data at the specific locations and elevations tested.
The Proctor value utilized to obtain the percent compaction is based upon the proctor provided by SET (Soil Engineering Testing).

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density
OK = All Results Meet Specification

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Field Density Test Report

Report No: ND:26-00822-W3
Issue No: 1

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

Becker, MN

Date of Issue: 9/30/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Testing Details

Tested By:	ALEX STERGER		
Date Tested:	9/24/2014		
Field Methods:	ASTM D 6938		
Gauge Type:	Troxler 3440 (NUCLEAR DENSITY GAUGE)	**Test Mode:**	Direct Transmission
Model Number:	3440	**Standard Count: Density:**	714
Serial Number:	36458	**Standard Count: Moisture:**	2543

Proctor Information

Sample ID	Material	Method	MDD (lb/ft³)	OMC (%)
26-00822-W4-S2 (SO)	Sandy Lean Clay, a little gravel, brown (CL)	ASTM D 698 (B)	115.9	14.0

Test Results

Test No.	Field Sample ID	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft³)	Comp (%)	Comp Spec	Results
1	CL-6	26-00822-W4-S2	12	132.8	17.7	+3.7	112.8	**97.4**	≥97	OK
2	CL-7	26-00822-W4-S2	12	136.0	15.3	+1.3	118.0	**101.8**	≥97	OK

Location

General Location: Pond 3 Clay

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
1	CL-6	N 862411, E 2030922, Elev: 998.0	998.0'	Elevation
2	CL-7	N 862699, E 2031998, Elev: 995.9	995.9'	Elevation

Comments

(SO) = Sampled By Others
Our compaction testing was done on a will-call basis; therefore, AET cannot comment on the materials used or preparation of the fill, the lift thicknesses, or the compactive effort applied. Our tests only provide the percent compaction level and soil type data at the specific locations and elevations tested.
The Proctor value utilized to obtain the percent compaction is based upon the proctor provided by SET (Soil Engineering Testing).

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density
OK = All Results Meet Specification

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Field Density Test Report

Report No: ND:26-00822-W6
Issue No: 1

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

Becker, MN

Date of Issue: 9/30/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Testing Details

Tested By:	ALEX STERGER		
Date Tested:	9/25/2014		
Field Methods:	ASTM D 6938		
Gauge Type:	Troxler 3440 (NUCLEAR DENSITY GAUGE)	**Test Mode:**	Direct Transmission
Model Number:	3440	**Standard Count: Density:**	714
Serial Number:	36458	**Standard Count: Moisture:**	2543

Proctor Information

Sample ID	Material	Method	MDD (lb/ft³)	OMC (%)
26-00822-W4-S2 (SO)	Sandy Lean Clay, a little gravel, brown (CL)	ASTM D 698 (B)	115.9	14.0

Test Results

Test No.	Field Sample ID	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft³)	Comp (%)	Comp Spec	Results
1	CL-8	26-00822-W4-S2	12	136.5	15.6	+1.6	118.1	**101.9**	≥97	OK
2	CL-9	26-00822-W4-S2	12	135.9	17.3	+3.3	115.9	**100.0**	≥97	OK
3	CL-10	26-00822-W4-S2	12	135.4	16.1	+2.1	116.6	**100.7**	≥97	OK
4	Cl-11	26-00822-W4-S2	12	134.2	15.7	+1.7	116.0	**100.1**	≥97	OK
5	CL-12	26-00822-W4-S2	12	132.4	16.3	+2.3	113.8	**98.3**	≥97	OK
6	CL-13	26-00822-W4-S2	12	132.4	17.2	+3.2	113.0	**97.5**	≥97	OK

Location

General Location: Pond 3 Clay

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
1	CL-8	N 863910, E 2031999, Elev: 996.0	996.0'	Elevation
2	CL-9	N 863026, E 2031997, Elev: 997.1	997.1'	Elevation

General Location: Pond 3 Skirt

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
3	CL-10	N 863545, E 2031997, Elev: 997.0	997.0'	Elevation

General Location: Pond 3 Clay

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
4	Cl-11	N 864045, E 2031998, Elev: 997.1	997.1'	Elevation
5	CL-12	N 864641, E 2031999, Elev: 996.1	996.1'	Elevation
6	CL-13	N 865108, E 2031998, Elev: 996.0	996.0'	Elevation

Comments

(SO) = Sampled By Others
Our compaction testing was done on a will-call basis; therefore, AET cannot comment on the materials used or preparation of the fill, the lift thicknesses, or the compactive effort applied. Our tests only provide the percent compaction level and soil type data at the specific locations and elevations tested.
The Proctor value utilized to obtain the percent compaction is based upon the proctor provided by SET (Soil Engineering Testing).

