

APR 09 2007

April 6, 2007

SM-4060-071056

State of Colorado
Office of the State Engineer
1313 Sherman Street, Room 818
Denver, Colorado 80203

Subject: Well Construction and Test Reports
Well Permit #46819-MH

Greetings:

The S.M. Stoller Corporation herewith submits the Well Construction and Test Report forms as required by Well Permit #46819-MH. Also attached are copies of Stoller's lithology logs and well completion diagrams for each of the seven installations.

If you have any questions or need additional information, please contact me at 303-546-4321.

Sincerely,



Ralph Rupp
Geologist
S.M. Stoller Corporation

cc Mr. Linn Havelick, CSM

Attachments: (1) Notice of Intent to Construct Monitoring Holes
(7) Well Construction and Test Reports
(7) Lithology Logs
(7) Well Completion Diagrams

GWS-51
03/05

NOTICE OF INTENT TO CONSTRUCT MONITORING HOLE(S)

RECEIVED

Please type or print legibly in black or blue ink

JAN 03 2007

Colorado Division of Water Resources 1313 Sherman St-Room 821 Denver CO 80203
Phone 303-866-3581 Fax 303-866-3589

WATER RESOURCES
STATE ENGINEER
COLO

AUTHORIZED INDIVIDUAL OR DRILLER

Contact Ralph Rupp - Geologist
Company The S.M. Stoller Corporation
Address 105 Technology Drive, Suite 190
City, State, Zip Broomfield, CO 80021
Phone 303-546-4300 Fax No. 303-443-1408
Driller Lic. No. (if applicable) 1350

Location: NW 1/4, NE 1/4, Section 33
Township 3 N Range 70 E W PM 6
County Jefferson
Subdivision _____
Lot _____, Blk _____, Flg _____

Site/Property Address 500 ft. NW of Intersection Birch and 12th St., Golden, CO

Hole(s) to be constructed: Number 7
Estimated depth ±40 Ft. Aquifer Alluvial/Colluvial
Purpose of Monitoring Hole(s) monitoring of water levels and/or water quality sampling
Approximate Date of Construction JAN. 08, 2007
(Must be at least 3 days prior to construction)

Well Owner (Client) Information
Name Colorado School of Mines
Attn: Mr Linn Havelick
Address Director of Environmental Health and Safety
Chauvenet Hall Room 194
1015 14th Street
Golden, CO 80401
Well Owner's Phone 303-273-3998
Landowner's Name: Colorado School of Mines

Ralph E. Rupp
Authorized Signature

ACKNOWLEDGEMENT FROM STATE ENGINEER'S OFFICE

MH- 046819 FOR OFFICE USE ONLY
DIV. 1 WD 7 BAS _____ MD _____ PROCESSED BY Brenda Holmgren
DATE ACKNOWLEDGED 01/04/07

CONDITIONS OF MONITORING HOLE ACKNOWLEDGEMENT

A COPY OF THE WRITTEN NOTICE OR ACKNOWLEDGEMENT SHALL BE AVAILABLE AT THE DRILLING SITE.

Notice was provided to the State Engineer at least 3 days prior to construction of monitoring & observation hole(s). Construction of the hole(s) must be completed within 90 days of the date notice was given to the State Engineer. Testing and/or pumping shall not exceed a total of 200 hours unless prior written approval is obtained from the State Engineer. Water diverted during testing shall not be used for beneficial purposes. The owner of the hole(s) is responsible for obtaining permit(s) and complying with all rules and regulations pertaining to the discharge of fluids produced during testing.

All work must comply with the Water Well Construction Rules, 2 CCR 402-2. Minimum construction standards must be met or a variance obtained. Standard permit application and work report forms are found on the DWR website at <http://www.water.state.co.us>.

Well Construction and Test Reports (GWS-31) must be completed for each hole drilled. The licensed contractor or authorized individual must submit the completed forms to this office within 60 days of drilling.

Unless a well permit is obtained, the hole(s) must be plugged and sealed within one (1) year after construction.

An Abandonment Report (form GWS-9) must be submitted for each hole plugged within 60 days of plugging & sealing. The monitoring hole acknowledgement number, owner's structure name, and hole owner's name and address must be provided on all well permit application(s), well construction and abandonment reports.

The owner of the hole(s) should maintain records of water quality testing and submit this data to the State Engineer upon request.

A monitoring hole cannot be converted to a production water well, except for purposes of remediation (recovery) or as a permanent dewatering system, if constructed in accordance with the Water Well Construction Rules and policies of the State Engineer.

THIS ACKNOWLEDGEMENT OF NOTICE DOES NOT INDICATE THAT WELL PERMIT(S) CAN BE APPROVED.

IF HOLES WILL NOT BE CONSTRUCTED UNDER THIS NOTICE WITHIN 90 DAYS, PLEASE WRITE, "NO HOLES CONSTRUCTED" ON A COPY OF THE ACKNOWLEDGED NOTICE WITH THE FILE NUMBER AND FAX THE COPY TO THE DIVISION OF WATER RESOURCES.

