CLOSURE AND POST-CLOSURE PLAN

CLOSURE AND POST-CLOSURE PLAN

Ash Pond 91 CCR Surface Impoundment
Coal Creek Station
Great River Energy

Submitted To: Great River Energy
Coal Creek Station
2875 Third Street SW
Underwood, North Dakota 58576

Submitted By: Golder Associates Inc.
44 Union Boulevard, Suite 300
Lakewood, Colorado 80228

October 13, 2016 **1649586**

Golder Associates

Table of Contents

List of Figures

List of Appendices

1.0 INTRODUCTION

Great River Energy (GRE) owns and operates Coal Creek Station (CCS) located near Underwood, North Dakota. GRE manages coal combustion residuals (CCR) in several existing landfills and surface impoundments including the Ash Pond 91 CCR Surface Impoundment (Ash Pond 91). Ash Pond 91 is located approximately 0.5 miles east of the CCS generating units (see Figure 1).

Golder Associates Inc. (Golder) has prepared this closure plan and post-closure plan for Ash Pond 91 on behalf of GRE to serve as the written closure plan required under 40 CFR Section 257.102(b) (§257.102(b)), and the written post-closure plan required under §257.104(d). The facility will be closed with CCRs left in place in accordance with the requirements of §257.102(d) (EPA 2015). At the completion of closure activities in accordance with the closure plan, the post-closure care period will commence.

2.0 CLOSURE PLAN

2.1 Narrative Description of Facility Closure

The lined Ash Pond 91 footprint compromises approximately 75 acres. Ash Pond 91 will piggyback onto the adjacent Upstream Raise CCR Surface Impoundment (Upstream Raise) to the east. The final configuration of Ash Pond 91 is shown on the final waste grades and final cover grades drawings (Golder 2015a, Appendix A). The total area that will receive final cover (including the piggyback area) is approximately 90 acres.

Ash Pond 91 will be closed incrementally as CCR placement progresses, through construction of both temporary and final cover. The incremental closure allows placement of temporary and/or final cover on final outside slopes to aid in dust control, and to allow shedding of non-contact storm water from the facility. Installation of final cover will occur when a substantial portion of side-slope and/or cap area has reached final CCR design grades. Future final cover will be installed in accordance with the Closure Plan in effect at the time of closure.

The primary closure activities include drainage and stabilization of CCR, adjusting CCR grades if necessary, installing the final cover system with surface water controls, and establishing vegetation.

2.1.1 Drainage and Stabilization of CCR

Ash Pond 91 will be operated as a CCR surface impoundment receiving sluiced flue-gas desulfurization (FGD) material, and dry CCR material until the design FGD grades are met. After FGD sluicing is completed, free water will be decanted off the surface of the FGD material and a cap of dry CCR material will be placed over the FGD material. This dry CCR cap will assist in consolidation and stabilization of the FGD material, and will provide a minimum 3% slope on the top of the facility to promote surface water run-off. It is expected that the placement of the dry CCR cap will take several years, over which time

consolidation of the FGD material will occur. As required, additional dry CCR material will be placed over consolidated areas as they are identified.

During placement of the dry CCR cap, drainage of the FGD material will continue through the bottom ash perimeter drain, sumps, and the crossover culverts connecting Ash Pond 91 to the Drains Pond System CCR Surface Impoundment (Drains Pond System). The bottom ash perimeter drain is 100 to 150 feet wide and surrounds the FGD material on the north, west, and south sides. Seepage pipes within the bottom ash perimeter drain will collect water and convey it to the pool in the northwest corner of Ash Pond 91, which flows to the Drains Pond System via crossover culverts. An existing sump in the northeast corner of Ash Pond 91 is connected to piping and drainage medium (sand) across the floor of Ash Pond 91. Water pumped from the sump will be directed to the Drains Pond System. Portable pumps may also be installed within the pool in the northwest corner of Ash Pond 91 to remove water from Ash Pond 91.

Through the combination of consolidation and drainage, the FGD material will be stabilized and prepared to support the final cover system.

2.1.2 Final Cover System Installation

The final cover system will be installed using conventional soil placement techniques and common earthmoving equipment, such as bulldozers, haul trucks, scrapers, motor graders, and/or compactors. Soils that are suitable for use in the final cover system will be obtained from select on-site stockpiles and borrow sources. Disruption of the integrity of the final cover system will be inhibited by compacting the underlying CCRs to establish a firm and unyielding subgrade prior to installation of the final cover system and by establishing a slope of approximately 3% to 5% across the top surface to provide positive drainage, limit ponding, and mitigate the potential effects of settling and subsidence. Final cover soil placement, moisture conditioning, compaction, and testing will be in accordance with the site construction quality assurance plan (Golder 2013). A North Dakota Registered Professional Engineer or a person working under their direct supervision will observe the placement of the final cover. A report indicating that closure was in compliance with the Closure Plan and signed by a North Dakota-registered Professional Engineer will be prepared after the closure of the facility. The closure report will be placed into the operating record of the facility.

2.1.3 Surface Water Controls

The surface of the final cover will have side slopes of up to 25% and a crown of between 3% and 5% along the top of the facility. The slopes will promote surface water run-off, aid in preventing surface water from ponding on the final cover, and allow for maintenance of the final cover (erosion repairs, mowing, etc.).

Surface water control features will be installed with the final cover and include terrace channels and down-chute channels to direct surface water run-off and minimize cover erosion.

- Terrace channels are grass-lined v-notch channels that direct flow from the side-slopes to down-chute channels. The terrace channels are constructed with the final cover approximately every 25 to 30 vertical feet to minimize erosion and soil loss.
- Down-chute channels are armored trapezoidal channels and convey run-off collected from the terrace channels off the facility to site surface water drainage ditches.

Surface water controls have been designed for the 24-hour, 100-year storm for Ash Pond 91 and are discussed further in the Run-on and Run-off Control Systems Plan (Golder 2016).

The combination of soil types, grasses, and surface water controls have been selected to control long-term surface soil loss to 2 tons per acre per year or less.

2.1.4 Vegetation

Vegetation enhances evapotranspiration and reduces erosion, thus playing an important part in surface water control. Vegetation activities will include preparing the soil surface, applying fertilizer if necessary, seeding, and mulching.

The seedbed should be roughened to a depth of 4 to 6 inches by scarifying, disking, harrowing, or equivalent methods. Rows should be spaced a minimum of 12 inches apart. Immediately prior to seeding in areas that have been heavily compacted by trucks or equipment, the topsoil surface should be ripped and scarified. All areas to be seeded should be dozer-tracked prior to seeding. The seedbed should not be prepared prior to completion of earthwork activities and no more than 2 weeks prior to planting.