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density
OK = All Results Meet Specification

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Field Density Test Report

Report No: ND:26-00822-W7
Issue No: 1

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

Becker, MN

Date of Issue: 9/30/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Testing Details

Tested By:	ALEX STERGER		
Date Tested:	9/26/2014		
Field Methods:	ASTM D 6938		
Gauge Type:	Troxler 3440 (NUCLEAR DENSITY GAUGE)	**Test Mode:**	Direct Transmission
Model Number:	3440	**Standard Count: Density:**	714
Serial Number:	36458	**Standard Count: Moisture:**	2543

Proctor Information

Sample ID	Material	Method	MDD (lb/ft³)	OMC (%)
26-00822-W4-S2 (SO)	Sandy Lean Clay, a little gravel, brown (CL)	ASTM D 698 (B)	115.9	14.0

Test Results

Test No.	Field Sample ID	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft³)	Comp (%)	Comp Spec	Results
1	CI-14	26-00822-W4-S2	12	133.2	15.5	+1.5	115.3	**99.5**	≥97	OK
2	CL-15	26-00822-W4-S2	12	133.4	18.0	+4.0	113.1	**97.6**	≥97	OK
3	CL-16	26-00822-W4-S2	12	132.4	17.3	+3.3	112.9	**97.4**	≥97	OK

Location

General Location: Pond 3 Clay

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
1	CI-14	N 865009, E 2031999, Elev: 997.1	997.1'	Elevation
2	CL-15	N 865364, E 2031033, Elev: 996.1	996.1'	Elevation
3	CL-16	N 865364, E 2031528, Elev: 996.1	996.1'	Elevation

Comments

(SO) = Sampled By Others
Our compaction testing was done on a will-call basis; therefore, AET cannot comment on the materials used or preparation of the fill, the lift thicknesses, or the compactive effort applied. Our tests only provide the percent compaction level and soil type data at the specific locations and elevations tested.
The Proctor value utilized to obtain the percent compaction is based upon the proctor provided by SET (Soil Engineering Testing).

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density
OK = All Results Meet Specification

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Field Density Test Report

Report No: ND:26-00822-W8
Issue No: 1

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

Becker, MN

Date of Issue: 9/30/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Testing Details

Tested By:	ALEX STERGER		
Date Tested:	9/29/2014		
Field Methods:	ASTM D 6938		
Gauge Type:	Troxler 3440 (NUCLEAR DENSITY GAUGE)	**Test Mode:**	Direct Transmission
Model Number:	3440	**Standard Count: Density:**	714
Serial Number:	36458	**Standard Count: Moisture:**	2543

Proctor Information

Sample ID	Material	Method	MDD (lb/ft³)	OMC (%)
26-00822-W4-S2 (SO)	Sandy Lean Clay, a little gravel, brown (CL)	ASTM D 698 (B)	115.9	14.0

Test Results

Test No.	Field Sample ID	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft³)	Comp (%)	Comp Spec	Results
1	CL-17	26-00822-W4-S2	12	134.0	18.0	+4.0	113.6	**98.0**	≥97	OK
2	CL-18	26-00822-W4-S2	12	132.5	16.8	+2.8	113.4	**97.9**	≥97	OK
3	CL-19	26-00822-W4-S2	12	136.2	15.6	+1.6	117.8	**101.7**	≥97	OK

Location

General Location: Pond 3 Clay

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
1	CL-17	N 865363, E 2031602, Elev: 997.0	997.0'	Elevation
2	CL-18	N 865365, E 2031104, Elev: 997.1	997.1'	Elevation
3	CL-19	N 863032, E 2031992, Elev: 998.4	998.4'	Elevation

Comments

(SO) = Sampled By Others
Our compaction testing was done on a will-call basis; therefore, AET cannot comment on the materials used or preparation of the fill, the lift thicknesses, or the compactive effort applied. Our tests only provide the percent compaction level and soil type data at the specific locations and elevations tested.
The Proctor value utilized to obtain the percent compaction is based upon the proctor provided by SET (Soil Engineering Testing).

