

Pit 3: 150'x600'x14'  
(36,320 cy. / 174,659 bbls.)  
Pit 4: 150'x600'x14'  
(36,320 cy. / 174,659 bbls.)

Note: No wells located on staging pad.  
Meter houses are located on the individual well pads.

ITEM	Estimated Dirt Quantities (cy)		
	CUT	FILL	EXCESS
	<i>SUBSOIL</i>	<i>TOPSOIL</i>	
Pit 3	69,549	3,908	73,457 (C)
Pit 4	80,802	4,245	85,047 (C)
Staging		10,737	139,614 (F)
<b>TOTAL</b>	<b>150,351</b>	<b>18,890</b>	<b>18,890 (C)</b>

Notes:

- Subsoil from pits cuts (150,351cy.) used to create staging area.
- Topsoil (18,890 cy.) stored in separate pile from staging area.
- Topsoil volumes based on 8" soil depth.
- Total Disturbed Area = +/- 12.1 Ac.

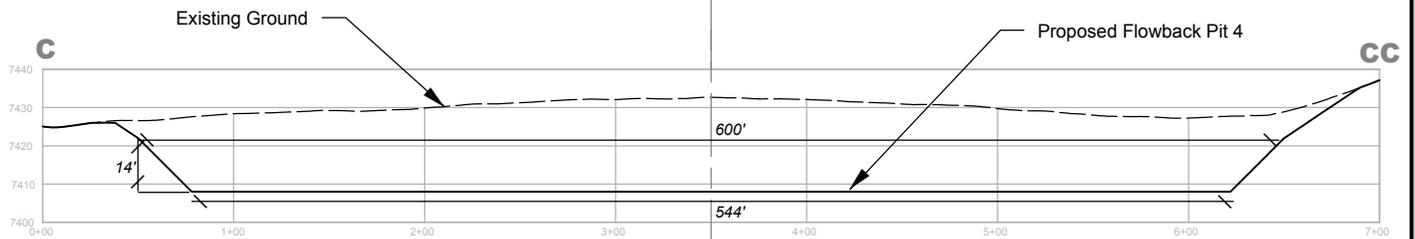
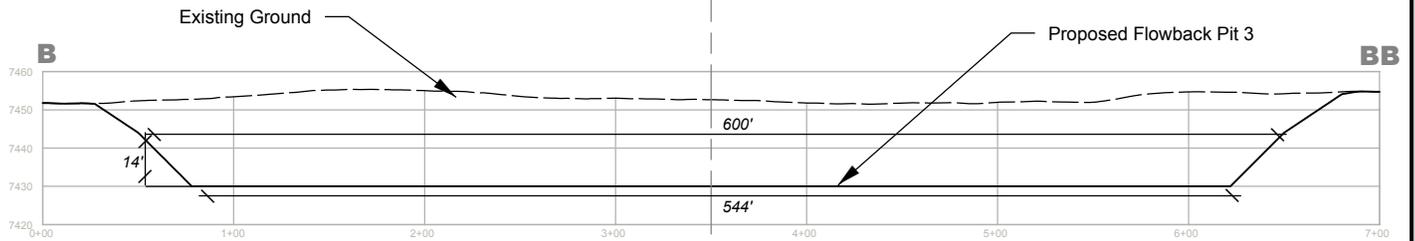
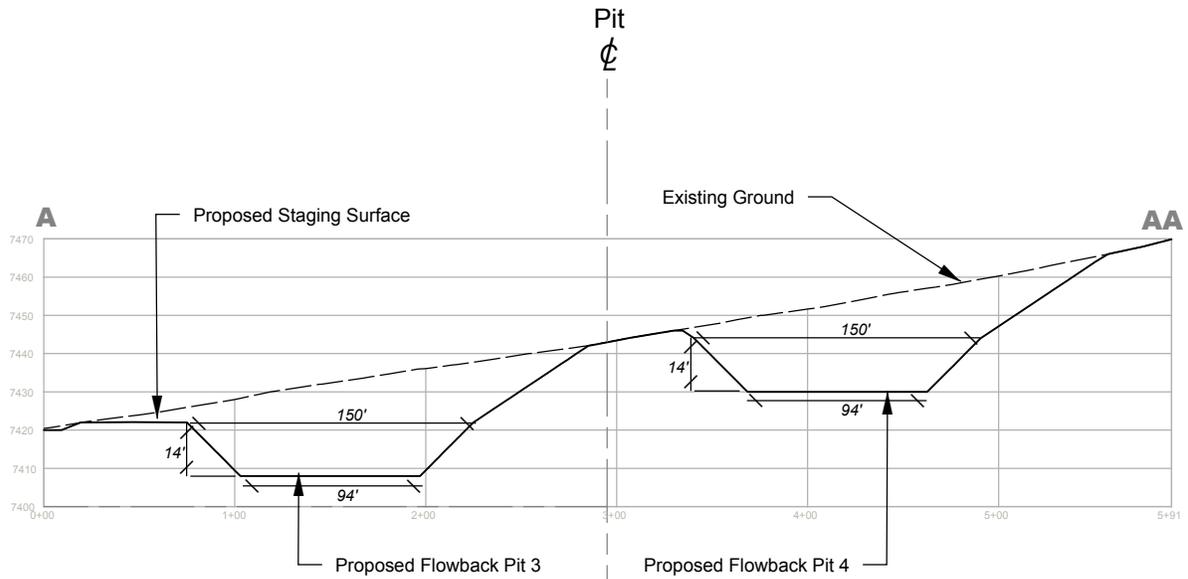
SCALE: 1" = 150'  
DATE: 10.22.2010



**SG Interests**  
PO Box 26  
Montrose, CO 81402  
970-252-0696

**Bull Mountain Unit**  
T. 11 S, R. 90 W, Section 26

**McIntyre Flowback Pits 3 & 4**  
**CONSTRUCTION LAYOUT**



- Notes:  
 1. Inner perimeter cut slopes = 2:1.  
 2. Outer perimeter cut slopes = 3:1.

