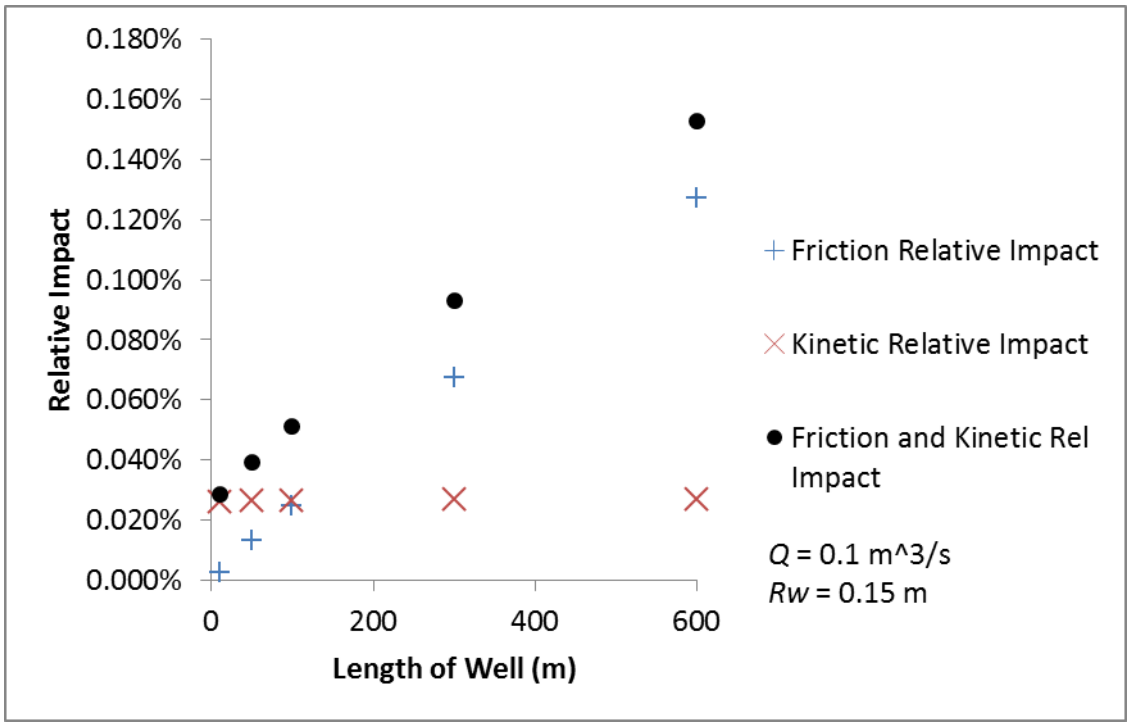
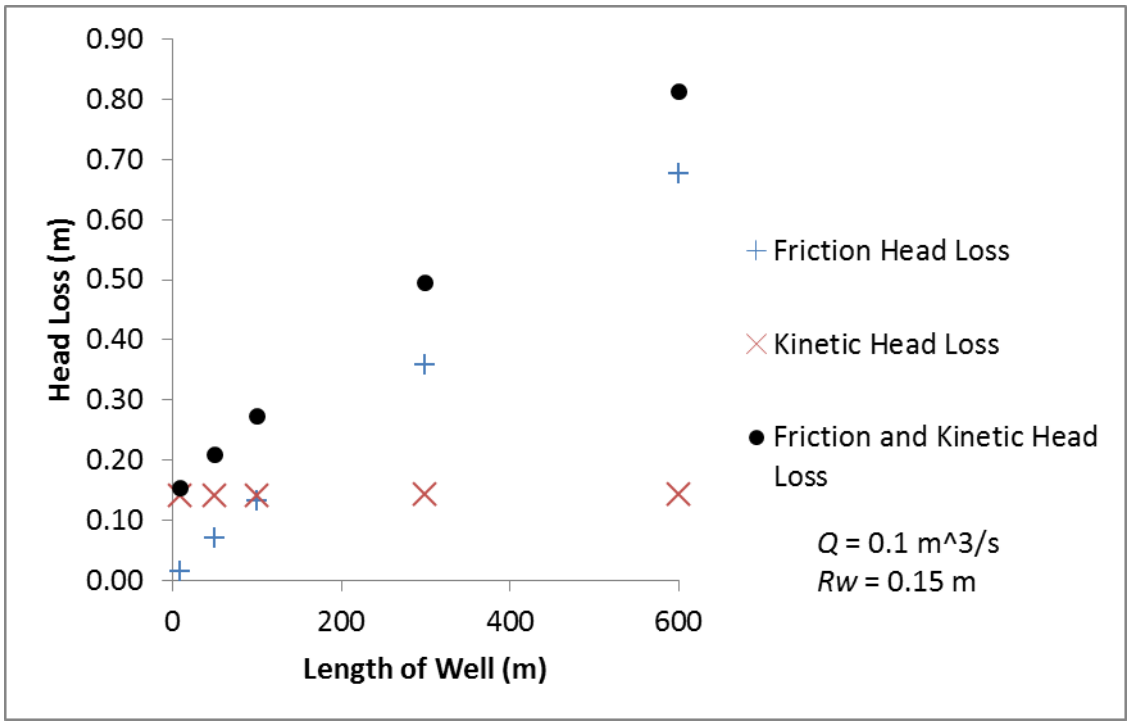
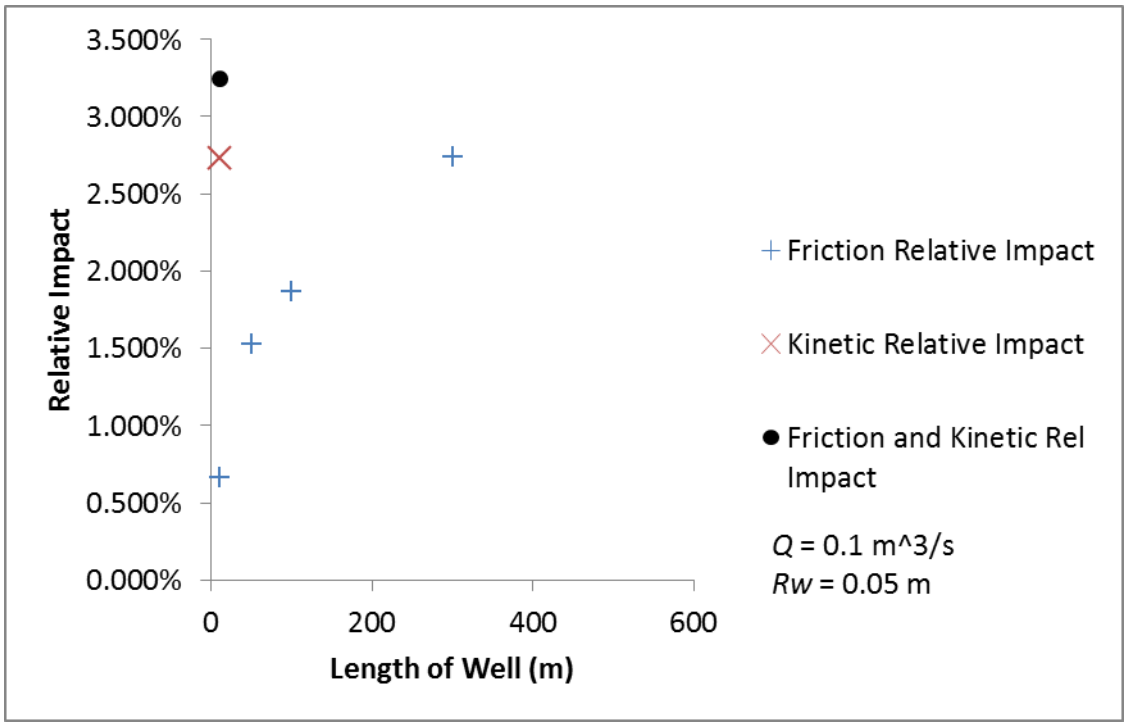
PART A:

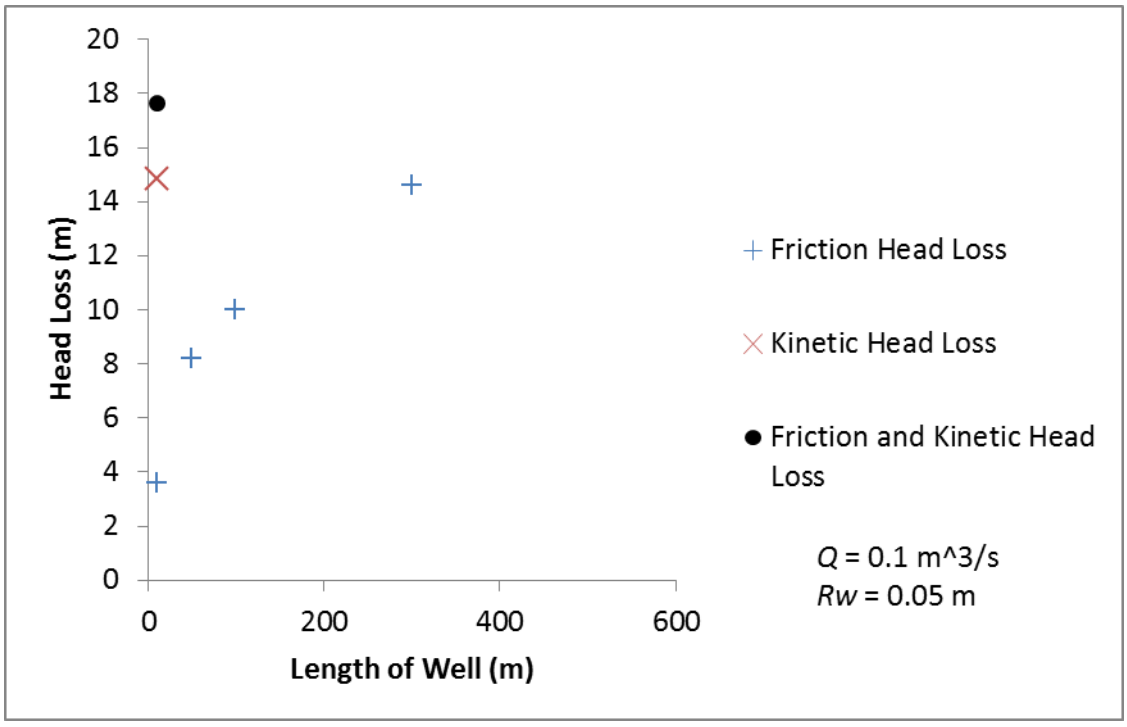
INPUT / OUTPUT OF INTRA-WELLBORE ENERGY LOSS MODEL

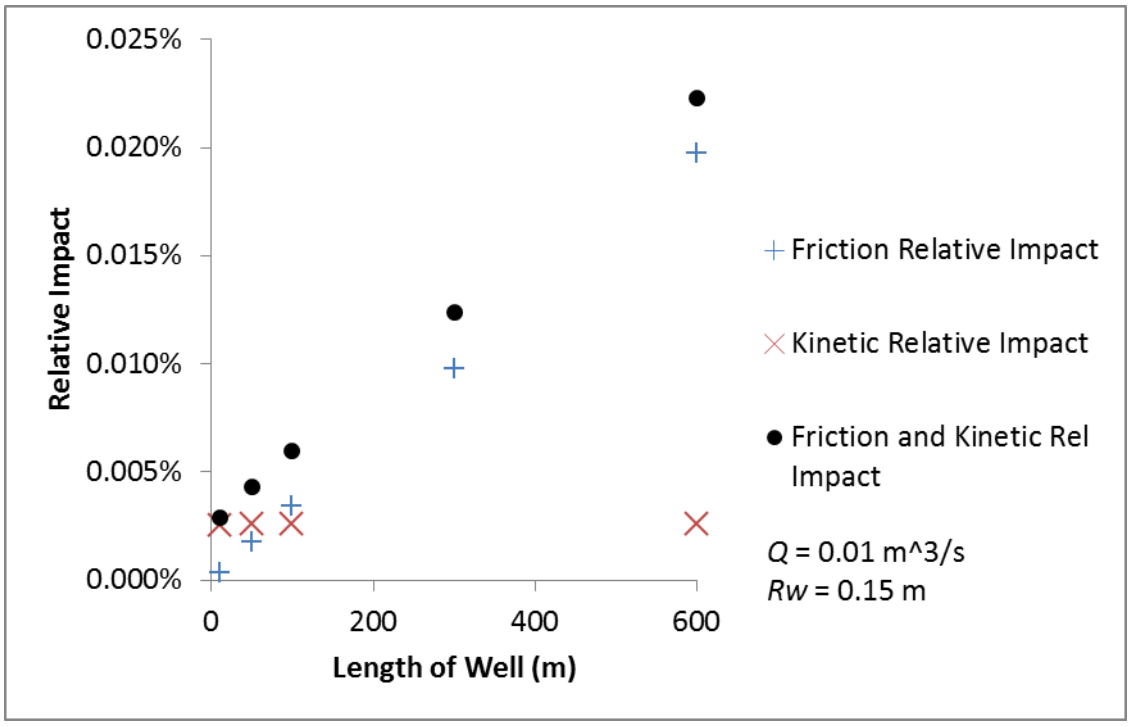
Model Parameters					