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density
OK = All Results Meet Specification

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Field Density Test Report

Report No: ND:26-00822-W9
Issue No: 1

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

Becker, MN

Date of Issue: 9/30/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Testing Details

Tested By:	ALEX STERGER		
Date Tested:	9/30/2014		
Field Methods:	ASTM D 6938		
Gauge Type:	Troxler 3440 (NUCLEAR DENSITY GAUGE)	**Test Mode:**	Direct Transmission
Model Number:	3440	**Standard Count: Density:**	714
Serial Number:	36458	**Standard Count: Moisture:**	2543

Proctor Information

Sample ID	Material	Method	MDD (lb/ft³)	OMC (%)
26-00822-W4-S2 (SO)	Sandy Lean Clay, a little gravel, brown (CL)	ASTM D 698 (B)	115.9	14.0

Test Results

Test No.	Field Sample ID	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft³)	Comp (%)	Comp Spec	Results
1	CL-20	26-00822-W4-S2	12	135.0	17.8	+3.8	114.6	**98.9**	≥97	OK
2	CL-21	26-00822-W4-S2	12	135.8	15.5	+1.5	117.6	**101.5**	≥97	OK

Location

General Location: Pond 3 Clay

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
1	CL-20	N 863616, E 2031991, Elev: 998.3	998.3'	Elevation
2	CL-21	N 864300, E 2031993, Elev: 998.2	998.2'	Elevation

Comments

(SO) = Sampled By Others
Our compaction testing was done on a will-call basis; therefore, AET cannot comment on the materials used or preparation of the fill, the lift thicknesses, or the compactive effort applied. Our tests only provide the percent compaction level and soil type data at the specific locations and elevations tested.
The Proctor value utilized to obtain the percent compaction is based upon the proctor provided by SET (Soil Engineering Testing).

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density
OK = All Results Meet Specification

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Field Density Test Report

Report No: ND:26-00822-W10
Issue No: 1

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

Becker, MN

Date of Issue: 10/7/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Testing Details

Tested By:	ALEX STERGER		
Date Tested:	10/2/2014		
Field Methods:	ASTM D 6938		
Gauge Type:	Troxler 3440 (NUCLEAR DENSITY GAUGE)	**Test Mode:**	Direct Transmission
Model Number:	3440	**Standard Count: Density:**	714
Serial Number:	36458	**Standard Count: Moisture:**	2543

Proctor Information

Sample ID	Material	Method	MDD (lb/ft³)	OMC (%)
26-00822-W4-S2 (SO)	Sandy Lean Clay, a little gravel, brown (CL)	ASTM D 698 (B)	115.9	14.0

Test Results

Test No.	Field Sample ID	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft³)	Comp (%)	Comp Spec	Results
1	CL-22	26-00822-W4-S2	12	133.2	16.5	+2.5	114.3	**98.7**	≥97	OK
2	CL-23	26-00822-W4-S2	12	138.5	15.7	+1.7	119.7	**103.3**	≥97	OK
3	CL-24	26-00822-W4-S2	12	134.7	16.6	+2.6	115.5	**99.7**	≥97	OK

Location

General Location: Pond 3 Clay

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
1	CL-22	N 864829, E 2031992, Elev: 998.3	998.3'	Elevation
2	CL-23	N 865361, E 2031689, Elev: 998.2	998.2'	Elevation
3	CL-24	N 865359, E 2031250, Elev: 998.3	998.3'	Elevation

Comments

(SO) = Sampled By Others

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density
OK = All Results Meet Specification