SCALE: Horiz.: 1" = 100'  
 Vert.: 1" = 25'  
 DATE: 10.22.2010



**SG Interests**  
 PO Box 26  
 Montrose, CO 81402  
 970-252-0696

**Bull Mountain Unit**  
 T. 11 S, R. 90 W, Section 26

**McIntyre Flowback Pits 3 & 4**  
**CONSTRUCTION CROSS SECTION**

# McIntyre Flowback Pit 3

## Pit Volume Calculations

Date: 10.25.2010



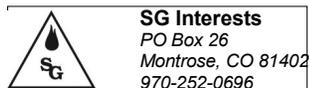
	Width	Length	Depth	Side Slopes		Total Pit Volume		Free Board		Usable Volume	
				Run	Rise			Required	Volume		
	<i>Ft.</i>	<i>Ft.</i>	<i>Ft.</i>	<i>Ft.</i>	<i>Ft.</i>	<i>cy.</i>	<i>bbls.</i>	<i>ft.</i>	<i>cy.</i>	<i>cy.</i>	<i>bbls.</i>
Flowback Pit 3	150	600	14	2	1	36,320	174,659	2	6,446	29,874	143,660

*Volume Calculation = (Area of top + Area of Bottom + (4 \* Area at Middle Height)) / 6 \* Height*

# McIntyre Flowback Pit 4

## Pit Volume Calculations

Date: 10.25.2010

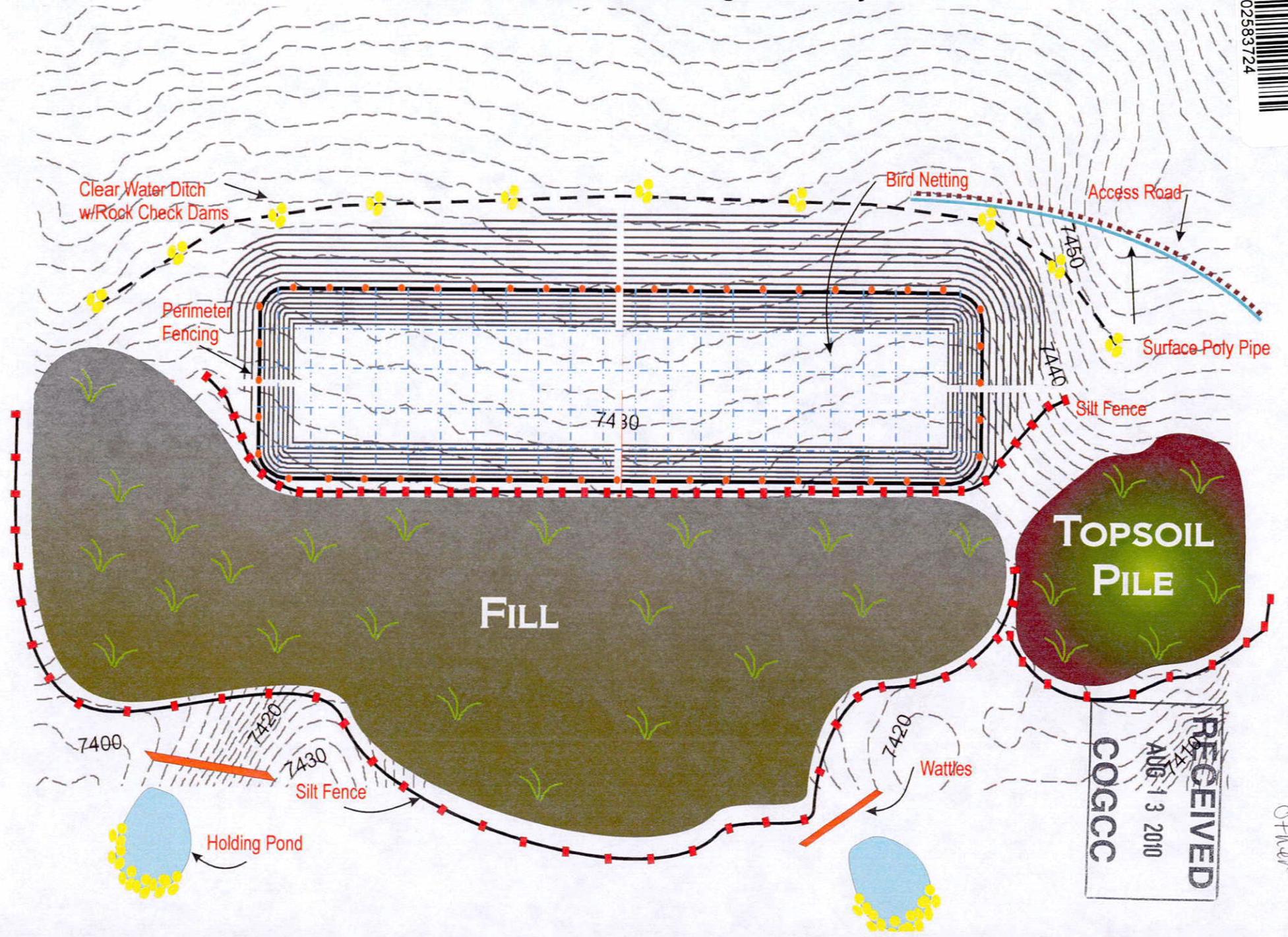


	Width	Length	Depth	Side Slopes		Total Pit Volume		Free Board		Usable Volume	
				Run	Rise			Required	Volume		
	<i>Ft.</i>	<i>Ft.</i>	<i>Ft.</i>	<i>Ft.</i>	<i>Ft.</i>	<i>cy.</i>	<i>bbls.</i>	<i>ft.</i>	<i>cy.</i>	<i>cy.</i>	<i>bbls.</i>
Flowback Pit 4	150	600	14	2	1	36,320	174,659	2	6,446	29,874	143,660

*Volume Calculation = (Area of top + Area of Bottom + (4 \* Area at Middle Height)) / 6 \* Height*