Additional Conditions _____

CSMRI-1B

Colorado School of Mines

Colorado School of Mines Research Institute Site

Golden, Colorado

Project Number: 4060 - 720

Client: Colorado School of Mines

Geologist: N. Malczyk

Northing: 4,400,354.1 Easting: 480,232.1

Drilling Contractor: Prosonic Corporation, B. Owens

Total Depth of Borehole: 21.5 feet bgs

Dates Drilled: 02/11/07 - 02/15/07

Depth to Water: Dry

Borehole Type: 6-inch dia. Resonant Sonic Casing Advance

Well Type: 2-inch Sch 40 PVC GW Monitoring Well

Ground Elevation: 5,709.02 feet

Top of Casing Elevation: 5,712.14 feet

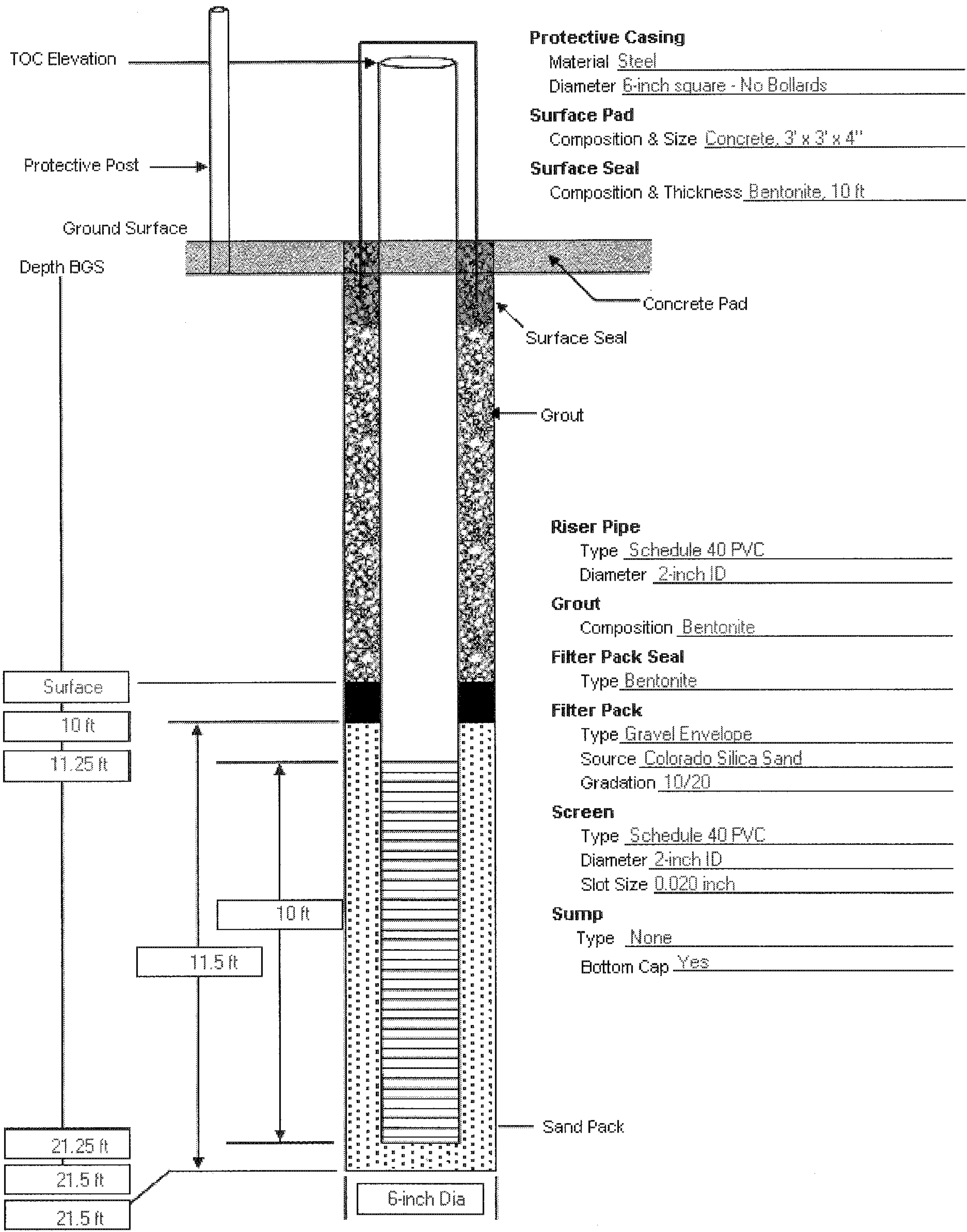
Completion	Depth (Ft.)	Lithology	USCS	Description	Sample	GAMMA (CPM) Background 17,000 cpm
			ML	0' - 1' Silt, clayey, some pebbles, dark yellowish brown (10YR 4/4), moist		
			SP	1' - 3' Sand, fine grain, few pebbles, dark yellowish brown (10YR 4/4), dry		
	5		SM	3' - 7' Sand, silty, light yellowish brown (10YR 6/4), dry		15,600
			SP	7' - 8' Sand, fine grain, some cobbles, yellowish red (5YR 4/6), dry		
	10		SW	8' - 13' Sand, gravelly, alluvial material, light gray (5YR 7/1), loose, dry		16,800
	15		sw	13' - 16.5' Sand, medium to coarse grain, some pebbles and gravel, dark gray (5YR 4/1), loose, damp, becoming moist from 15 ft to 16.5 ft		17,500
	20		SH	16.5' - 21.5' Pierre Shale, black (2.5YR 2.5/0), dry		16,700
	25			Total Depth of Borehole 21.5 feet bgs No Water Encountered Total Depth of Well 21.5 feet bgs 2" Sch. 40 PVC Blank Casing +3.12' ags to 11.25' bgs 2" Sch. 40 PVC 0.020" Slot Screen 11.25' to 21.25' bgs 2" Sch. 40 PVC End Cap 21.25' to 21.5' bgs 10/20 Colorado Silica Sand 10' to 21.5' bgs Hydrated Bentonite Surface Seal 0' to 10' bgs 3'x3'x4" Concrete Surface Pad with 6" Steel Protective Casing and Locking Cover to +3.81' ags		