Clay In-place Permeability and Index Property Test Reports

Hydraulic Conductivity Test Data ASTM D5084

Project: Sherco Pond Date: 10/6/2014

Reported To: Veit & Company, Inc. Job No.: 9548-B

Boring No.:	CL TW-1	CL TW-2					
Sample No.:							
Elevation	998.0	998.3					
Location:	N 862429 E 2031302	N 865359 E 2031243					
Sample Type:	TWT	TWT					
Soil Type:	Clayey Sand w/a little gravel (SC)	Clayey Sand w/a little gravel (SC)					
Atterberg Limits							
LL	30.1	31.0					
PL	12.7	12.3					
PI	17.4	18.7					
Permeability Test	Intact	Intact					
Before Test Conditions: Saturation %:							
Porosity:							
Ht. (in):	2.32	2.77					
Dia. (in):	2.88	2.88					
Dry Density (pcf):	115.9	114.8					
Water Content:	15.5%	16.0%					
Test Type:	Falling	Falling					
Max Head (ft):	5.0	5.0					
Confining press. (Effective-psi):	2.0	2.0					
Trial No.:	5-9	5-9					
Water Temp °C:	20.0	20.0					
% Compaction							
% Saturation (After Test)	97.2%	97.3%					
Coefficient of Permeability							
K @ 20 °C (cm/sec)	**1.3×10^{-8}**	**2.4×10^{-8}**					
K @ 20 °C (ft/min)	**2.5×10^{-8}**	**4.8×10^{-8}**					
Notes:							

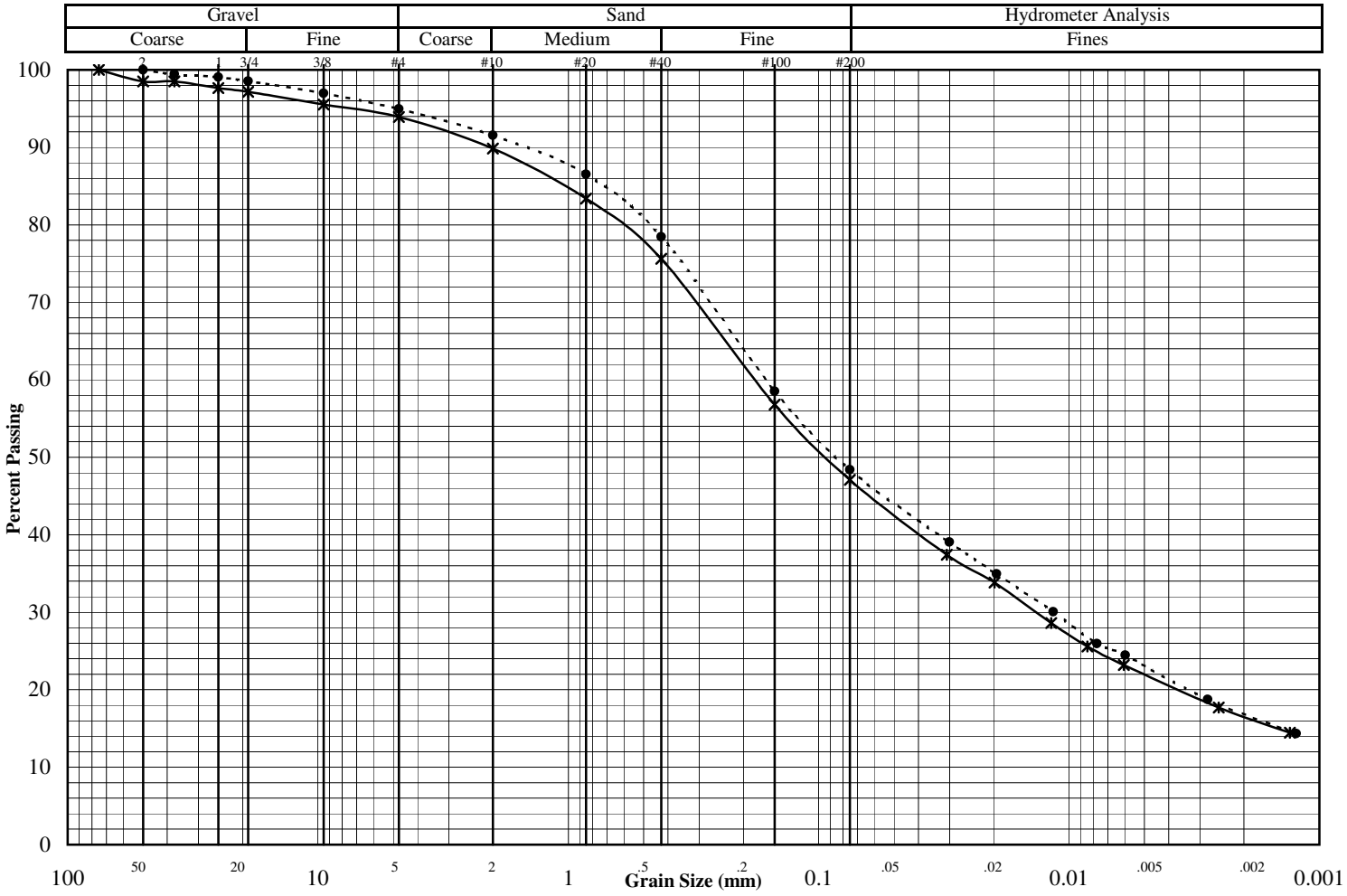
2401 W 66th Street
SOIL ENGINEERING TESTING, INC.
Richfield, Minnesota 55423-2031