Seed rates should be applied by broadcast or drilled methods, or by the hydraulic seeding method and are to be applied as directed in the facility's Operations Plan (Golder 2015b). If broadcast or drilled, seed should be buried by harrowing, chain dragging, or other scarification measures. Equipment and procedures should be appropriate for the seed as recommended by the seed supplier. A suitable native species seed mix and application rates shall be selected at the time of final cover placement.

Straw mulch should be applied immediately after seeding at a rate of 2 tons per acre. To prevent dispersal or removal of straw by wind, mulch should be anchored using a crimper run perpendicular to the prevailing wind direction. A disc should not be used for crimping. The mulch should be applied over the seed in a separate application. At least 50% of individual straws should be 6 inches or greater in length.

2.2 Final Cover System

The federal CCR rule requires the final cover system to meet the requirements of §257.102(d)(3) with a minimum 18-inch infiltration layer and 6-inch erosion layer. The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than $1x10^{-5}$ cm/sec, whichever is less.

The bottom liner system for Ash Pond 91 consists of 2-feet of compacted clay rich material with a hydraulic conductivity of $1x10^{-7}$ cm/sec, overlain with a 40-mil high-density polyethylene (HDPE) geomembrane liner.

2.2.1 Alternative Final Cover System

An alternative cover design utilizing an evapotranspiration (ET) cover has been previously permitted by the North Dakota Department of Health (NDDH) for this site based on both modeling and test plot instrumentation. The ET cover design consists of the following layers (from the top down):

- 6 inches of topsoil (erosion layer) that is capable of sustaining native plant growth.
- 30 inches of clay-rich, plant root zone soil (growth medium/infiltration layer), being compacted between 80% and 95% of the maximum dry unit weight as determined by ASTM D698 (standard Proctor).

GRE intends to update the alternative cover demonstration previously done to show that the cover system described above is in compliance with the requirements of §257.102(d)(3). If this demonstration cannot be made, GRE will adjust the cover design as required. No final cover will be placed until either the demonstration is made or the cover design is adjusted to meet the requirements of §257.102(d)(3).

2.3 Closure Estimates

2.3.1 Maximum Inventory of CCR

The final design contours shown on Drawing 5 (Appendix A), provide for a maximum inventory of CCR of approximately 8,340,000 cubic yards.

2.3.2 Largest Area Requiring Final Cover

The entire footprint of Ash Pond 91 has been developed (lined) and has received CCR. Including the piggyback of CCR disposal onto the west side of the Upstream Raise, the current maximum area requiring final cover is approximately 90 acres. As incremental closure continues at Ash Pond 91, this maximum area requiring final cover will be reduced.

2.4 Closure Schedule

Within 30 days after the last receipt of waste (either CCR or any non-CCR waste stream) permitted for disposal, the closure plan will be implemented. Notification of intent to close the facility will be placed in the operating record prior to the commencement of closure activities. The NDDH will also be notified in accordance with the engineering design and operations plan for the facility. At this time, closure activities are expected to commence in the year 2031 depending upon plant operation and the use of the other CCR facilities at CCS.

The facility will be dewatered via the bottom ash perimeter drain and sumps as described in Section 2.1.1. FGD material sluicing is anticipated to be complete in 2028. Dry CCR (bottom ash and fly ash) deposition will continue until final waste grades are achieved in approximately 2031, Dewatering will continue after final receipt of CCR at Ash Pond 91, and consolidation will be monitored prior to commencing closure activities.

Closure activities will be completed in accordance with the closure plan within 5 years after commencing closure activities, or as allowed through a closure extension demonstration in accordance with §257.102(f)(2)(i). Closure activities to be completed during this time include drainage and stabilization of CCRs, regrading of final waste slopes after drainage and stabilization of FGD material, preparation of bid documents and solicitation of contractor's bids, installation of the final cover system, and preparation and submittal of as-built documents and certifications as required under §257.102(f)(3) and the engineering design and operations plan for the facility. An extension of the closure timeframe may be pursued in accordance with §257.102(f)(2)(i).

Notification that closure of Ash Pond 91 has been completed will be placed in the operating record within 30 days of the completion of closure activities. This notification will include certification by a qualified professional engineer that closure has been completed in accordance with the closure plan. Following closure of Ash Pond 91, GRE will record a notation on the deed to the property (or another instrument that is normally examined during title search) that will notify potential purchasers of the land that the land has been used as a CCR landfill and its use is restricted under post-closure care requirements. Within 30 days of recording the notation, notification will be placed in the operating record.

3.0 POST-CLOSURE PLAN

During the post-closure care period for Ash Pond 91, GRE will implement inspection, maintenance, and monitoring programs to maintain the integrity of the final cover system, maintain the groundwater monitoring system, and monitor groundwater in accordance with the requirements of §257.90 through §257.98. The post-closure care period will be 30 years in duration. If GRE is operating under assessment monitoring in accordance with §257.95 at the conclusion of the post-closure care period, GRE will continue to conduct post-closure care until it can return to detection monitoring in accordance with §257.95. Within 60 days following the completion of the post-closure care period, GRE will prepare a notification certified by a qualified professional engineer that post-closure care has been completed in accordance with the post-closure plan and will place the notification in the operating record.

3.1 Inspection

Regular inspections will be conducted during the post-closure care period to help ensure that the integrity of the facility is maintained. The final cover system will be inspected for signs of settlement, subsidence, erosion, and other damage or deficiency. Surface water control features, including terrace channels,

down-chute channels, and culverts, will be inspected to verify that the run-on and run-off controls are adequately limiting erosion and other damage to the final cover system. Surface water control features will also be inspected for erosion damage and clogging by sediment, weeds, and other debris. Surface components of groundwater monitoring wells will be inspected for damage.

Inspections will be conducted on an annual basis (typically between late spring and early fall) to facilitate inspection of the final cover vegetation. Inspection forms will be completed to document each inspection. Completed inspection forms will be maintained in the operating record. To maintain consistency in the inspection process, trained GRE employees or contract employees will conduct the inspections. Issues identified during the inspections will be reported to the person responsible for compliance with this post-closure plan as soon as practical.

3.2 Maintenance

GRE will oversee post-closure maintenance of Ash Pond 91, using appropriate internal resources and/or third-party personnel and equipment. Post-closure maintenance of the facility will include making necessary repairs to the final cover system to maintain its integrity and effectiveness. Earthen fill will be placed as needed to correct the effects of settlement, subsidence, and erosion and to prevent run-on and run-off from eroding or otherwise damaging the final cover system. Maintenance of surface water control features will include clearing excess sediment and debris and armoring or implementing other appropriate measures in areas of persistent erosion. The final cover system will be reseeded in areas that have been repaired and where additional vegetation is needed to effectively limit erosion and promote transpiration of soil moisture. GRE will control noxious weeds and unwanted trees and shrubs from becoming established on Ash Pond 91.