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Well Installation Diagram

Project: CSMRI #4060-720
 Location: CSM, Golden, Colorado 80401
 Contractor: S.M. Stoller Corporation
 Driller: B. Dwens, Prosonic Corp, Lic # 1350
 Well Coordinates: N 4,400,354.1 m E 480,232.1 m
 TOC Elevation: 1,741.06 m (5,712.14 ft)
 Surface Elevation: 1,740.11 m (5,709.02 ft)

Well No: CSMRI-1B
 Well Type: G/W Monitoring Well
 Date Constructed: 02/15/07
 Observed By: N. Malczyk
 Sheet 1 of 1



CSMRI-6B

Colorado School of Mines

Colorado School of Mines Research Institute Site

Golden, Colorado

Project Number: 4060 - 720

Client: Colorado School of Mines

Geologist: N. Malczyk

Northing: 4,400,301.1 Easting: 480,289.1

Drilling Contractor: Prosonic Corporation, B. Owens

Total Depth of Borehole: 40 feet bgs

Dates Drilled: 02/16/07 - 02/16/07

Depth to Water: Dry

Borehole Type: 6-inch dia. Resonant Sonic Casing Advance

Well Type: 2-inch Sch 40 PVC GW Monitoring Well

Ground Elevation: 5,722.24 feet

Top of Casing Elevation: 5725.46 feet

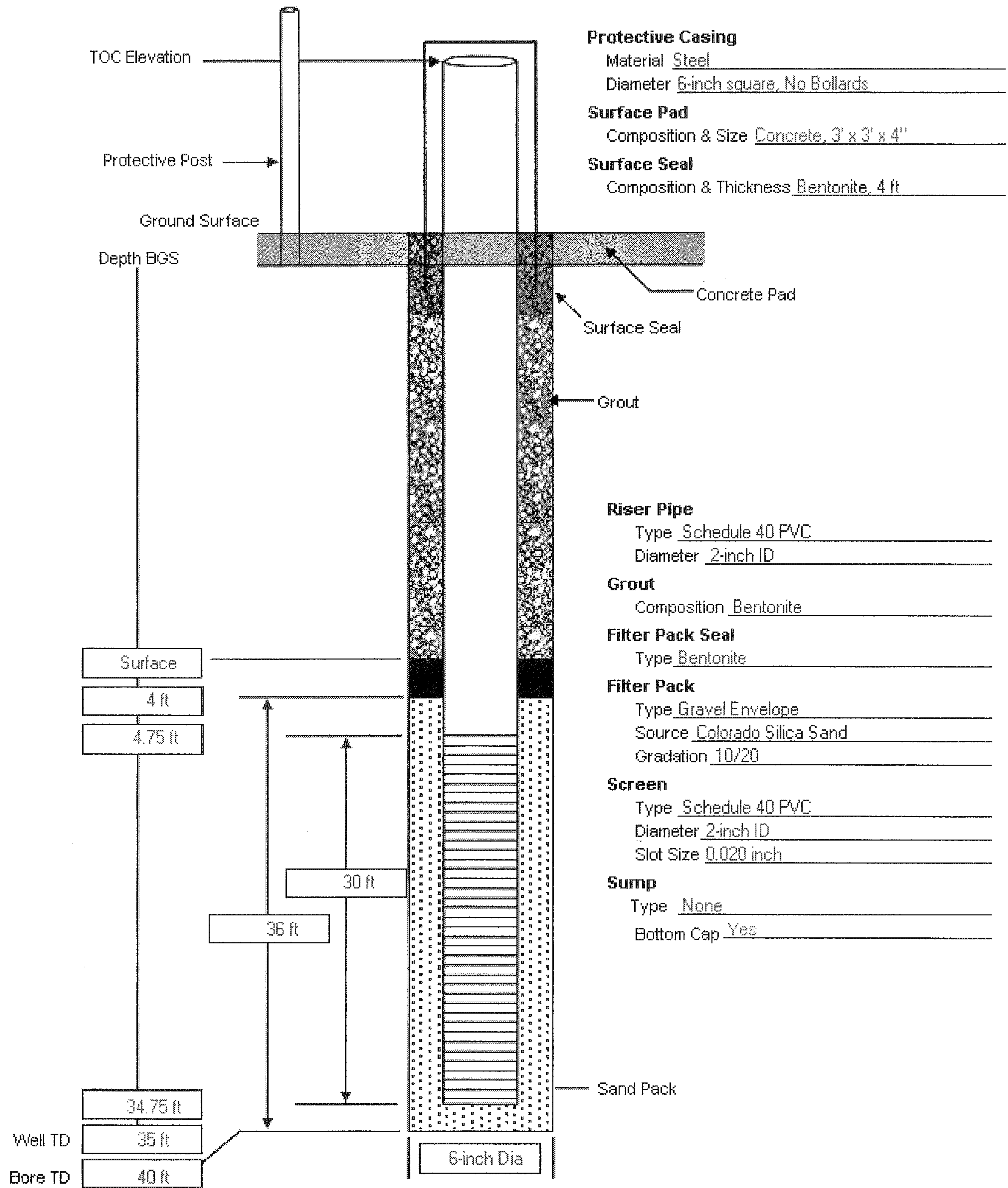
Completion	Depth (Ft.)	Lithology	USCS	Description	Sample	GAMMA (CPM) Background 12,500 cpm
			CL/ML	0' - 2' Clay, silty, dark yellowish brown (10YR 4/2), moist		
	5		CL/ML	2' - 8' Clay, silty, some pebbles, dark yellowish brown (10YR 4/2), moist		13,200