a	1000	m	K_x	1E-3	m/s
b	600	m	K_y	1E-3	m/s
c	10	m	K_z	1E-3	m/s
x_1	varies	m	S_s	1E-5	1/m
x_2	varies	m	Skin	0	
y_1	300	m	Density	997	Kg/m^3
y_2	300	m	Viscosity	8.9E-4	
z_1	5	m	Gravity	9.8	m/s^2
z_2	5	m	Well Diameter	0.1 & 0.3	m
Bound at $x = 0$	No flux		Abs. Pipe Roughness	0.15E-3	m
Bound at $x = a$	No flux		Friction	varies	
Bound at $y = 0$	No flux		Critical Reynolds	2000	
Bound at $y = b$	No Flux		Acceleration	varies	
Bound at $z = 0$	No-flux		Integral Abs Error	1E-4	
Bound at $z = c$	No-flux		Integral Rel. Error	1E-6	
One Time Step	Psuedo - Steady State		Discharge Limit	varies	m^3/s
Num. Segments	40				

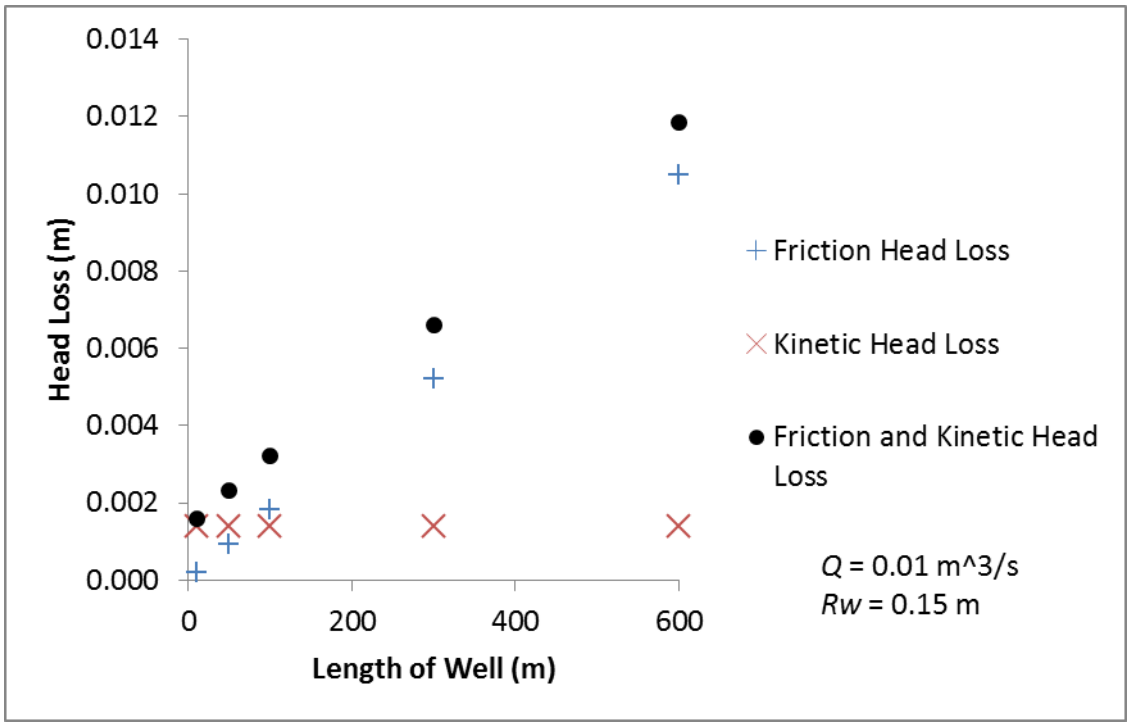

0.180%
0.160%
0.140%
0.120%
0.100%
0.080%
0.060%
0.040%
0.020%
0.000%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.1 m^3/s
Rw = 0.15 m

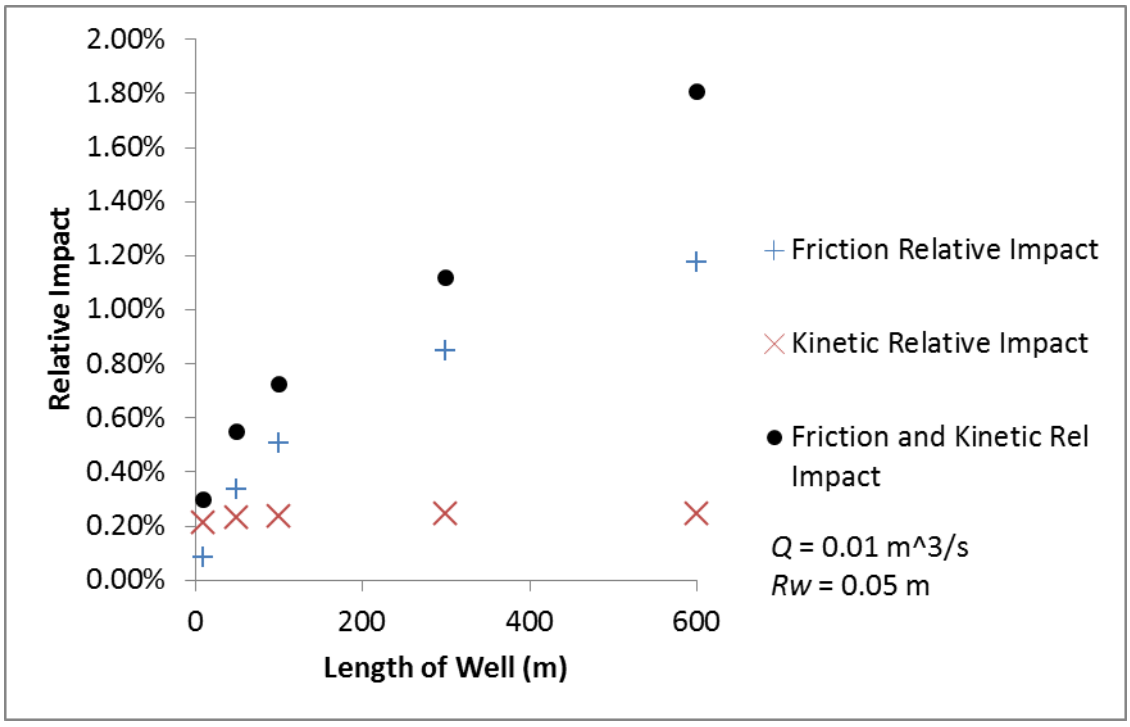