3.3 Monitoring

Groundwater monitoring will be conducted during the post-closure care period in accordance with the requirements of §257.90 through §257.98. Groundwater samples will be collected and analyzed in accordance with the sampling and analysis program for the facility. Results of the analyses will be placed in the operating record.

3.4 Contact Information

The post-closure contact for Ash Pond 91 will be:

Attention: Manager, Regulatory Services
Great River Energy – Coal Creek Station
2875 Third Street SW
Underwood, North Dakota 58576
Phone: (701) 442- 3211
Email: Environmental@GREnergy.com

3.5 Planned Property Usage

The closed facility will be designated as open space during the post-closure period and will be controlled via fence and/or signage. No agricultural, recreational, public, or otherwise active uses are planned for Ash Pond 91 during the post-closure care period. There will be no grazing or feeding of farm or domestic animals at Ash Pond 91 during the post-closure care period. Activities on GRE property are anticipated to include the continued operation of a power generating station, and will be managed to not disturb the integrity of the final cover or function of the monitoring systems associated with the facility.

4.0 CERTIFICATION

The undersigned attest to the completeness and accuracy of this closure and post-closure plan, and certify that the plan meets the requirements of 40 CFR §257.102(b) and 40 CFR §257.104(d).

GOLDER ASSOCIATES INC.

Todd Stong, PE
Associate and Senior Engineer

Craig Schuettpelz, PE
Senior Project Engineer

TS/CS/rjg

5.0 REFERENCES

EPA. 2015. Environmental Protection Agency, Code of Federal Regulations Title 40 Part 257: Hazardous and Solid Waste Management System; *Disposal of Coal Combustion Residuals from Electric Utilities*. April.

Golder. 2013. *Construction Quality Assurance Guidelines for Final Cover Construction, Revision 1*. July.

Golder. 2015a. *Permit Modification Document (Ash Pond 91 Upstream Raise), Permit No. SP-033*. February.

Golder. 2015b. *Operations Plan for Ash Pond 91, Ash Pond 92, and Section 16 – Permit No. SP-033*. February.

Golder. 2016. *Run-On and Run-Off Control System Plan, Ash Pond 91 CCR Surface Impoundment*. October.

FIGURE

0 800 1600

SCALE FEET

Golder Associates

COAL CREEK STATION
CCR FACILITIES

FIGURE 1

Path: \\Denver\projects\16JOBS\16449586 GRE CCS\CCR Rules\Closure and Post-Closure Plans\ | File Name: Facility Aerials 2.dwg

APPENDIX A
ASH POND 91 PERMIT DRAWINGS (GOLDER 2015A)

DRAINS POND

ASH POND 91

ASH POND 92

ASH POND 91 TO DRAINS POND HYDRAULIC CONNECTION DETAIL SEE NOTE 2 SEE DETAIL 3/9

ACCESS HAUL ROAD SEE DETAIL 5/9

CONTACT WATER CONTROL PERIMETER DITCH SEE DETAIL 1/9

ASH POND 91 PROFILE SEE DETAIL 1/7

ACCESS ROAD SEE DETAIL 5/9

CONTACT WATER CONTROL PERIMETER DITCH SEE DETAIL 1/9

5% (SEE NOTE 1)

0 120 240 SCALE FEET

LEGEND

- EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 2)
- DESIGN TOP OF CCP GRADES (ASH POND 92 AND SW SECTION 16 UPSTREAM RAISE)
- PROPOSED TOP OF CCP GRADES (ASH POND 91 UPSTREAM RAISE)
- CROSS-OVER PIPING

NOTES

1. CROWN OF CCP GRADES ARE SHOWN AT FIVE PERCENT, BUT MAY BE CONSTRUCTED BETWEEN THREE PERCENT AND FIVE PERCENT.
2. CONTACT WATER IS COLLECTED IN THE PERIMETER DITCH AROUND ASH POND 91. WATER IS DIRECTED THROUGH CROSS-OVER PIPES TO THE DRAINS POND OR DOWNWARD INTO THE UPSTREAM RAISE.

REFERENCES

1. SITE LOCATION: SECTIONS 16 AND 17, T145N, R82W, MCLEAN COUNTY, NORTH DAKOTA.
2. EXISTING GROUND TOPOGRAPHY WAS PROVIDED BY GREAT RIVER ENERGY. THE SURVEYS WERE PERFORMED BETWEEN 1996 AND 2011 EXCEPT DRAINS POND AS-BUILT TOP OF LINER SYSTEM GRADES, WHICH WERE SURVEYED BY INTERSTATE ENGINEERING, INC. AND ARE REFERENCED FROM A SURVEY DRAWING PROVIDED BY GREAT RIVER ENERGY, DATED JANUARY 10, 1994.
3. COORDINATES ARE BASED ON THE PLANT GRID SYSTEM.
4. THE CONTOUR INTERVAL IS TWO FEET.
5. ALL PROPERTY SHOWN ON THIS MAP IS OWNED BY GREAT RIVER ENERGY.

Rev.	YYYY-MM-DD	DESCRIPTION	PREPARED	DESIGN	REVIEW	APPROVED
B	2015-02-11	ISSUED FOR PERMIT MODIFICATION	CCS	CCS	TJS	RRJ
A	2014-11-10	ISSUED FOR CLIENT REVIEW	CCS	CCS	TJS	RRJ