	10		CL	8' - 11' Clay, dark yellowish brown (10YR 4/2), hard, saturated		13,300
			CL/ML	11' - 13' Clay, silty, grayish red (10R 4/2), soft, moist		
	15		SP	13' - 23' Sand, dark reddish brown (10R 3/4), fine grain, loose, dry		12,400
	20					14,200
	25		SP	23' - 32' Sand, some cobbles, pinkish gray (5YR 8/1), fine grain, little medium grain		16,400
	30					15,700
	35		SH	32' - 40' Pierre Shale, black (2.5YR 2.5/0), dry		13,700
	40			Total Depth of Borehole 40 feet bgs Vadose Water 8' - 11' bgs		13,600
	45			Total Depth of Well 35 feet bgs 2" Sch. 40 PVC Blank Casing +3.22' ags to 4.75' bgs 2" Sch. 40 PVC 0.020" Slot Screen 4.75' to 34.75' bgs 2" Sch. 40 PVC End Cap 34.75' to 35' bgs		
	50			10/20 Colorado Silica Sand 4' to 40' bgs Hydrated Bentonite Surface Seal 0' to 4' bgs		
	55			3'x3'x4" Concrete Surface Pad with 6" Steel Protective Casing and Locking Cover to +3.88' ags		

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Well Installation Diagram

Project: CSMRI #4060-720
 Location: CSM, Golden, Colorado 80401
 Contractor: S. M. Stoller Corporation
 Driller: B. Owens, Prosonic Corp, Lic #1350
 Well Coordinates: N 4,400,301.1 m E 480,289.1 m
 TOC Elevation: 1,745.12 m (5,725.46 ft)
 Surface Elevation: 1,744.14 m (5,722.24 ft)

Well No: CSMRI-6B
 Well Type: GW Monitoring Well
 Date Constructed: 02/16/07
 Observed By: N. Malczyk
 Sheet 1 of 1