# McIntyre Flowback Pit #3 Proposed Stormwater Management Layout

02583724



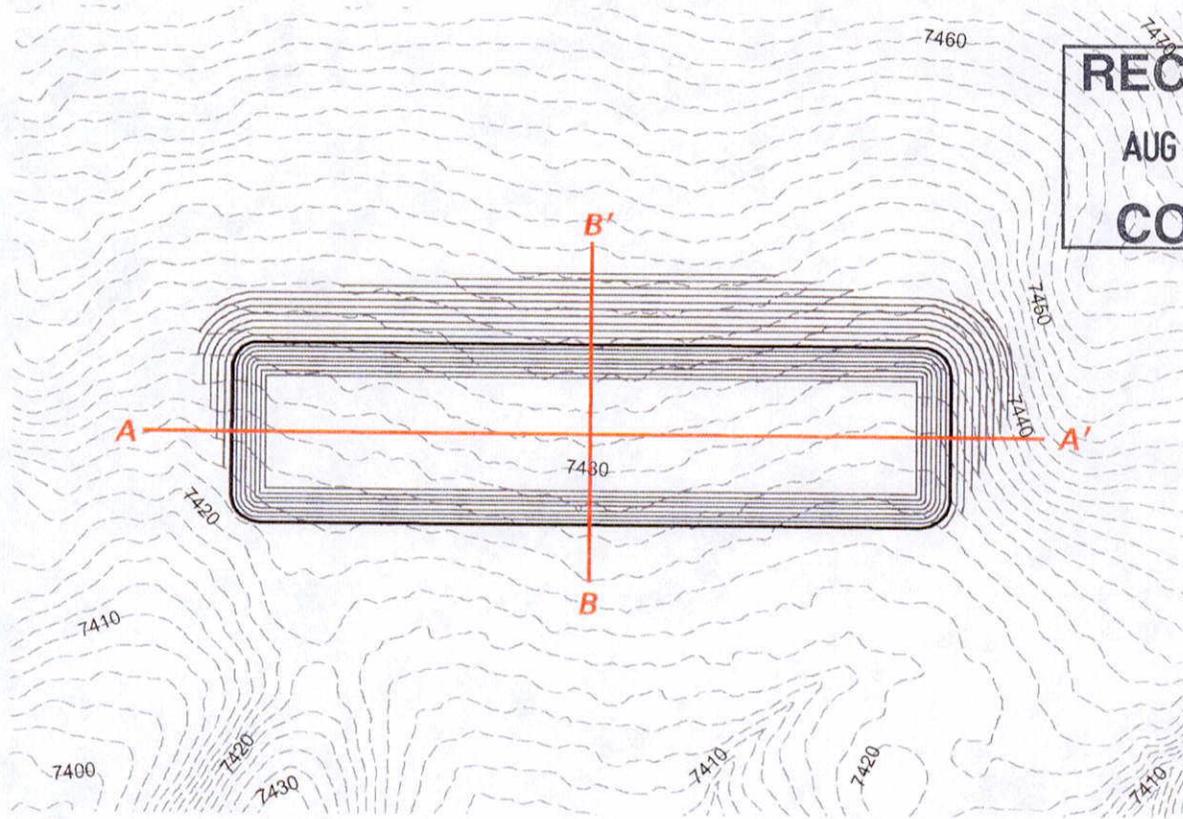
RECEIVED  
ATL  
AUG 13 2010  
COGCC

O'Neil



02583725

Other

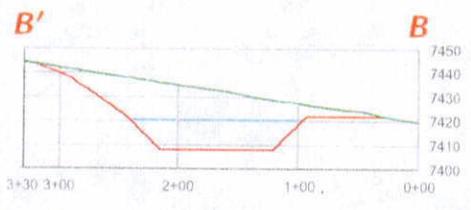
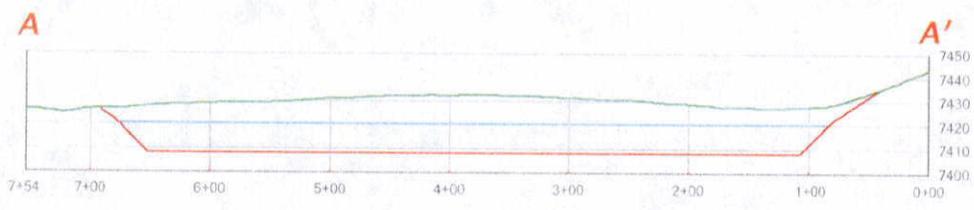


**RECEIVED**  
**AUG 13 2010**  
**COGCC**

Scale: 1" = 150'

Existing Countour Proposed Countour

**PLAN**



Horizontal Scale 1" = 150'  
 Vertical Scale 1" = 75'

Existing Grade Surface Finished Grade Surface

**SECTION**

**CALCULATIONS**

Pit Perimeter Elevation: 7,422'  
 Pit Bottom Elevation: 7,408'  
 Pit Depth: 14'  
 Pit Width: 600'  
 Pit Length: 150'  
 Fluid Volume: 143,455 bbls.

**Note:**  
 Existing 2-ft surface contours interpolated from LIDAR base data. LIDAR data acquired in November 2008 with 1-meter posting resulting in < 6 in. vertical RMSE (Root Mean Square Error).

**Disclaimer:**  
 This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information. The maps are distributed "AS-IS" without warranties of any kind, either expressed or implied, including but not limited to warranties of suitability to a particular purpose or use.

McIntyre Flowback Pit #3  
 Pit Design & Cross Section  
 07.30.2010



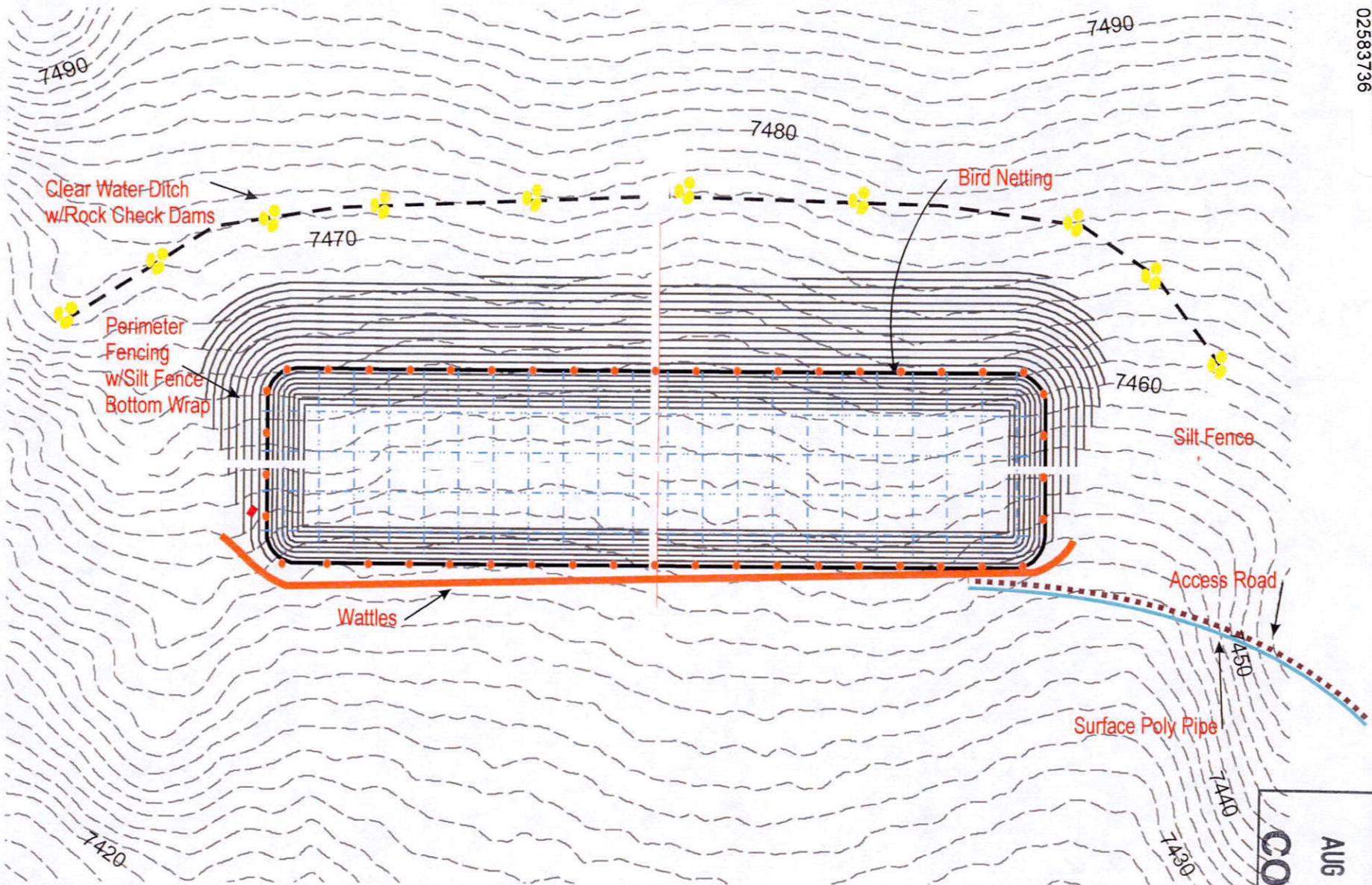
**SG Interests**  
 PO Box 26  
 Montrose, CO 81402

Prepared By: ZDP  
 Prepared For: SG Interests, Ltd.  
 Contour Interval: 2 ft.