SEAL

REGISTERED PROFESSIONAL ENGINEER — TODD J. STONG — PE-6144 — DATE 2/11/2015 — NORTH DAKOTA

CLIENT

GREAT RIVER ENERGY
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

CONSULTANT

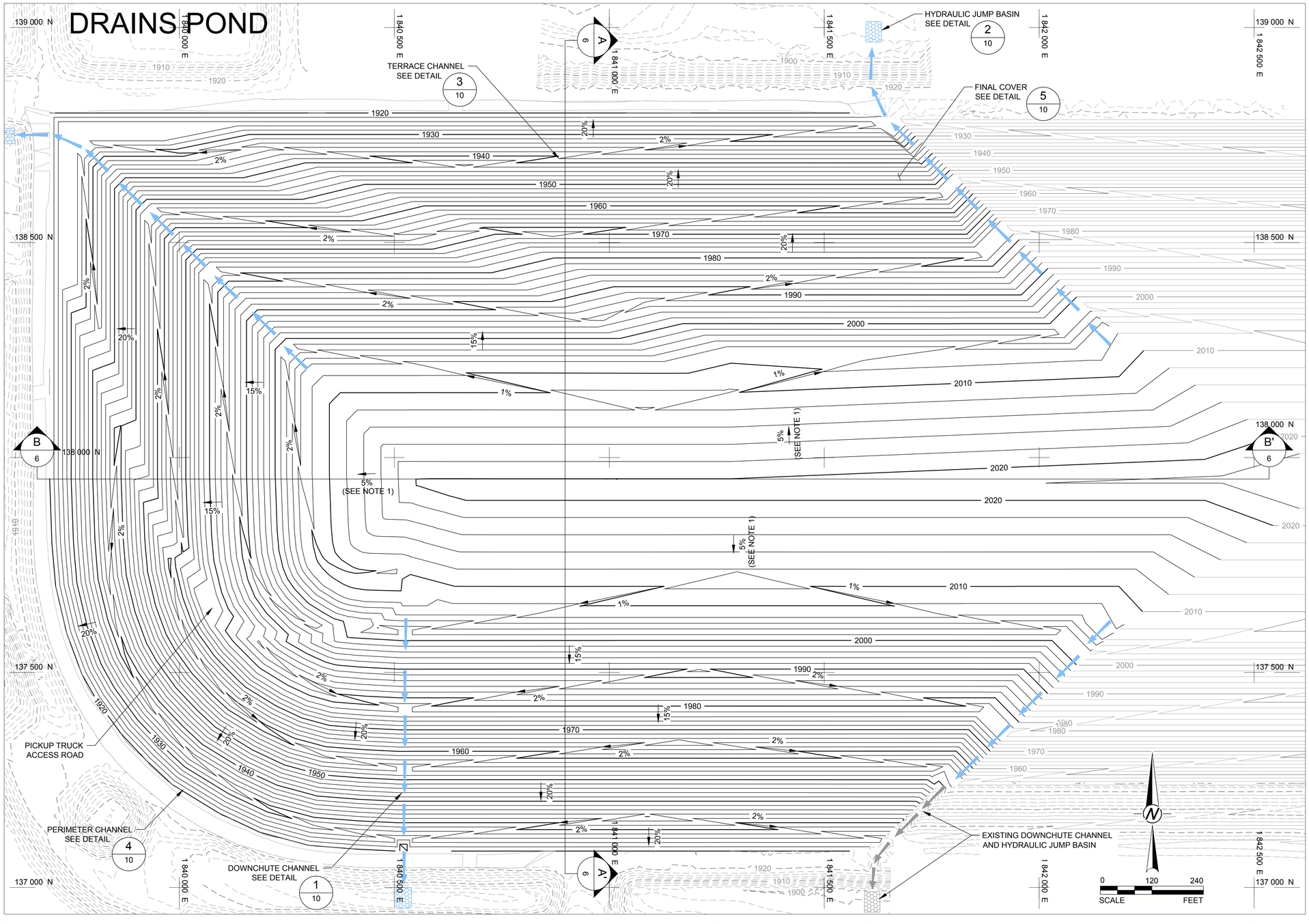
GOLDER ASSOCIATES INC.
44 UNION BLVD. SUITE 300
LAKEWOOD, COLORADO
USA
(303) 980-0540
www.golder.com

PROJECT
ASH POND 91
PERMIT NO. 0033 MODIFICATION

TITLE
PROPOSED FINAL CCP GRADES

PROJECT No. 1400644 | Rev. B | 4 of 10 | SHEET 4

DRAINS POND



LEGEND

- EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 2)
- DESIGN TOP OF FINAL COVER GRADES (ASH POND 92 AND SW SECTION 16 UPSTREAM RAISE)
- PROPOSED TOP OF FINAL COVER GRADES (ASH POND 91 UPSTREAM RAISE)
- DOWNCHUTE/OUTLET CHANNEL
- HYDRAULIC JUMP BASIN

NOTES

1. GRADES OF THE CROWN OF THE FACILITY ARE SHOWN AT FIVE PERCENT, BUT MAY BE CONSTRUCTED BETWEEN THREE PERCENT AND FIVE PERCENT.
2. SEE THE SURFACE WATER ENGINEERING WORKSHEET FOR FURTHER DETAILS CONCERNING THE SURFACE WATER CONTROL PLAN.

REFERENCES

1. SITE LOCATION: SECTIONS 16 AND 17, T145N, R82W, MCLEAN COUNTY, NORTH DAKOTA.
2. EXISTING GROUND TOPOGRAPHY WAS PROVIDED BY GREAT RIVER ENERGY. THE SURVEYS WERE PERFORMED BETWEEN 1996 AND 2011 EXCEPT DRAINS POND AS-BUILT TOP OF LINER SYSTEM GRADES, WHICH WERE SURVEYED BY INTERSTATE ENGINEERING, INC. AND ARE REFERENCED FROM A SURVEY DRAWING PROVIDED BY GREAT RIVER ENERGY, DATED JANUARY 10, 1994.
3. COORDINATES ARE BASED ON THE PLANT GRID SYSTEM.
4. THE CONTOUR INTERVAL IS TWO FEET.
5. ALL PROPERTY SHOWN ON THIS MAP IS OWNED BY GREAT RIVER ENERGY.

Rev.	YYYY-MM-DD	DESCRIPTION	PREPARED	DESIGN	REVIEW	APPROVED
B	2015-02-11	ISSUED FOR PERMIT MODIFICATION	CCS	CCS	TJS	RRJ
A	2014-11-10	ISSUED FOR CLIENT REVIEW	CCS	CCS	TJS	RRJ