Grain Size Distribution ASTM D422

Job No. : **9548-B**

Project:	Sherco Pond	Test Date:	10/3/14
Reported To:	Veit & Company, Inc.	Report Date:	10/9/14

	Location / Boring No.	Sample No.	Elevation	Sample Type	Soil Classification
*	N 862429 E 2031302	CL-TW1	998.0	Bag	Clayey Sand with a little gravel (CL)
●	N 865359 E 2031243	CL-TW2	998.3	Bag	Clayey Sand with a little gravel (CL)
◇					



Other Tests	*	●	◇
Liquid Limit	30.1	31.0	
Plastic Limit	12.7	12.3	
Plasticity Index	17.4	18.7	
Water Content	14.7	16.0	
Dry Density (pcf)			
Specific Gravity	2.69*	2.69*	
Porosity			
Organic Content			
pH			
Shrinkage Limit			
Penetrometer			
Qu (psf)			

(* = assumed)

Percent Passing	*	●	◇
Mass (g)	16172.0	21519.0	
2"	98.5	100.0	
1.5"	98.5	99.4	
1"	97.6	99.1	
3/4"	97.1	98.6	
3/8"	95.5	97.0	
#4	93.9	94.9	
#10	89.8	91.5	
#20	83.4	86.5	
#40	75.6	78.5	
#100	56.8	58.5	
#200	47.1	48.4	

	*	●	◇
D_{60}			
D_{30}			
D_{10}			
C_U			
C_C			

Remarks:

2401 W 66th Street

SOIL ENGINEERING TESTING, INC.