# McIntyre Flowback Pit #4 Proposed Stormwater Management Layout



02583736



RECEIVED  
AUG 13 2010  
COGCC

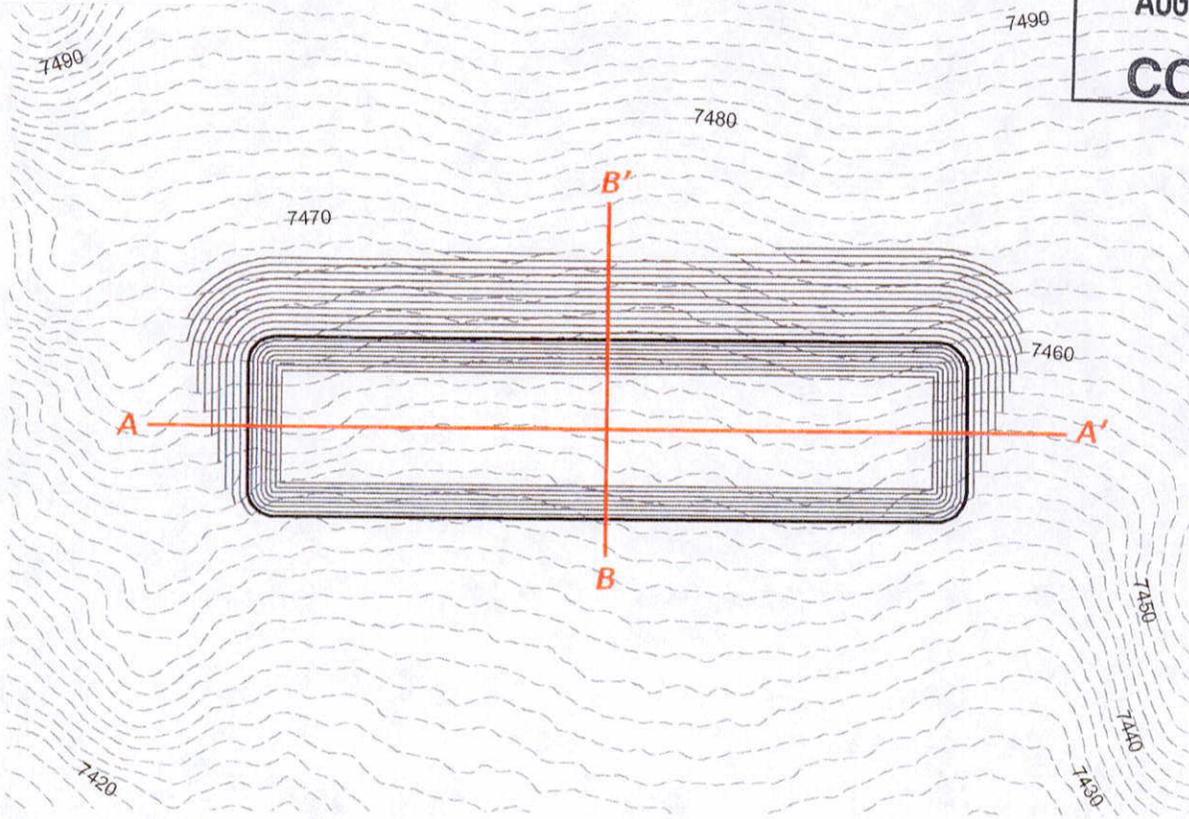
0744



02583735

other

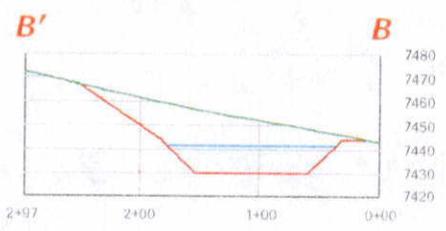
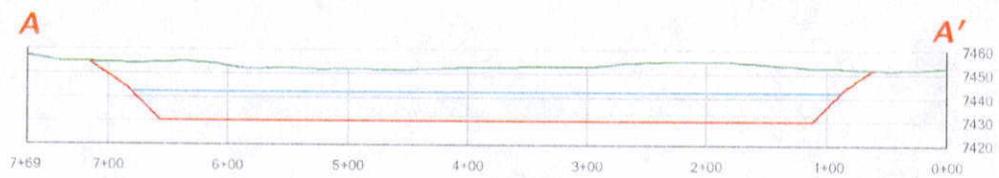
RECEIVED  
AUG 13 2010  
COGCC



Scale: 1" = 150'

Existing Countour Proposed Countour

PLAN



Horizontal Scale: 1" = 150'  
Vertical Scale: 1" = 75'

Existing Grade Surface Finished Grade Surface

SECTION

CALCULATIONS

Pit Perimeter Elevation: 7,444'  
Pit Bottom Elevation: 7,430'  
Pit Depth: 14'  
  
Pit Width: 600'  
Pit Length: 150'  
  
Fluid Volume: 143,455 bbls.

**Note:**  
Existing 2-ft surface contours interpolated from LIDAR base data. LIDAR data acquired in November 2008 with 1-meter posting resulting in < 6 in. vertical RMSE (Root Mean Square Error).

**Disclaimer:**  
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information. The maps are distributed "AS-IS" without warranties of any kind, either expressed or implied, including but not limited to warranties of suitability to a particular purpose or use.

McIntyre Flowback Pit #4  
Pit Design & Cross Section  
07.30.2010



SG Interests  
PO Box 26  
Montrose, CO 81402

Prepared By: ZDP  
Prepared For: SG Interests, Ltd.  
Contour Interval: 2 ft.

### **Liner and Leak Detection System**

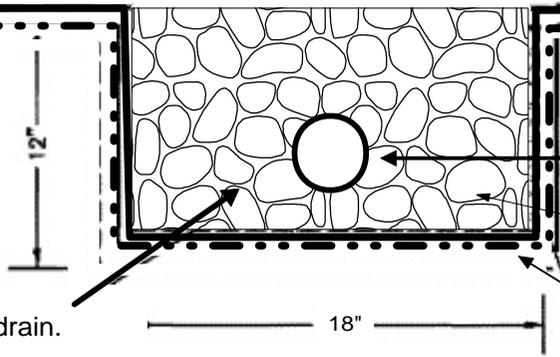
The leak detection system will be constructed at the low end (approximately 1 foot lower than the rest of the pit bottom) of the pit. The pit bottom will slope down toward this leak detection sump. The liner in the sump can be shaped into this rounded and sloped configuration and no special welding is required for the detection sump. All seams will be tested to the manufacturer's requirements. The following is a typical drawing of this leak detection system. Its actual shape will vary from this drawing based on field conditions.