SEAL

REGISTERED PROFESSIONAL ENGINEER
TODD J. STONG
PE-6144
Date 2/11/2015
NORTH DAKOTA

CLIENT

GREAT RIVER ENERGY
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

CONSULTANT

GOLDER ASSOCIATES INC.
44 UNION BLVD. SUITE 300
LAKEWOOD, COLORADO
USA
(303) 980-0540
www.golder.com

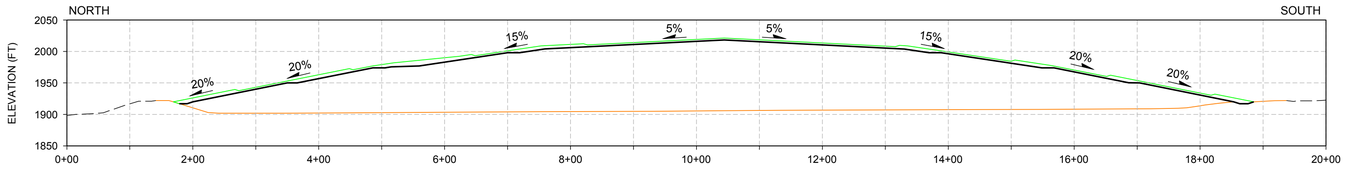
PROJECT
ASH POND 91
PERMIT NO. 0033 MODIFICATION

TITLE
FINAL COVER GRADES AND SURFACE WATER PLAN

PROJECT No. 1400644 | Rev. B | 5 of 10 | SHEET 5

LEGEND

- ASH POND 92/SW SECTION 16 DESIGN TOP OF CCP
- EXISTING GROUND TOPOGRAPHY
- PROPOSED TOP OF COVER
- PROPOSED ASH POND 91 TOP OF CCP
- APPROXIMATE LINER/FLOOR TOPOGRAPHY

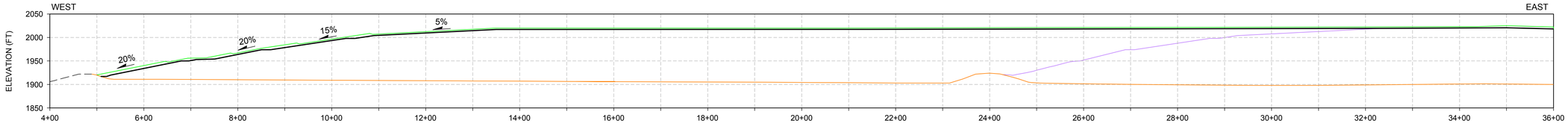


A SECTION A - A'

NO VERTICAL EXAGGERATION 6

0 120 240

SCALE FEET



DISTANCE (FT)

B SECTION B - B'

NO VERTICAL EXAGGERATION 6

0 120 240

SCALE FEET

Rev.	YYYY-MM-DD	DESCRIPTION	PREPARED	DESIGN	REVIEW	APPROVED
B	2015-02-11	ISSUED FOR PERMIT MODIFICATION	RFS	CCS	TJS	RRJ
A	2014-11-10	ISSUED FOR CLIENT REVIEW	RFS	CCS	TJS	RRJ

SEAL

REGISTERED PROFESSIONAL ENGINEER
TODD J. STONG
PE-6144
Date 2/11/2015
NORTH DAKOTA

CLIENT

GREAT RIVER ENERGY

CONSULTANT

GOLDER ASSOCIATES INC.
44 UNION BLVD. SUITE 300
LAKEWOOD, COLORADO
USA
(303) 980-0540
www.golder.com

GREAT RIVER ENERGY
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

PROJECT
ASH POND 91
PERMIT NO. 0033 MODIFICATION

TITLE
CROSS SECTIONS

PROJECT No. 1400644

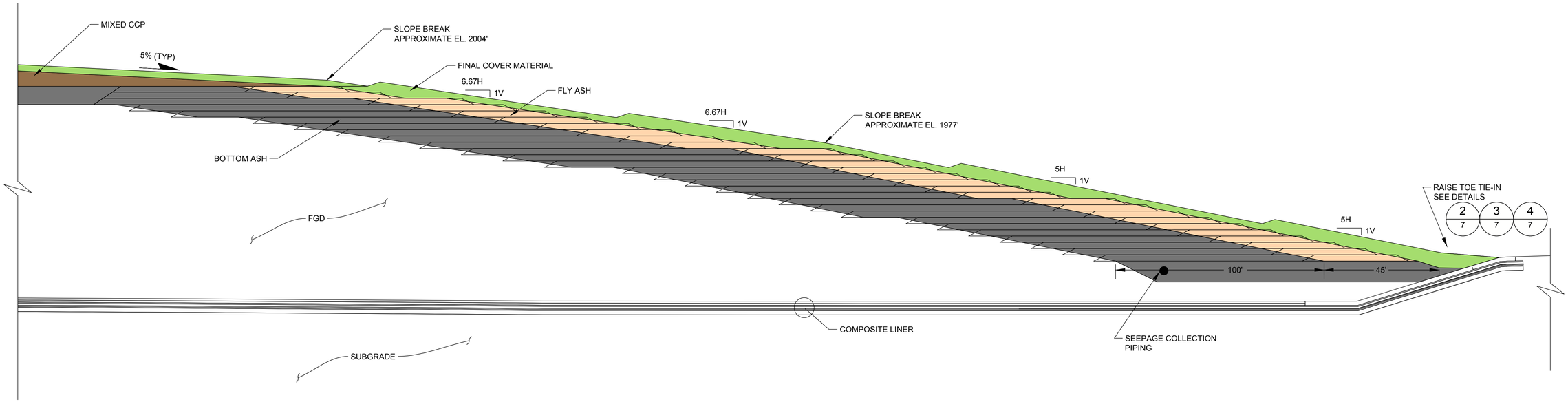
Rev. B

6 of 10

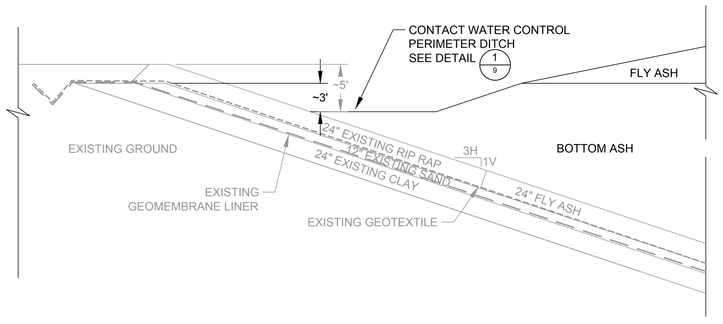
SHEET 6

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

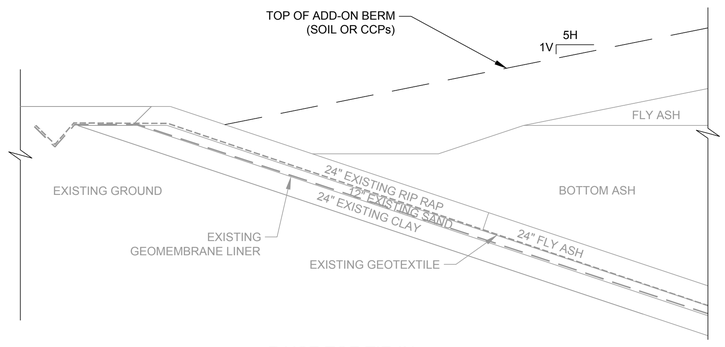
Path: \\Denver.golder.gis\acad1\1400644\AshPond91\Working\ | File Name: 1400644A006.dwg