Richfield, Minnesota 55423-2031

Appendix E - Controlled Fill Test Reports

In-Place Proctor Test Reports
In-Place Density Test Reports

In-place Proctor Test Reports

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Proctor Report

Report No: PTR:26-00822-W4-S4
Issue No: 2

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

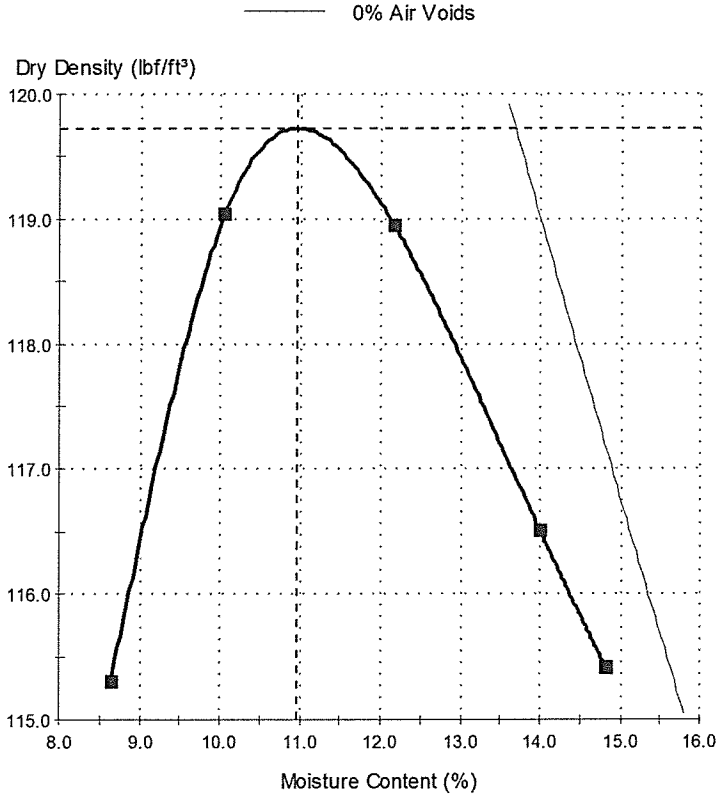
Becker, MN

Date of Issue: 10/17/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Sample Details

Sample ID: 26-00822-W4-S4 **Date Sampled:** 9/29/2014
Sampling Method: Sampled By American Eng & Testing
Source: On-Site Fill
Material: Sand w/ Silt, a little gravel, fine to medium grained, brown (SP-SM)
Specification:
Location: Control Borrow Area West of Trailer
Tested By: KRISTINE BORDAK **Date Tested:** 9/30/2014

Dry Density - Moisture Content Relationship



Test Results

ASTM D 698 - 2007

Maximum Dry Density (lbf/ft³):	**119.7**
Corrected Maximum Dry Density (lbf/ft³):	**119.7**
Optimum Moisture Content (%):	**11.0**
Corrected Optimum Moisture Content (%):	**11.0**
Method:	A
Preparation Method:	Dry
Received Moisture Content (%):	4
Specific Gravity (Fines):	2.60
Retained Sieve No 4 (4.75mm) (%):	9
Passing Sieve No 4 (4.75mm) (%):	91

Comments

Proctor: RFP 1 (AET - 2)
Jar: #7
Intended Use: Clay Berm Fill

In-place Density Test Reports

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Field Density Test Report

Report No: ND:26-00822-W13
Issue No: 1

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

Becker, MN

Date of Issue: 10/7/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Testing Details

Tested By:	ALEX STERGER		
Date Tested:	10/6/2014		
Field Methods:	ASTM D 6938		
Gauge Type:	Troxler 3440 (NUCLEAR DENSITY GAUGE)	**Test Mode:**	Direct Transmission
Model Number:	3440	**Standard Count: Density:**	714
Serial Number:	36458	**Standard Count: Moisture:**	2529

Proctor Information

Sample ID	Material	Method	MDD (lb/ft³)	OMC (%)
26-00822-W4-S4	Sand w/ Silt, a little gravel, fine to medium grained, brown (SP-SM)	ASTM D 698 (A)	119.7	11.0

Test Results

Test No.	Field Sample ID	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft³)	Comp (%)	Comp Spec	Results
1	RF-1	26-00822-W4-S4	12	126.4	4.6	-6.4	120.8	**100.9**	≥95	OK
2	RF-2	26-00822-W4-S4	12	120.2	4.8	-6.2	114.7	**95.8**	≥95	OK

Location

General Location: Pond 3 Sand

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
1	RF-1	N 862414, E 2031278, Elev: 1000.5	1000.5'	Elevation
2	RF-2	N 862426, E 2031277, Elev: 1001.5	1001.5'	Elevation

Comments

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density
OK = All Results Meet Specification

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Field Density Test Report

Report No: ND:26-00822-W14
Issue No: 1

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

Becker, MN

Date of Issue: 10/15/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Testing Details

Tested By:	ALEX STERGER		
Date Tested:	10/7/2014		
Field Methods:	ASTM D 6938		
Gauge Type:	Troxler 3440 (NUCLEAR DENSITY GAUGE)	**Test Mode:**	Direct Transmission
Model Number:	3440	**Standard Count: Density:**	714
Serial Number:	36458	**Standard Count: Moisture:**	2529