# Liner & Leak Detention System Details

**Pit Liner System:**

- \* 60 mil HDPE Liner (CL)
- \* 200 mil Hypernet Geonet Drain Mat (GSE)
- \* 36 mil HDPE Liner (CL)
- \* BentoMatDN Geosynthetic Bentonite Liner (CETCO)

Place pipe 2" above bottom of collection drain.  
Slope pipe toward deep end of pit.



- 4" Perforated PVC meeting ASTM D 3034 & D 2729.
- 3/4" - 1.5" rounded drain rock.
- Wrap collection drain rock in Mirafi Woven Fabric 160N or equal

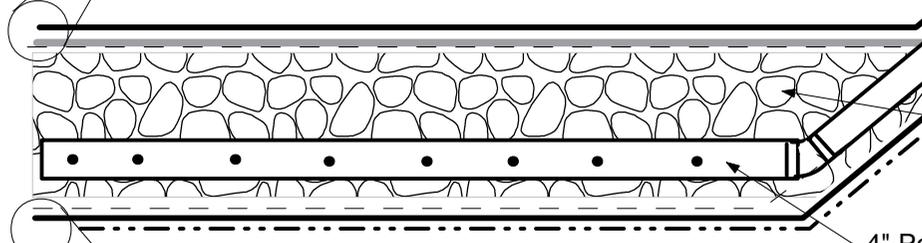
Monitoring Stand Pipe with 4" PVC  
Removeable Cap to be located at  
deep end of pit. Place steel fence  
posts for protection.

Install Pocket Vents per manufacturer's  
recommendations every 50 liner feet along  
perimeter at top of liner. Vent to perforate  
both HDPE liners.

4 ft. min.  
Pad Grade

- \* 60 mil HDPE Liner
- \* 200 mil Hypernet Geonet Drain Mat
- \* Mirafi NX160 Fabric Wrap

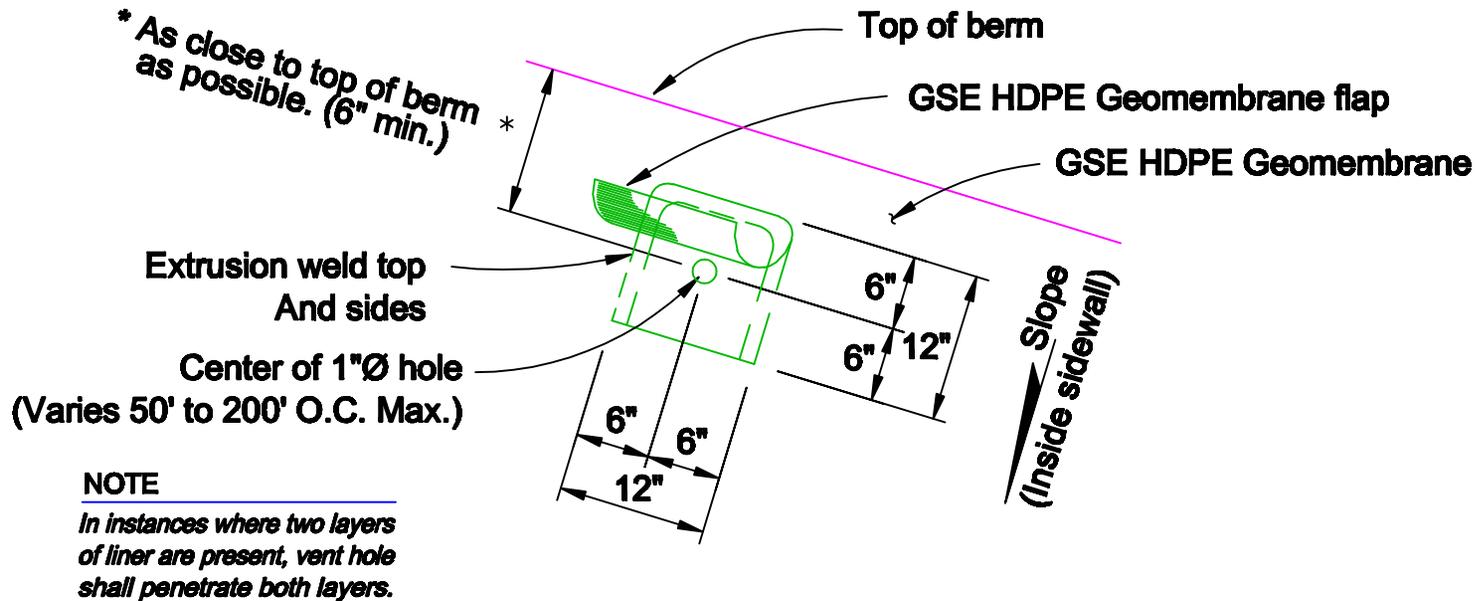
12" deep minimum anchor  
trench per manufacturer's  
instructions.



- 4" PVC meeting ASTM D 3034 & D 2729.
- 3/4" - 1.5" round drain rock.  
(No crushed gravel allowed.)
- 4" Perforated PVC meeting ASTM D 3034 & D 2729.

- \* Mirafi 160N Fabric Wrap
- \* 36 mil HDPE Liner
- \* BentoMatDN Geosynthetic Bentonite Liner

\* Install HPDE / Bentonite Liners;  
Hypernet and Vent Pockets  
per manufacturer's instructions.



## Typical Vent Pocket Detail

Not to scale



GSE Lining Technology, LLC  
19103 Gundle Road  
Houston, Texas 77073-3598  
(800)435-2008 / (281)443-8564

NO PART OF THIS DOCUMENT MAY BE REPRODUCED OR DISTRIBUTED IN ANY FORM OR BY ANY MEANS, OR STORED IN A DATA BASE OR RETRIEVAL SYSTEM, WITHOUT THE PRIOR WRITTEN PERMISSION OF GSE Lining Technology, LLC.