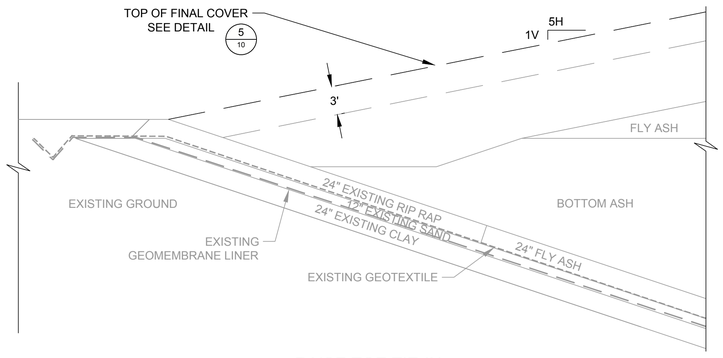
N.T.S. 1/7 ASH POND 91 PROFILE



N.T.S. 2/7 RAISE TOE TIE-IN
OPERATION AND CONSTRUCTION DETAIL



N.T.S 3/7 RAISE TOE TIE-IN
ADD-ON BERM CONSTRUCTION DETAIL



N.T.S. 4/7 RAISE TOE TIE-IN
FINAL COVER CONSTRUCTION

Rev.	YYYY-MM-DD	DESCRIPTION	PREPARED	DESIGN	REVIEW	APPROVED
B	2015-02-11	ISSUED FOR PERMIT MODIFICATION	RFS	RFS	TJS	RRJ
A	2014-11-10	ISSUED FOR CLIENT REVIEW	RFS	RFS	TJS	RRJ

SEAL

REGISTERED PROFESSIONAL ENGINEER
TODD J. STONG
PE-6144
DATE 2/11/2015
NORTH DAKOTA

CLIENT
GREAT RIVER ENERGY

CONSULTANT
Golder Associates

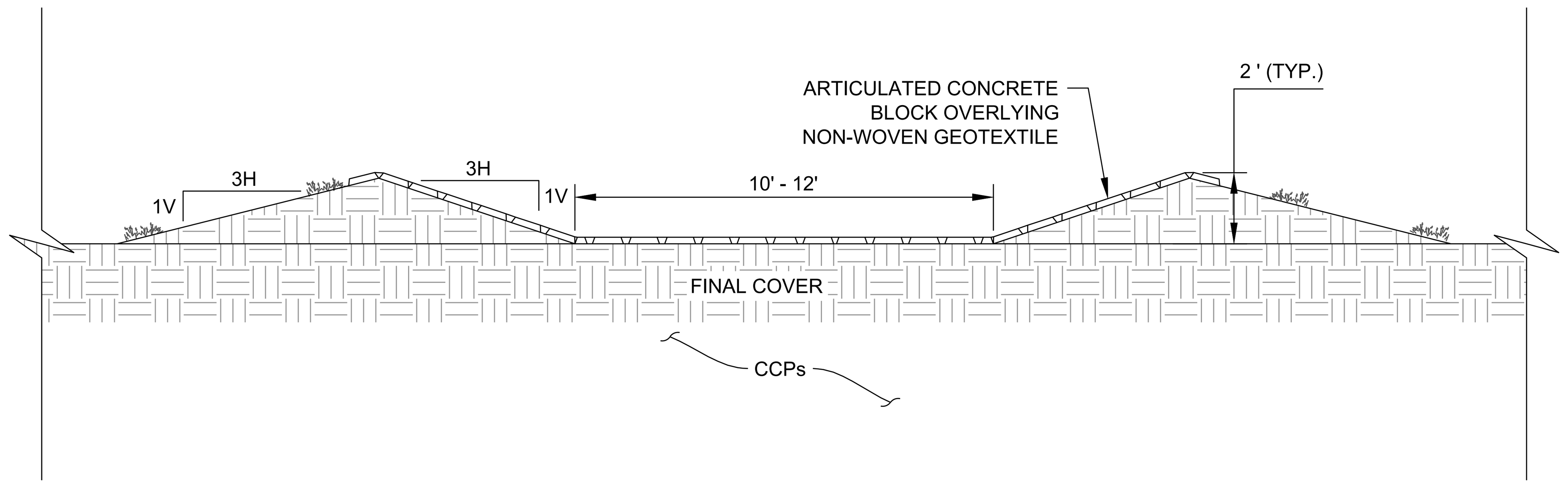
GREAT RIVER ENERGY
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