Proctor Information

Sample ID	Material	Method	MDD (lb/ft³)	OMC (%)
26-00822-W4-S4	Sand w/ Silt, a little gravel, fine to medium grained, brown (SP-SM)	ASTM D 698 (A)	119.7	11.0

Test Results

Test No.	Field Sample ID	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft³)	Comp (%)	Comp Spec	Results
1	RF-3	26-00822-W4-S4	12	125.4	5.5	-5.5	118.9	**99.3**	≥95	OK
2	RF-4	26-00822-W4-S4	12	126.2	4.7	-6.3	120.5	**100.7**	≥95	OK

Location

General Location: Pond 3 Sand

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
1	RF-3	N 863161, E 2032002, Elev: 1000.5	1000.5'	Elevation
2	RF-4	N 863162, E 2032000, Elev: 1001.5	1001.5'	Elevation

Comments

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density
OK = All Results Meet Specification

American Engineering Testing, Inc.
Saint Paul | Albertville
550 Cleveland Ave N | 5548 Barthel Ind Dr, Ste 500
St. Paul, MN 55114 | Albertville, MN 55301
(651)659-9001 | (763)428-5573
Toll Free:(800)972-6364
www.amengtest.com

Field Density Test Report

Report No: ND:26-00822-W16
Issue No: 1

Client: VEIT & COMPANY INC. **CC:** Mitch Sumstad

Project: 26-00822
Sherco 2014 Construction Project
Sherco Power Plant

Becker, MN

Date of Issue: 10/15/2014
Reviewed By: GENE ERZAR
Engineering Assistant

Testing Details

Tested By:	ALEX STERGER		
Date Tested:	10/14/2014		
Field Methods:	ASTM D 6938		
Gauge Type:	Troxler 3440 (NUCLEAR DENSITY GAUGE)	**Test Mode:**	Direct Transmission
Model Number:	3440	**Standard Count: Density:**	714
Serial Number:	36458	**Standard Count: Moisture:**	2529

Proctor Information

Sample ID	Material	Method	MDD (lb/ft³)	OMC (%)
26-00822-W4-S4	Sand w/ Silt, a little gravel, fine to medium grained, brown (SP-SM)	ASTM D 698 (A)	119.7	11.0

Test Results

Test No.	Field Sample ID	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft³)	Comp (%)	Comp Spec	Results
1	RF-5	26-00822-W4-S4	12	120.7	3.6	-7.4	116.5	**97.3**	≥95	OK
2	RF-6	26-00822-W4-S4	12	125.0	5.4	-5.6	118.6	**99.1**	≥95	OK
3	RF-7	26-00822-W4-S4	12	118.2	3.3	-7.7	114.4	**95.6**	≥95	OK
4	RF-8	26-00822-W4-S4	12	120.2	3.8	-7.2	115.8	**96.7**	≥95	OK

Location

General Location: Pond 3 Sand

Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer
1	RF-5	N 864425, E 2031998, Elev: 1000.5	1000.5'	Elevation
2	RF-6	N 864446, E 2031996, Elev: 1001.4	1001.4'	Elevation
3	RF-7	N 865370, E 2031524, Elev: 1000.4	1000.4'	Elevation
4	RF-8	N 865364, E 2031413, Elev: 1001.5	1001.5'	Elevation

Comments

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density
OK = All Results Meet Specification

Appendix F – Turf Establishment Information

Seed Mix Tag, Fertilizer Tag, Mulch Information, Erosion Control Blanket Spec Sheet

Seed Mix Tag, Fertilizer Tag, Mulch Information, Erosion Control Blanket Spec. Sheet