CSMRI-7B

Colorado School of Mines

Colorado School of Mines Research Institute Site

Golden, Colorado

Project Number: 4060 - 720

Client: Colorado School of Mines

Geologist: R. Hill

Northing: 4,400,397.6 Easting: 480,281.0

Drilling Contractor: Prosonic Corporation, B. Owens

Total Depth of Borehole: 20 feet bgs

Dates Drilled: 02/10/07 - 02/10/07

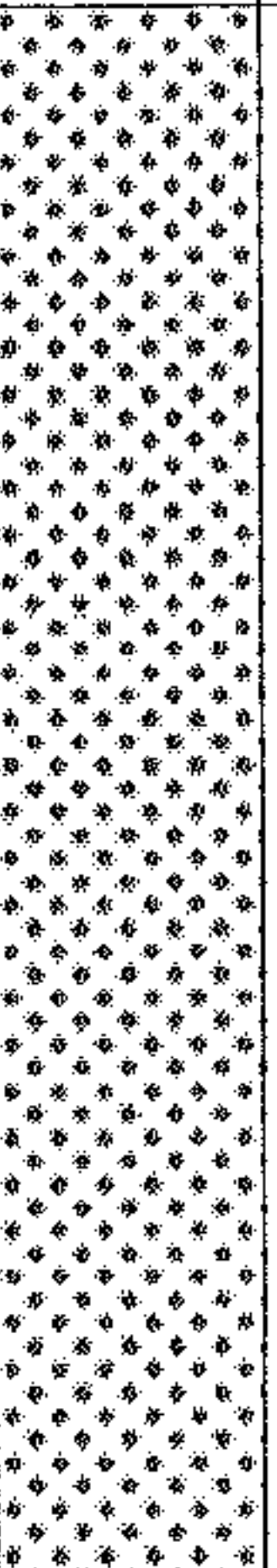
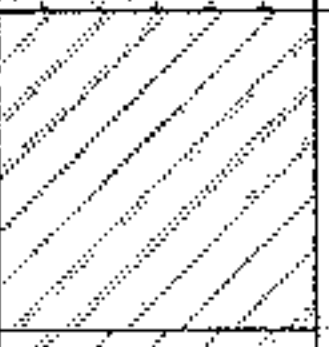
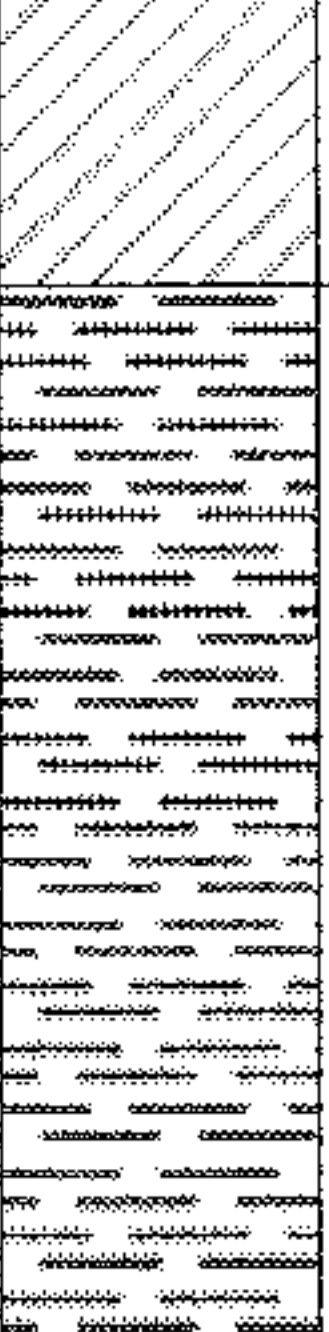
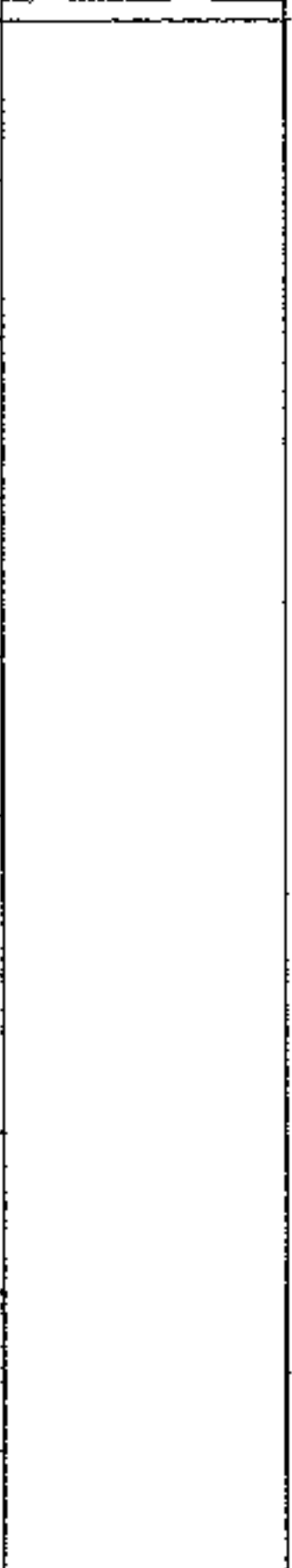
Depth to Water: Dry