0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.1 m^3/s
Rw = 0.15 m


3.500%
3.000%
2.500%
2.000%
1.500%
1.000%
0.500%
0.000%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.1 m^3/s
Rw = 0.05 m


20
18
16
14
12
10
8
6
4
2
0
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.1 m^3/s
Rw = 0.05 m


0.025%
0.020%
0.015%
0.010%
0.005%
0.000%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.01 m^3/s
Rw = 0.15 m


0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.01 m^3/s
Rw = 0.15 m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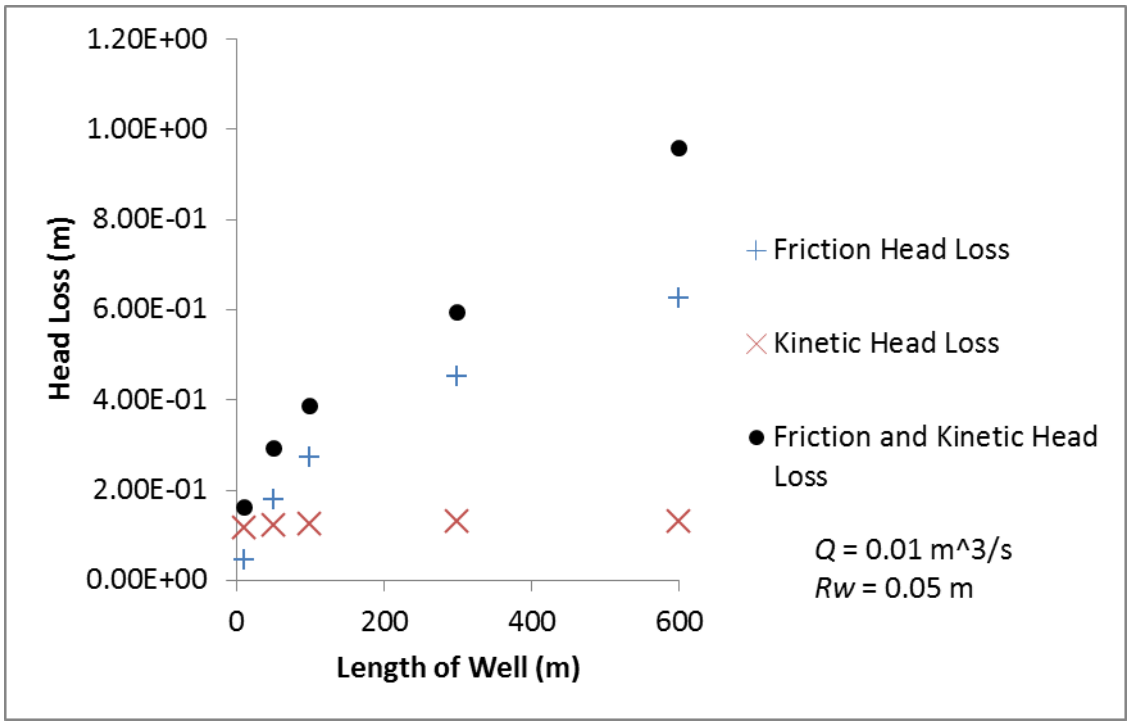