GOLDER ASSOCIATES INC.
44 UNION BLVD. SUITE 300
LAKEWOOD, COLORADO
USA
(303) 980-0540
www.golder.com

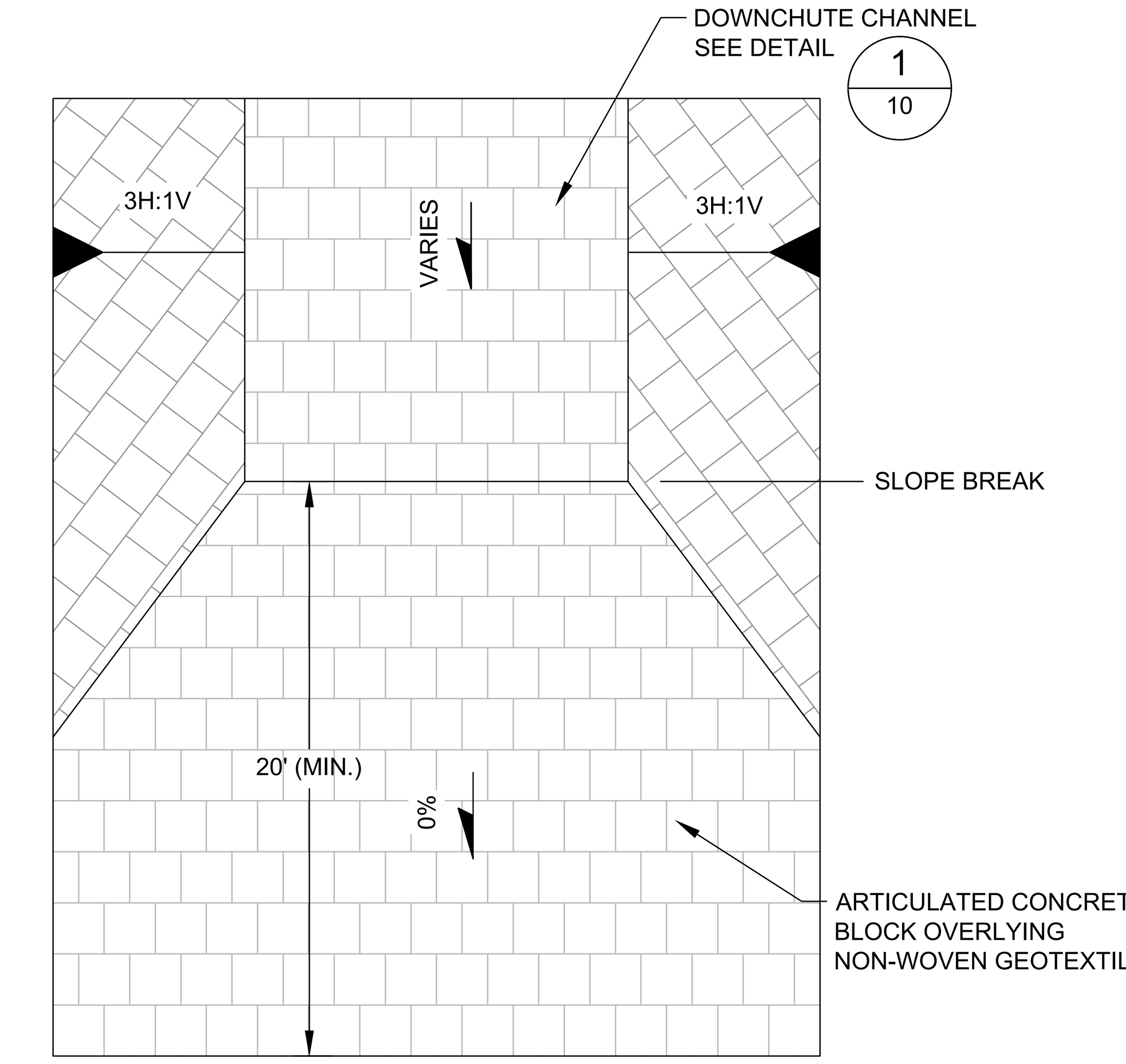
PROJECT
ASH POND 91
PERMIT NO. 0033 MODIFICATION

TITLE
RAISE DETAILS

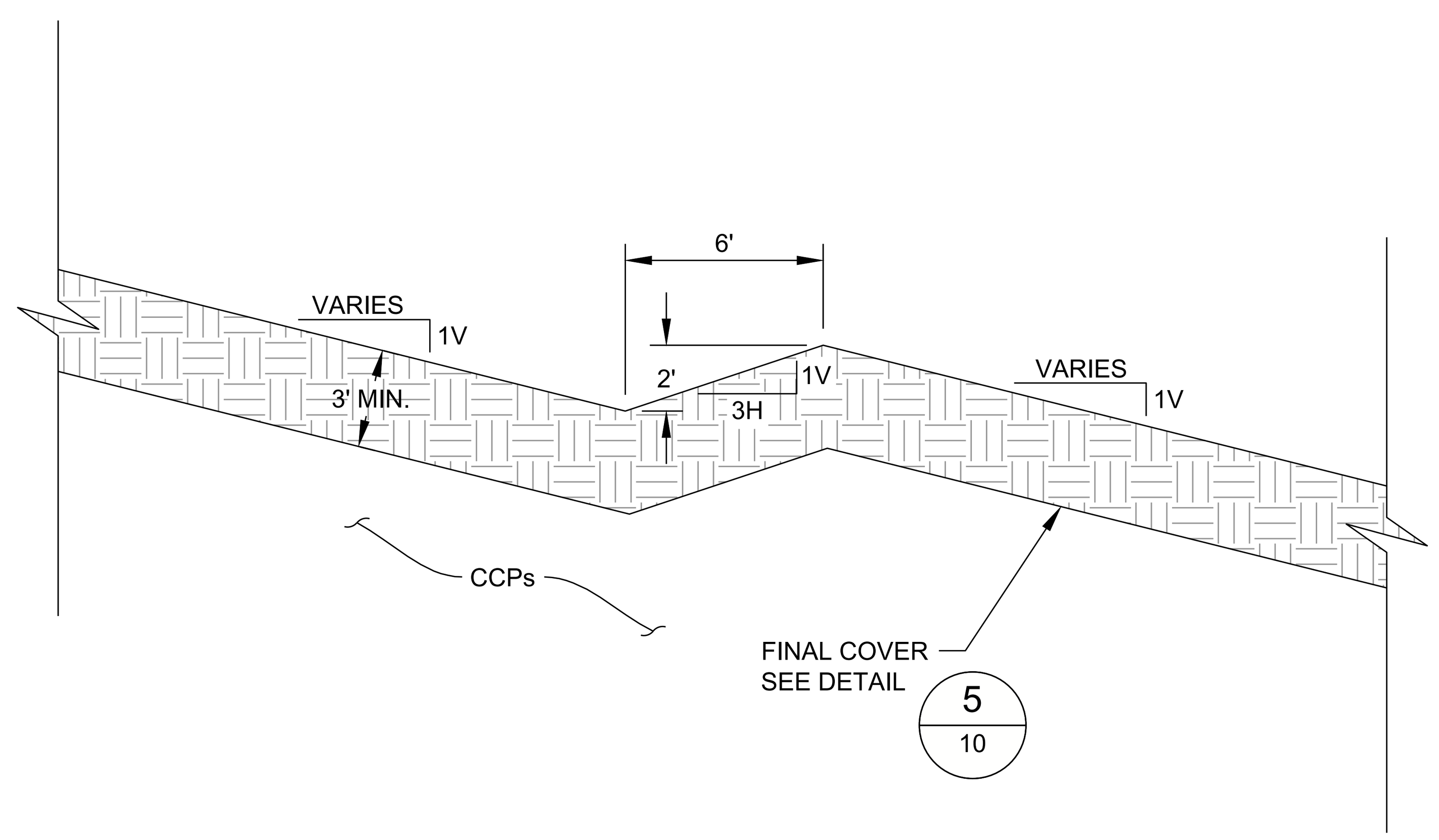
PROJECT No. 1400644
Rev. B
SHEET 7 of 10