Borehole Type: 6-inch dia. Resonant Sonic Casing Advance

Well Type: 2-inch Sch 40 PVC GW Monitoring Well

Ground Elevation: 5,700.07 feet

Top of Casing Elevation: 5,703.08 feet

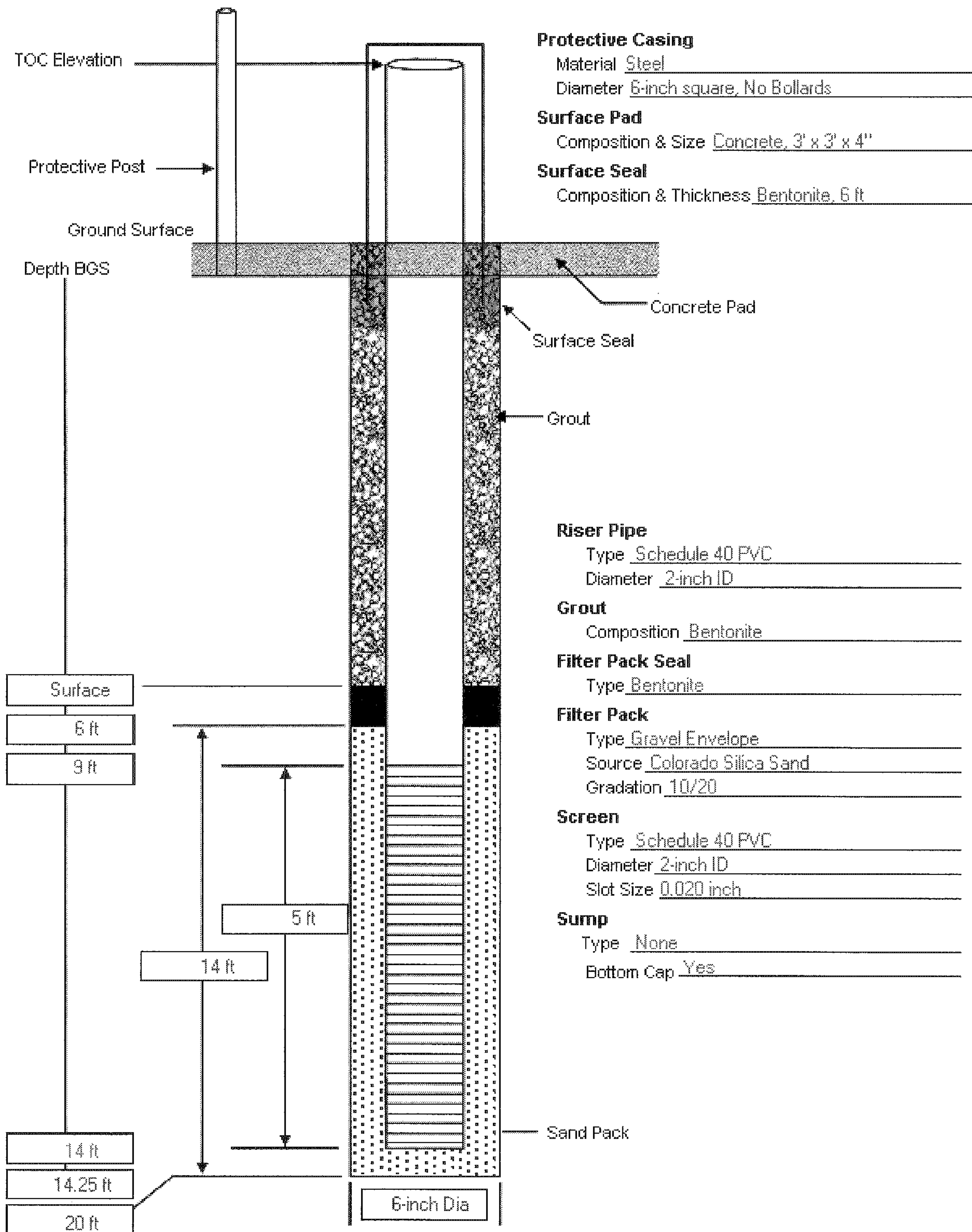
Completion	Depth (Ft.)	Lithology	USCS	Description	Sample	GAMMA (CPM) Background 21,000 cpm
	5		SW/ GW	0' - 10.5' Sand, clayey, abundant gravel and cobbles, moderate brown (5YR 4/4), poor sorting, fine to very coarse grain, loose, damp		21,500
	10		CL	10.5' - 12.3' Clay, sandy, medium light gray (N6), soft, moist to wet		21,700
	15		CL	12.3' - 14' Clay, trace silt, medium light gray (N6), mottled with rust colored streaks in fractures, stiff, dry, weathered shale		22,300
	20		SH	14' - 20' Pierre Shale, clay, trace silt, medium light gray (N6), no mottling, stiff, dry		22,100
	25			Total Depth of Borehole 20 feet bgs Vadose Water 10' - 11' bgs Total Depth of Well 14.24 feet bgs 2" Sch. 40 PVC Casing +3.01' ags to 9' bgs 2" Sch. 40 PVC 0.020" Slot Screen 9' to 14' bgs 2" Sch. 40 PVC End Cap 14' to 14.25' bgs 10/20 Colorado Silica Sand 6' to 20' bgs Hydrated Bentonite Surface Seal 0' to 6' bgs 3'x3'x4" Concrete Surface Pad with 6" Steel Protective Casing and Locking Cover to +3.60' ags		