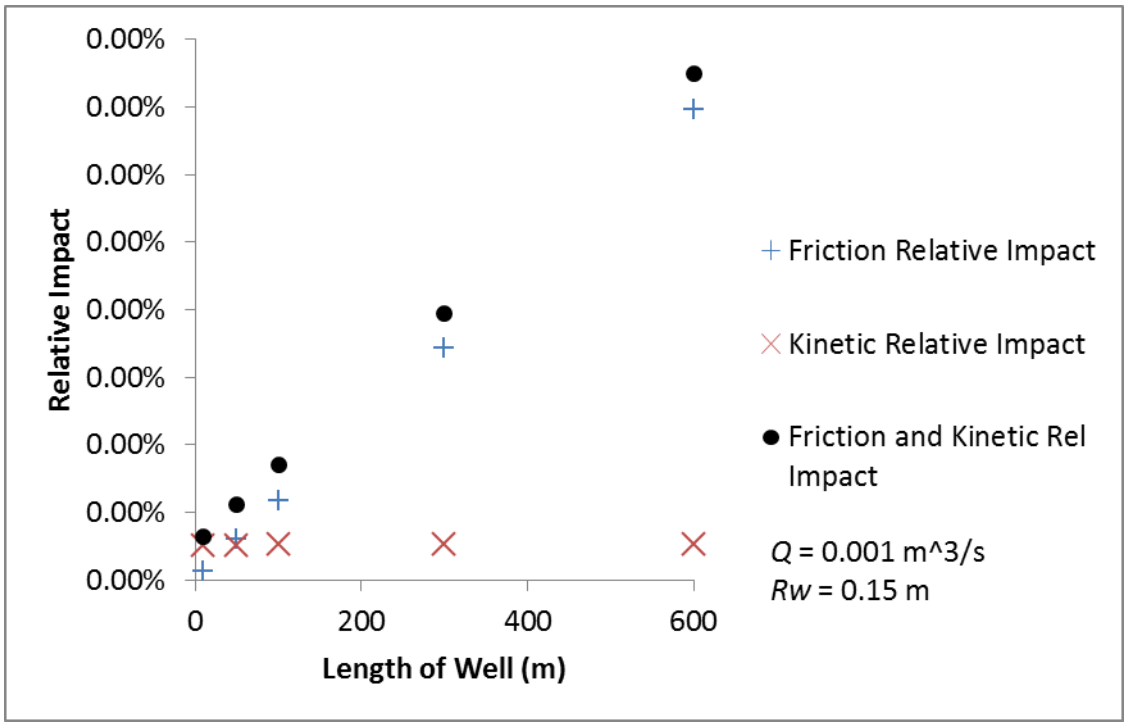
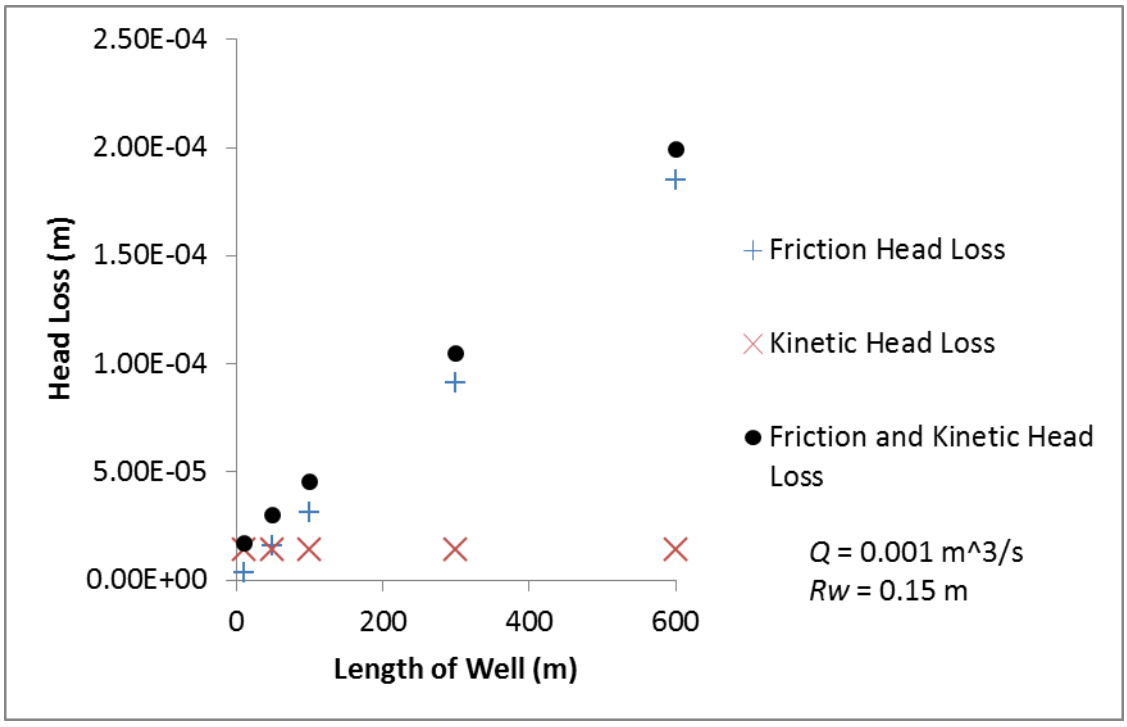
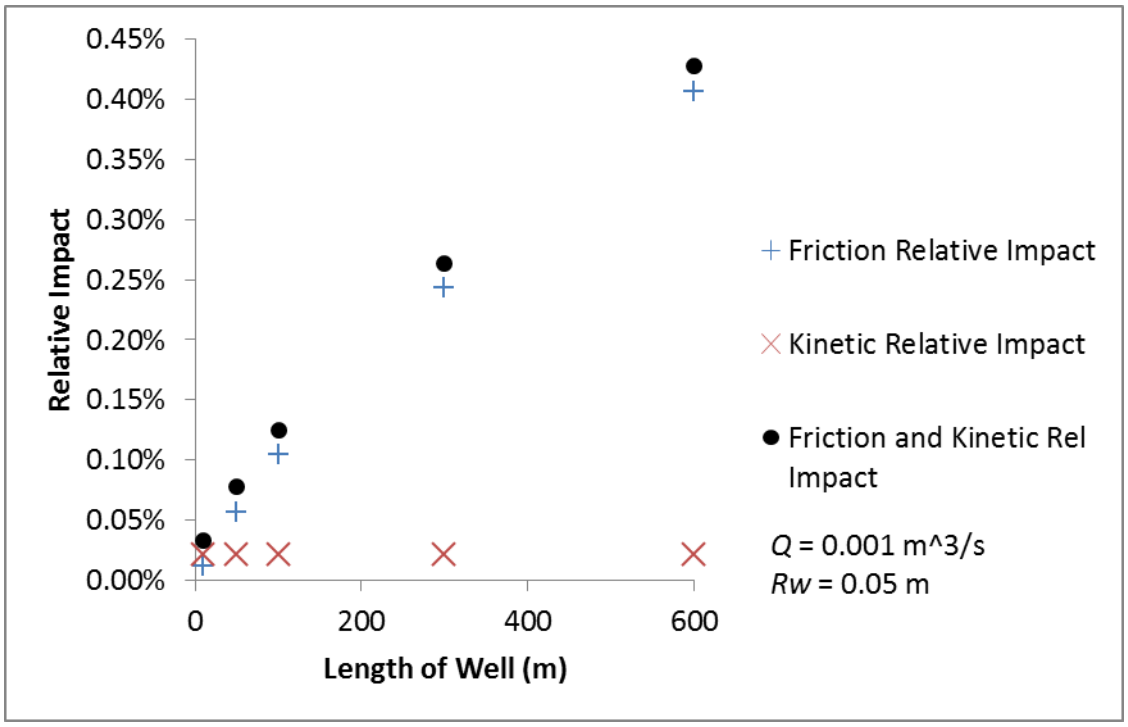
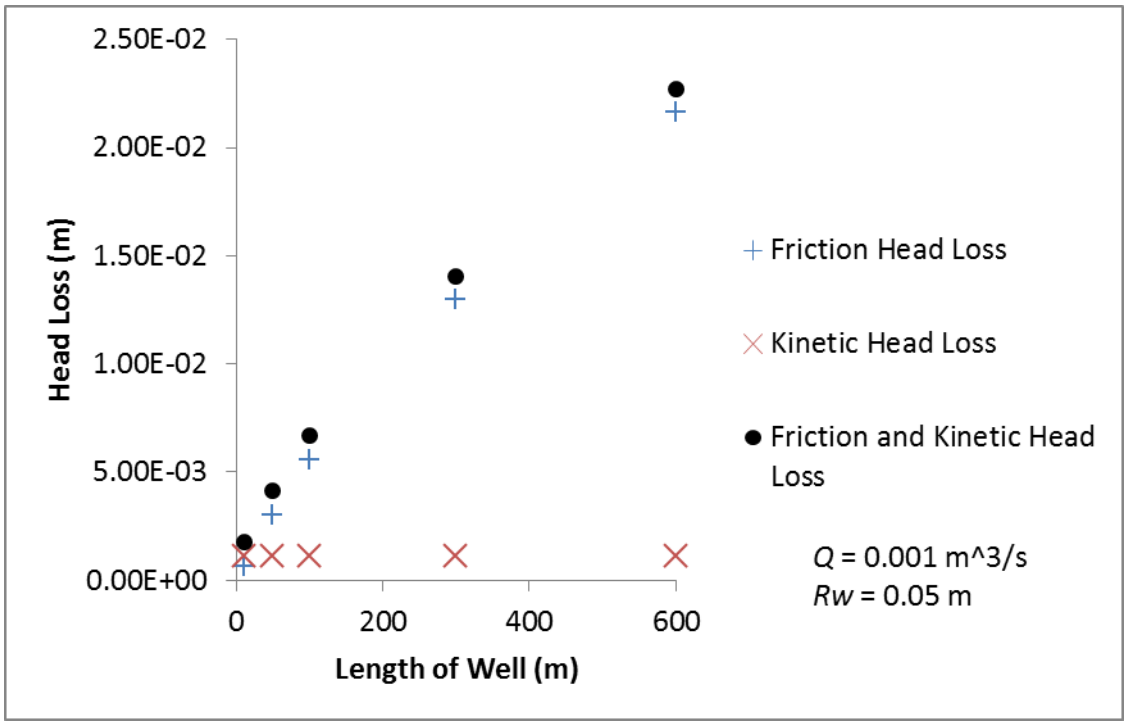
1.80%
1.60%
1.40%
1.20%
1.00%
0.80%
0.60%
0.40%
0.20%
0.00%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.01 m^3/s