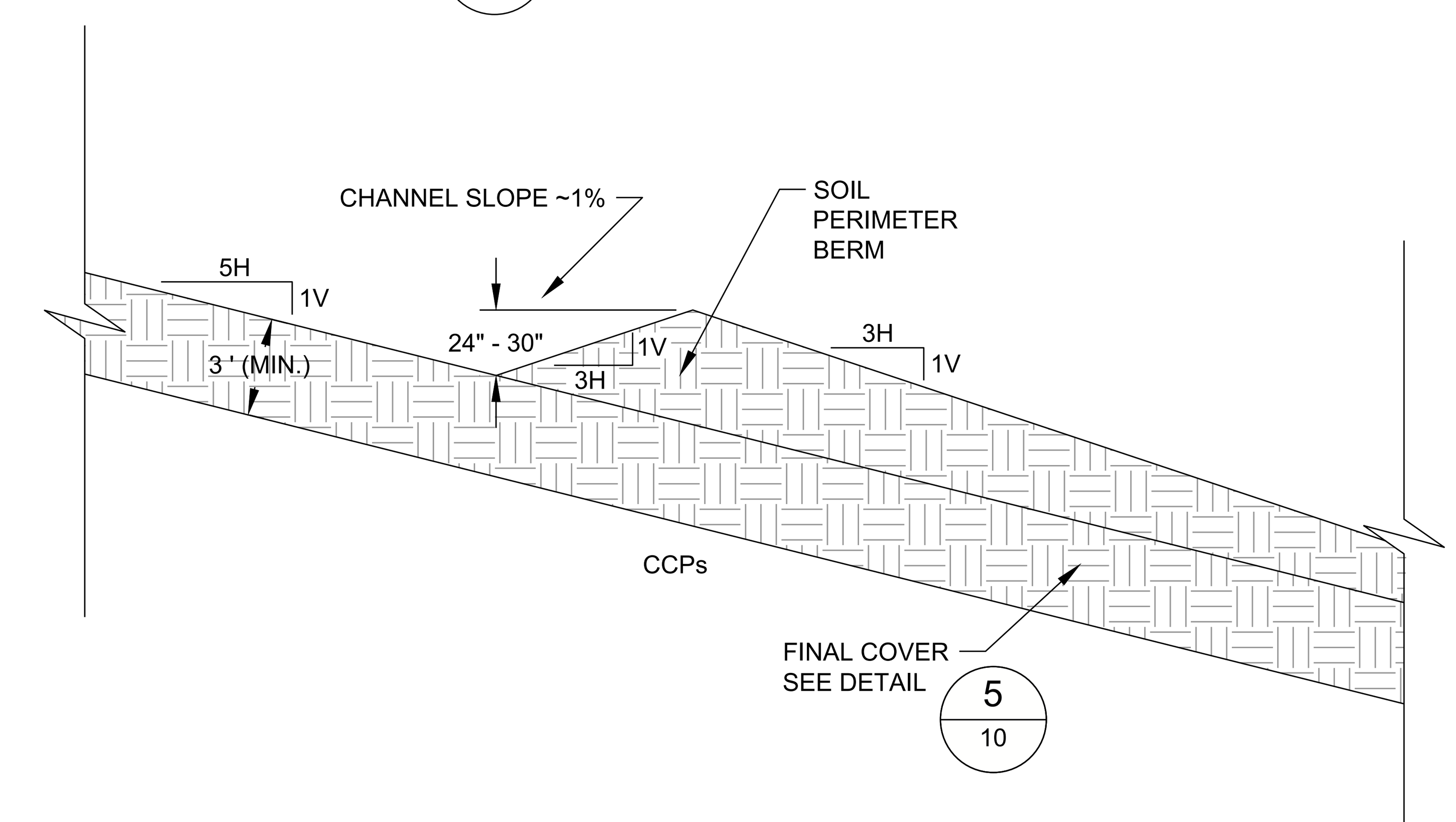
N.T.S. 1/10 DOWNCHUTE DETAIL



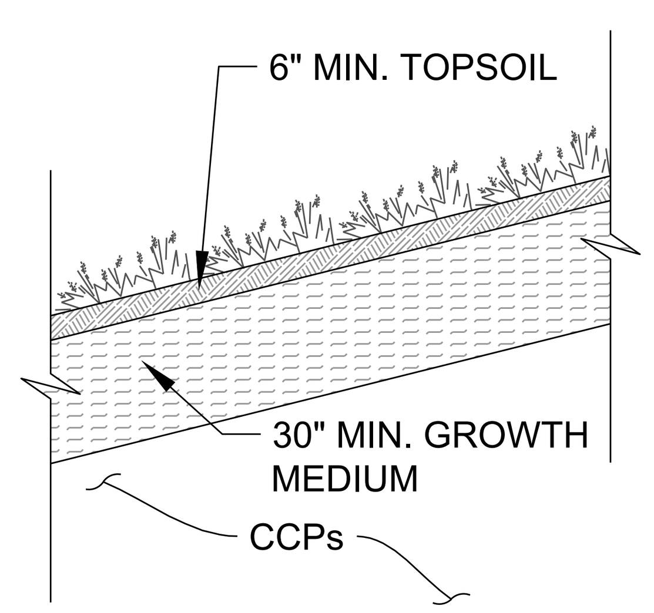
N.T.S. 2/10 HYDRAULIC JUMP BASIN DETAIL



N.T.S. 3/10 TERRACE CHANNEL DETAIL



N.T.S. 4/10 PERIMETER CHANNEL DETAIL



N.T.S. 5/10 FINAL COVER DETAIL

Rev.	YYYY-MM-DD	DESCRIPTION	PREPARED	DESIGN	REVIEW	APPROVED
B	2015-02-11	ISSUED FOR PERMIT MODIFICATION	RFS	RFS	TJS	RRJ
A	2014-11-10	ISSUED FOR CLIENT REVIEW	RFS	RFS	TJS	RRJ

SEAL

REGISTERED PROFESSIONAL ENGINEER
TODD J. STONG
PE-6144
DATE 2/11/2015
NORTH DAKOTA

CLIENT

GREAT RIVER ENERGY
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

CONSULTANT

Golder Associates

GOLDER ASSOCIATES INC.
44 UNION BLVD. SUITE 300
LAKEWOOD, COLORADO
USA
(303) 980-0540
www.golder.com

PROJECT
ASH POND 91
PERMIT NO. 0033 MODIFICATION

TITLE
COVER DETAILS

PROJECT No. 1400644
Rev. B
10 of 10
SHEET 10

Path: \\Denver.golder.gds\acad\14\1400644\AshPond91\Working\ | File Name: 1400644A007.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

At Golder Associates we strive to be the most respected global group of companies specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organizational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

Africa	+ 27 11 254 4800
Asia	+ 852 2562 3658
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

solutions@golder.com
www.golder.com

Golder Associates Inc.
44 Union Boulevard, Suite 300
Lakewood, Colorado 80228 USA
Tel: (303) 980-0540
Fax: (303) 985-2080

Golder Associates