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Well Installation Diagram

Project: CSMRI #4060-720
 Location: CSM, Golden, Colorado 80401
 Contractor: S.M. Stoller Corporation
 Driller: B. Owens, Prosonic Corp, Lic #1350
 Well Coordinates: N 4,400,397.6 m E 480,281.0 m
 TOC Elevation: 1,738.30 m (5,703.08 ft)
 Surface Elevation: 1,737.38 m (5,700.07 ft)

Well No: CSMRI-7B
 Well Type: GW Monitoring Well
 Date Constructed: 02/10/07
 Observed By: R. Hill
 Sheet 1 of 1



CSMRI-8

Colorado School of Mines

Colorado School of Mines Research Institute Site

Golden, Colorado

Project Number: 4060 - 720

Client: Colorado School of Mines

Geologist: N. Malczyk

Northing: 4,400424.7 Easting: 480,285.1

Drilling Contractor: Prosonic Corporation, B. Owens

Total Depth of Borehole: 15 feet bgs

Dates Drilled: 02/11/07 - 02/11/07

Depth to Water: 4.95 feet bgs

Borehole Type: 6-inch dia. Resonant Sonic Casing Advance

Well Type: 2-inch Sch 40 PVC GW Monitoring Well

Ground Elevation: 5,680.51 feet

Top of Casing Elevation: 5,683.60 feet

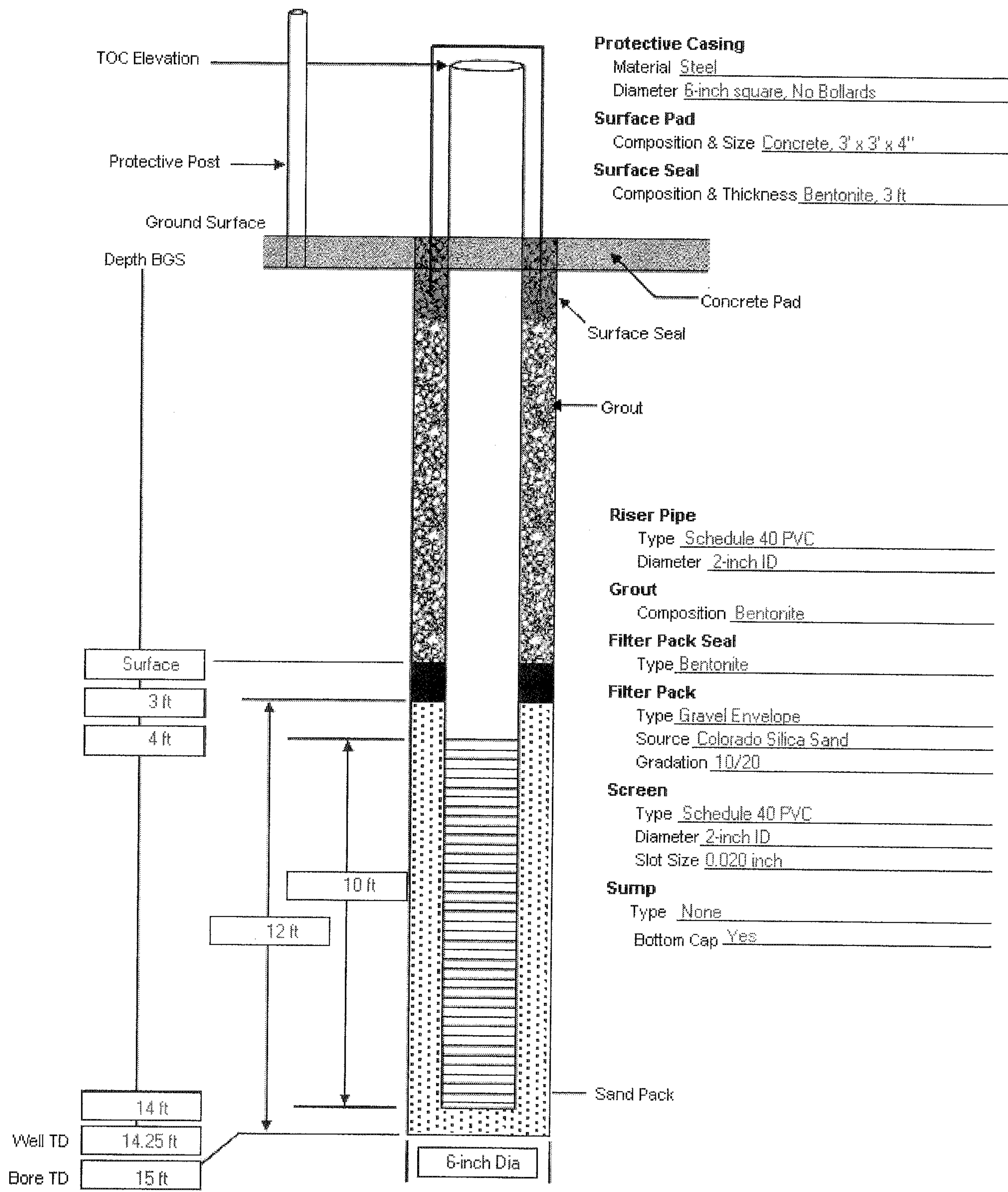
Completion	Depth (Ft.)	Lithology	USCS	Description	Sample	GAMMA (CPM) Background 18,500 cpm
				0' - 7' Post-Piney Creek Alluvium, Sand, silty, some gravel and cobbles, very dark brown (10YR 2/2), moist to 4 feet, saturated at 5 feet, 67% recovery		
	5		SW/GW	Static Water Level 4.95' bgs measured 03/08/07		18,200
	10		SH	7' - 15' Pierre Shale, dark gray (2.5YR 4/0), damp grading to dry		18,000
	15			Total Depth of Borehole 15 feet bgs Depth to Water 4.95 feet bgs		18,300
	20			Total Depth of Well 14.25 feet bgs 2" Sch. 40 PVC Blank Casing +3.09' ags to 4' bgs 2" Sch. 40 PVC 0.020" Slot Screen 4' to 14' bgs 2" Sch. 40 PVC End Cap 14' to 14.25' bgs 10/20 Colorado Silica Sand 3' to 15' bgs Hydrated Bentonite Surface Seal 0' to 3' bgs 3'x3'x4" Concrete Surface Pad with 6" Steel Protective Casing and Locking Cover to +3.64' ags		
	25					