THIS IS A CONCEPTUAL DRAWING SOLELY FOR USE BY ENGINEERS AS A GENERAL GUIDELINE IN FORMULATING SITE SPECIFIC ENGINEERING DRAWINGS. NO DESCRIPTION OF MATERIALS OR THIS DESIGN CREATES OR AMOUNTS TO AN EXPRESS WARRANTY, OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

DRAWN

MG

DATE

01/10/2010

REVISION

0

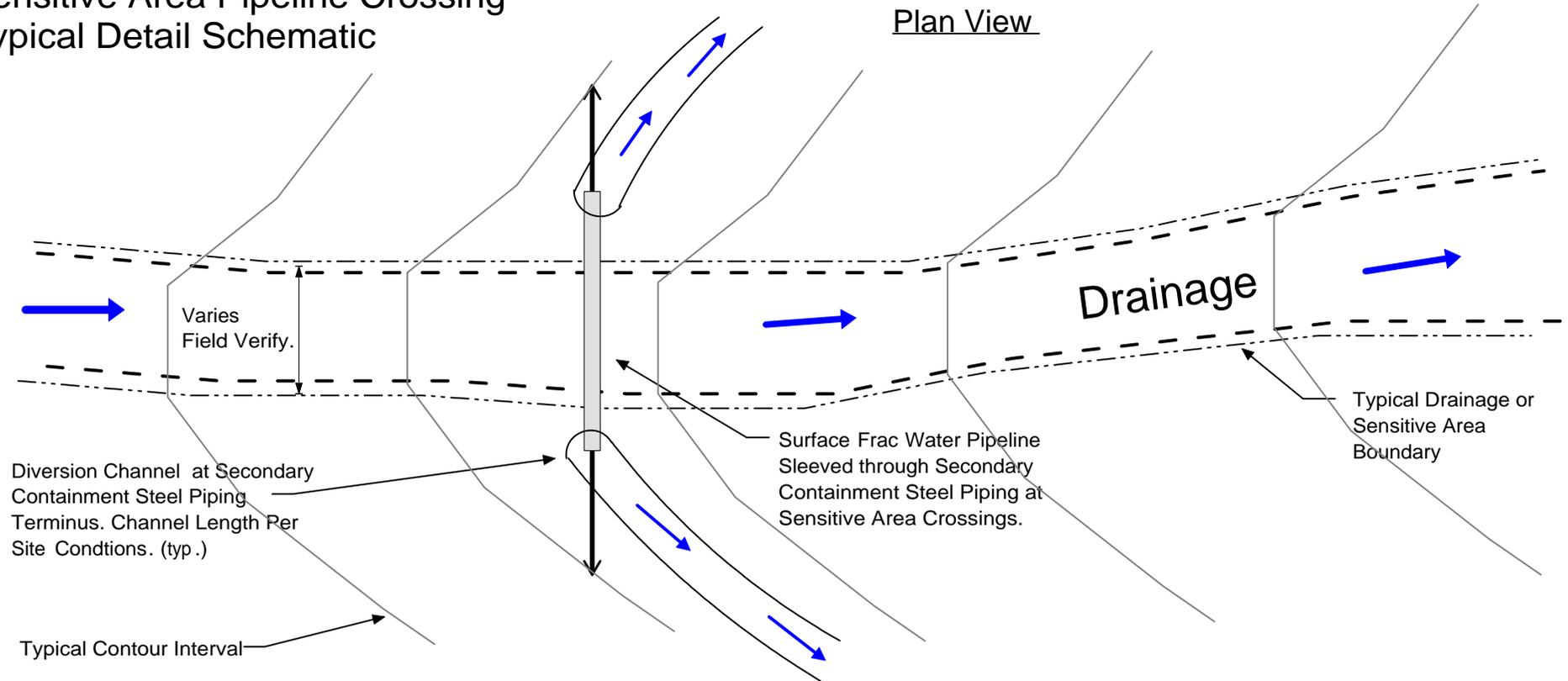
DWG. NO.

GSE-030

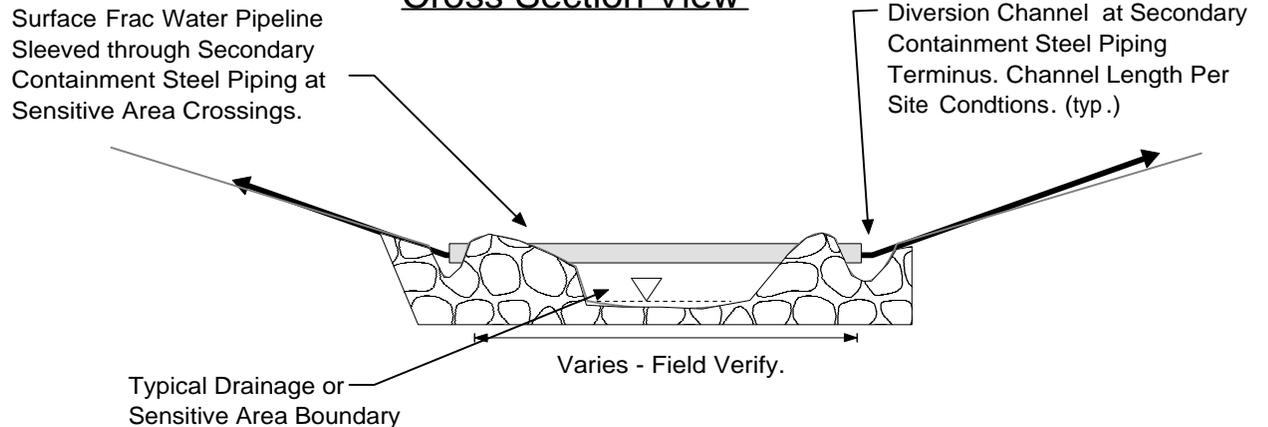
### **Sensitive Area Pipeline Crossing**

Where SG Interests uses a poly pipeline to transport water to or from the McIntyre Flowback Pits over a sensitive area (a stream, wetland or other waterbody), the poly pipe will be contained within a secondary containment system to prevent flowback fluids from contaminating the surface water in the event of a leak in the poly pipeline. The surface poly pipeline will be cased within a steel pipeline of larger diameter for the length of the sensitive area. The ends of the steel casing will extend from upland area to upland area through the entire sensitive area. At the ends of the steel casing, diversion channels will be constructed to direct fluid away from the sensitive area and into containment basins in the event of a leak in the surface poly line. The design of the diversion ditch and the containment basin will be site specific depending on local terrain in the vicinity of that particular crossing. These containment features will be designed by a qualified stormwater inspector with training and experience in sizing and designing these features. A qualified stormwater inspector will monitor and inspect all sensitive areas crossed by such poly pipelines on a daily basis during use and operation. A typical of this secondary containment system for use in sensitive area crossings follows this narrative.

SG Interest, I Ltd.  
 Sensitive Area Pipeline Crossing  
 Typical Detail Schematic



**Cross Section View**



**Notes:**

\* Pipelines hydraulic including total dynamic and static head pressures shall be verified to insure that the allowable working pressure of the pipeline is not compromised.

\* Storm water and erosion control BMP's shall be installed as necessary by SG Interest, I Ltd. or designated contractor.

\* Field verify location of all underground utilities, gas, water, phone, cable and electric lines. Call Before You Dig. Statewide One Call 1-800-922-1987.

\*Verify field grades and elevations.

\* Not to Scale.