SEED MIX

MN 25-121 AGASSIZ SEED 3660 KENNEBEC DR EAGAN MN LOT 314073

KIND	PURITY	GERM	HS	TOTALGERM	ORIGIN
SMOOTH BROME*	12.89%	87%		87%	CAN
SLENDER WHEATGRASS*	3.24%	87%		87%	CAN
HARD FESCUE*	6.94%	85%		85%	OR
PERENNIAL RYEGRASS*	21.99%	97%		97%	MN
PARK KY BLUEGRASS	25.15%	87%		87%	MN
CANADA BLUEGRASS*	12.33%	85%		85%	WA
SWITCHGRASS*	2.46%	38%	58%	96%	MN
LITTLE BLUESTEM*	1.99%	37%	54%	91%	MN
SNAKE RIVER SAND DROPSEED	2.43%	94%		94%	WA
MN PURPLE PRAIRIE CLOVER	.81%	33%	65%	98%	MN
RED CLOVER*	7.33%	88%	02%	90%	MN

CROP 0.13% INERT 1.05 WEEDS 0.25% NOXIOUS 0.01% *DENOTE
VARITY NOT STATED TEST 1/14 NET WT 50LBS TOTAL PLS WT 44.09LBS
THIS BAG WILL SEED .6931 ACRES @ 61PLS LB PER ACREAPPLY AT 69.18L

WARRANTY: Seller warrants to the purchaser that the seeds described on the tag are as stated within acceptable tolerances. Seller gives no further warranties of the seed, express or implied, of merchantability or fitness for any particular purpose, nor any other warranty against loss of yield or for any reason or cause, including environmental conditions. The parties agree the buyer's sole and exclusive remedy against Seller in the purchase/sales of the seed, and that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any incidental or consequential loss) shall be available to the purchaser. The parties further agree the purchaser may return seed within fifteen (15) days after purchase for refund of the purchase price and, unless the seed is returned within (15) days, the purchaser accepts these terms.

Approved Seed Vendor

MINNESOTA DEPARTMENT OF TRANSPORTATION

The supplier warrants at the time of shipment that the seed contained in this package meets current requirements as specified in the Minnesota Department of Transportation Technical Memorandums, Special Provisions and Standard Specifications for Construction.

VERIFICATION:
Minnesota Crop Improvement Association verifies that the seed supplier has been approved to supply seed for Minnesota Department of Transportation projects.

NOTICE TO BUYER:
EXCLUSION OF WARRANTIES AND LIMITATIONS OF DAMAGES
The foregoing verification is in lieu of all other warranties, expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. There are not warranties which extend beyond the description on the face hereof. In no case shall Minnesota Crop Improvement Association be liable for any actual, special, incidental or consequential damages for any cause, including breach of contract, breach of warranty, negligence, or any other legal theory, with respect to the sale of this product.

MCIA™ MINNESOTA CROP IMPROVEMENT ASSOCIATION
1900 Hendon Ave
St. Paul, MN 55108

N° 47251

FERTILIZER

GUARANTEED ANALYSIS

Total Nitrogen [N] .....19.....

Available Phosphoric Acid [P205}..19.

Soluble Potash [K20] .....19.....

Sulfur.....

50 LBS. NET WEIGHT

Manufactured by
Centra Sota
St. Martin, Minnesota

MULCH

Neaton Brothers Erosion, LLC
3480 County Road 21
Mayer, MN 55360
952-955-2412 phone / 952-955-3582 fax
www.neatonbrothers.com / admin@neatonbrothers.com

Submittal for Type 1 Hay Mulch

All mulch products used by Neaton Brothers are grown on company fields. Mulch consists of clean hay, and not other objectionable foreign matter.

All mulch products are applied with Hay Buster by Neaton Brothers employees.

EROSION CONTROL BLANKET

Specification Sheet

SFP-2s

Netting Description
* two sided degradable polypropylene green netting

Machine Direction Strand Count	21.30 strands per 10 inches
2.13 strands per inch	
Transverse Direction Strand Count	20.00 strands per 10 inches
2.00 strands per inch	
SP Machine Direction Mesh Size	0.47 inches, mid strand to midstrand
Transverse Direction Mesh Size	050 inches, mid strand to mid strand
SP Machine Direction Break Load	15.97 lbs per 3 inches
Transverse Direction Break Load	15.00 lbs per 3 inches
Product Weight	17.7 lbs. per 1000 sq. yds.

Thread Description
Polypropylene biodegradable multifilament thread

Straw
Straw is 100% agricultural straw
Straw is minimum of 0.5 lbs/sy

Blanket Longevity
Approximately 12 months