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Well Installation Diagram

Project: CSMRI #4060-720
 Location: CSM, Golden, Colorado 80401
 Contractor: S.M. Stoller Corporation
 Driller: B. Dwens, Prosonic Corp, Lic #1350
 Well Coordinates: N 4,400,424.7 m E 480,285.1 m
 TOC Elevation: 1,732.36 m (5,683.60 ft)
 Surface Elevation: 1,731.42 m (5,680.51 ft)

Well No: CSMRI-8
 Well Type: GW Monitoring Well
 Date Constructed: 02/11/07
 Observed By: N. Malczyk
 Sheet 1 of 1



CSMRI-9

Colorado School of Mines

Colorado School of Mines Research Institute Site

Golden, Colorado

Project Number: 4060 - 720

Client: Colorado School of Mines

Geologist: N. Malczyk

Northing: 4,400408.8 Easting: 480,361.3

Drilling Contractor: Prosonic Corporation, B. Owens

Total Depth of Borehole: 30 feet bgs

Dates Drilled: 02/19/07 - 02/19/07

Depth to Water: 22.99 feet bgs

Borehole Type: 6-inch dia. Resonant Sonic Casing Advance

Well Type: 2-inch Sch 40 PVC GW Monitoring Well

Ground Elevation: 5,704.56 feet

Top of Casing Elevation: 5,707.71 feet

Completion	Depth (Ft.)	Lithology	USCS	Description	Sample	GAMMA (CPM) Background 15,000 cpm
	0 - 2	Fill	Fill	0' - 2' Fill, fine grain sand, silt, clay, some cobbles, dark yellowish brown (10YR 4/2), moist		
	2 - 4	Fill	Fill	2' - 4' Fill, silt, some fine sand, dark yellowish orange (10YR 6/6), dry		
	4 - 10	Fill	Fill	4' - 10' Fill, fine and medium grain sand, some cobbles, pieces of wood, moderate brown (5YR 4/4)		18,400
	10 - 19			10' - 19' Similar material as above with color change to greenish gray (5GY 6/1), probable Louviers Alluvium		20,300
	19 - 30		SW	19' - 30' Fox Hills Sandstone, fine grain sand, dark yellowish orange (10YR 6/6), moist		18,300
	25 - 26		SP	Static Water Level 22.99' bgs measured 02/27/07 @ 25' - 26' becomes moist to wet		16,600
	30			Total Depth of Borehole 30 feet bgs Depth to Water 22.99 feet bgs		14,300
	35			Total Depth of Well 30 feet bgs 2" Sch. 40 PVC Blank Casing +3.15' ags to 14.75' bgs 2" Sch. 40 PVC 0.020" Slot Screen 14.75' to 29.75' bgs 2" Sch. 40 PVC End Cap 29.75' to 30' bgs 10/20 Colorado Silica Sand 12' to 30' bgs Hydrated Bentonite Surface Seal 0' to 12' bgs 3'x3'x4" Concrete Surface Pad with 6" Steel Protective Casing and Locking Cover to +3.67' ags		

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