### **Liner and Leak Detection System**

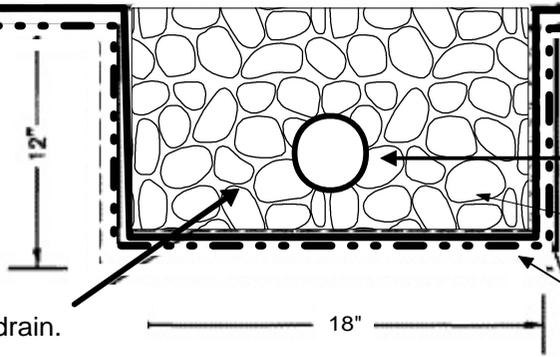
The leak detection system will be constructed at the low end (approximately 1 foot lower than the rest of the pit bottom) of the pit. The pit bottom will slope down toward this leak detection sump. The liner in the sump can be shaped into this rounded and sloped configuration and no special welding is required for the detection sump. All seams will be tested to the manufacturer's requirements. The following is a typical drawing of this leak detection system. Its actual shape will vary from this drawing based on field conditions.

# Liner & Leak Detention System Details

**Pit Liner System:**

- \* 60 mil HDPE Liner (CL)
- \* 200 mil Hypernet Geonet Drain Mat (GSE)
- \* 36 mil HDPE Liner (CL)
- \* BentoMat DN Geosynthetic Bentonite Liner (CETCO)

Place pipe 2" above bottom of collection drain.  
Slope pipe toward deep end of pit.



- 4" Perforated PVC meeting ASTM D 3034 & D 2729.
- 3/4" - 1.5" rounded drain rock.
- Wrap collection drain rock in Mirafi Woven Fabric 160N or equal

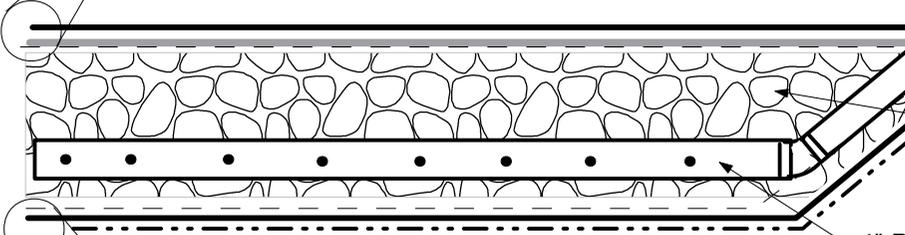
Monitoring Stand Pipe with 4" PVC  
Removeable Cap to be located at  
deep end of pit. Place steel fence  
posts for protection.

4 ft. min.  
Pad Grade

Install Pocket Vents per manufacturer's  
recommendations every 50 liner feet along  
perimeter at top of liner. Vent to perforate  
both HDPE liners.

- \* 60 mil HDPE Liner
- \* 200 mil Hypernet Geonet Drain Mat
- \* Mirafi NX 160 Fabric Wrap

12" deep minimum anchor  
trench per manufacturer's  
instructions.



- 4" PVC meeting ASTM D 3034 & D 2729.
- 3/4" - 1.5" round drain rock.  
(No crushed gravel allowed.)
- 4" Perforated PVC meeting ASTM D 3034 & D 2729.

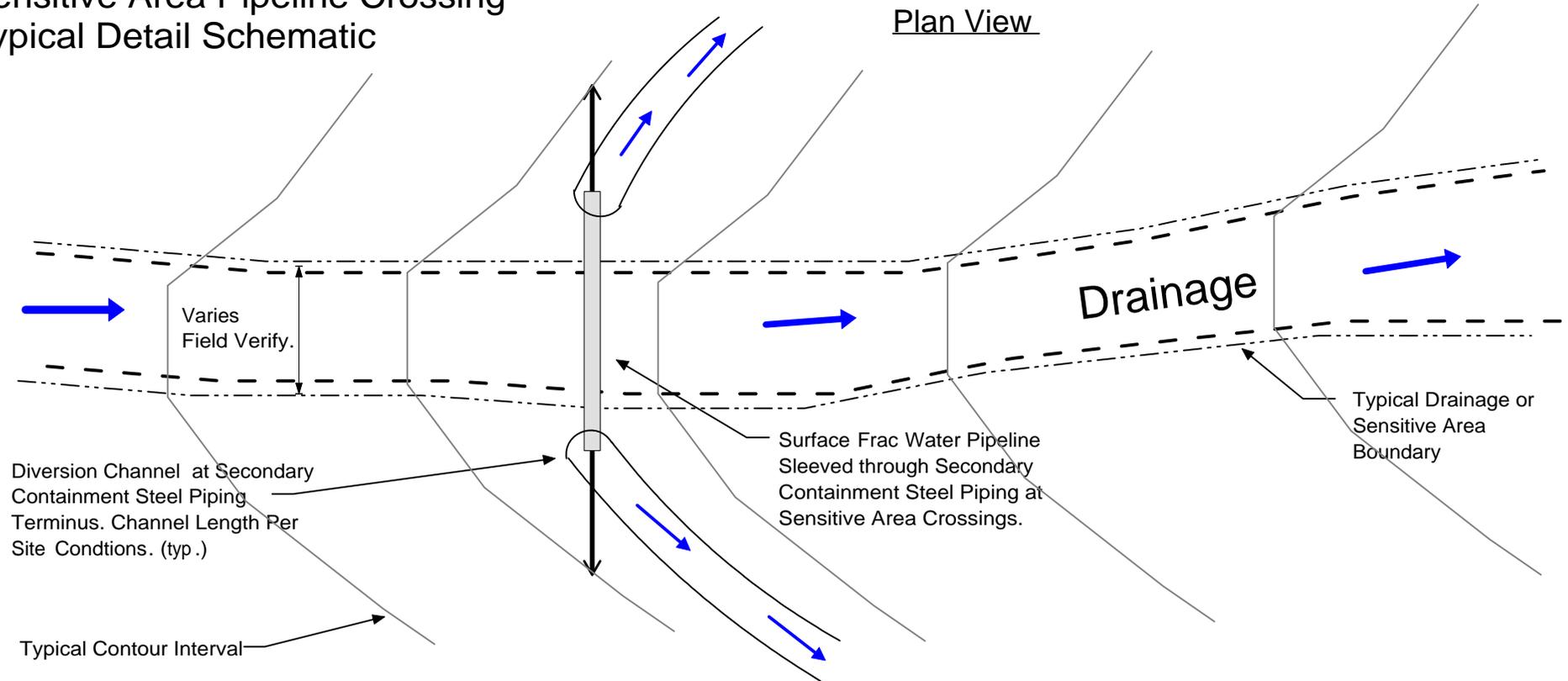
- \* Mirafi 160N Fabric Wrap
- \* 36 mil HDPE Liner
- \* BentoMat DN Geosynthetic Bentonite Liner

\* Install HPDE / Bentonite Liners;  
Hypernet and Vent Pockets  
per manufacturer's instructions.

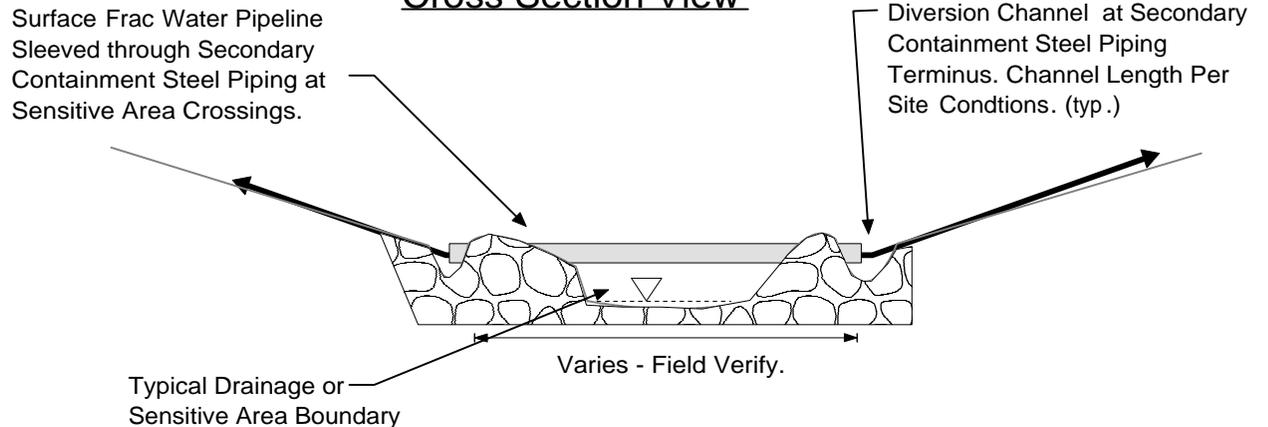
### **Sensitive Area Pipeline Crossing**

Where SG Interests uses a poly pipeline to transport water to or from the McIntyre Flowback Pits over a sensitive area (a stream, wetland or other waterbody), the poly pipe will be contained within a secondary containment system to prevent flowback fluids from contaminating the surface water in the event of a leak in the poly pipeline. The surface poly pipeline will be cased within a steel pipeline of larger diameter for the length of the sensitive area. The ends of the steel casing will extend from upland area to upland area through the entire sensitive area. At the ends of the steel casing, diversion channels will be constructed to direct fluid away from the sensitive area and into containment basins in the event of a leak in the surface poly line. The design of the diversion ditch and the containment basin will be site specific depending on local terrain in the vicinity of that particular crossing. These containment features will be designed by a qualified stormwater inspector with training and experience in sizing and designing these features. A qualified stormwater inspector will monitor and inspect all sensitive areas crossed by such poly pipelines on a daily basis during use and operation. A typical of this secondary containment system for use in sensitive area crossings follows this narrative.

SG Interest, I Ltd.  
 Sensitive Area Pipeline Crossing  
 Typical Detail Schematic



**Cross Section View**



**Notes:**

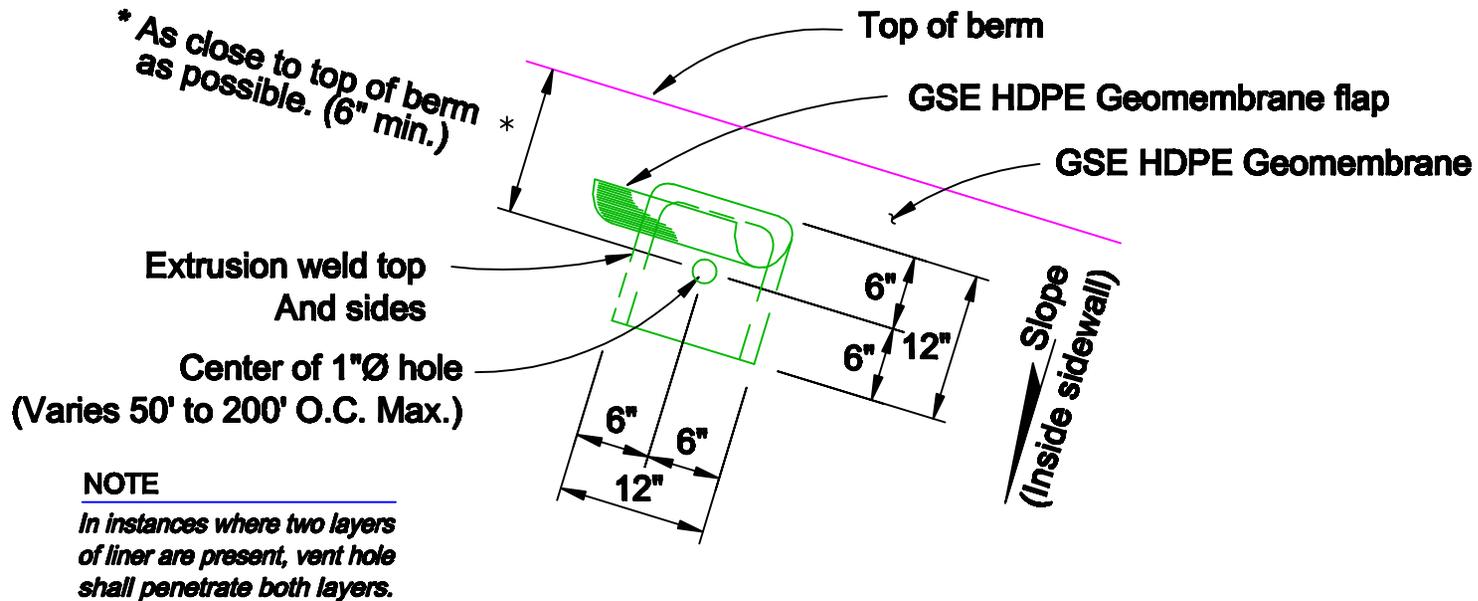
\* Pipelines hydraulic including total dynamic and static head pressures shall be verified to insure that the allowable working pressure of the pipeline is not compromised.

\* Storm water and erosion control BMP's shall be installed as necessary by SG Interest, I Ltd. or designated contractor.

\* Field verify location of all underground utilities, gas, water, phone, cable and electric lines. Call Before You Dig. Statewide One Call 1-800-922-1987.

\*Verify field grades and elevations.

\* Not to Scale.



## Typical Vent Pocket Detail

Not to scale



GSE Lining Technology, LLC  
19103 Gundle Road  
Houston, Texas 77073-3598  
(800)435-2008 / (281)443-8564

NO PART OF THIS DOCUMENT MAY BE REPRODUCED OR DISTRIBUTED IN ANY FORM OR BY ANY MEANS, OR STORED IN A DATA BASE OR RETRIEVAL SYSTEM, WITHOUT THE PRIOR WRITTEN PERMISSION OF GSE Lining Technology, LLC.

THIS IS A CONCEPTUAL DRAWING SOLELY FOR USE BY ENGINEERS AS A GENERAL GUIDELINE IN FORMULATING SITE SPECIFIC ENGINEERING DRAWINGS. NO DESCRIPTION OF MATERIALS OR THIS DESIGN CREATES OR AMOUNTS TO AN EXPRESS WARRANTY, OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

DRAWN

MG

DATE

01/10/2010

REVISION

0

DWG. NO.

GSE-030