Rw = 0.05 m


1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.01 m^3/s
Rw = 0.05 m

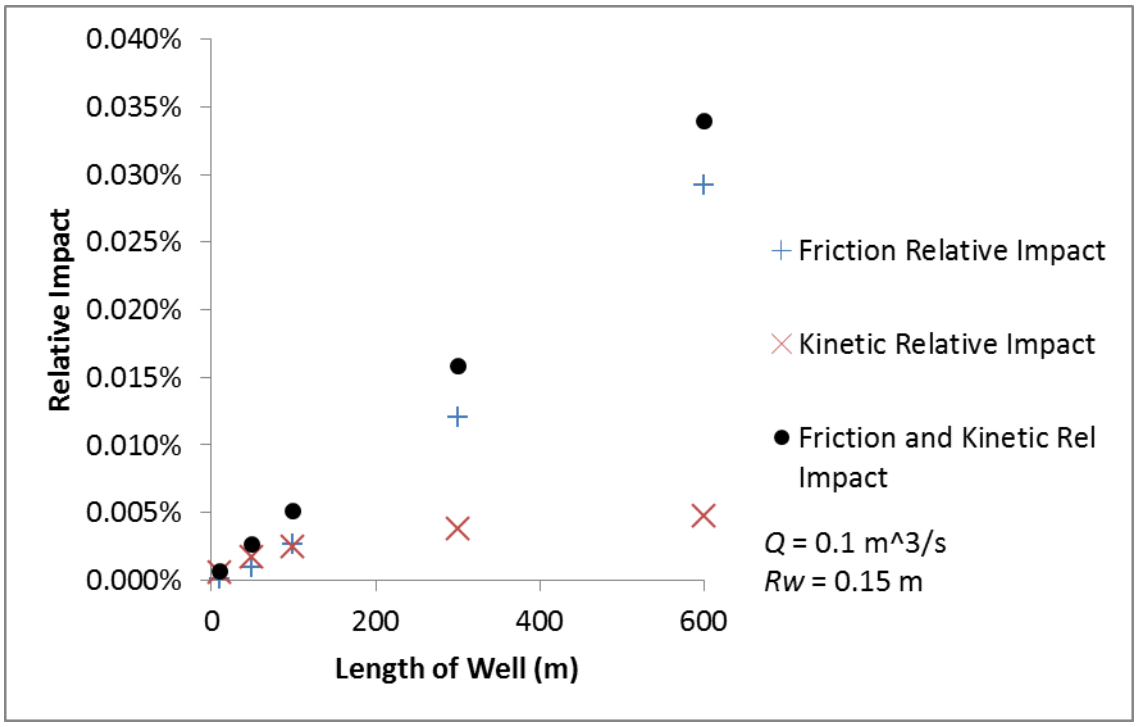

0.00%
0.00%
0.00%
0.00%
0.00%
0.00%
0.00%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.001 m^3/s
Rw = 0.15 m

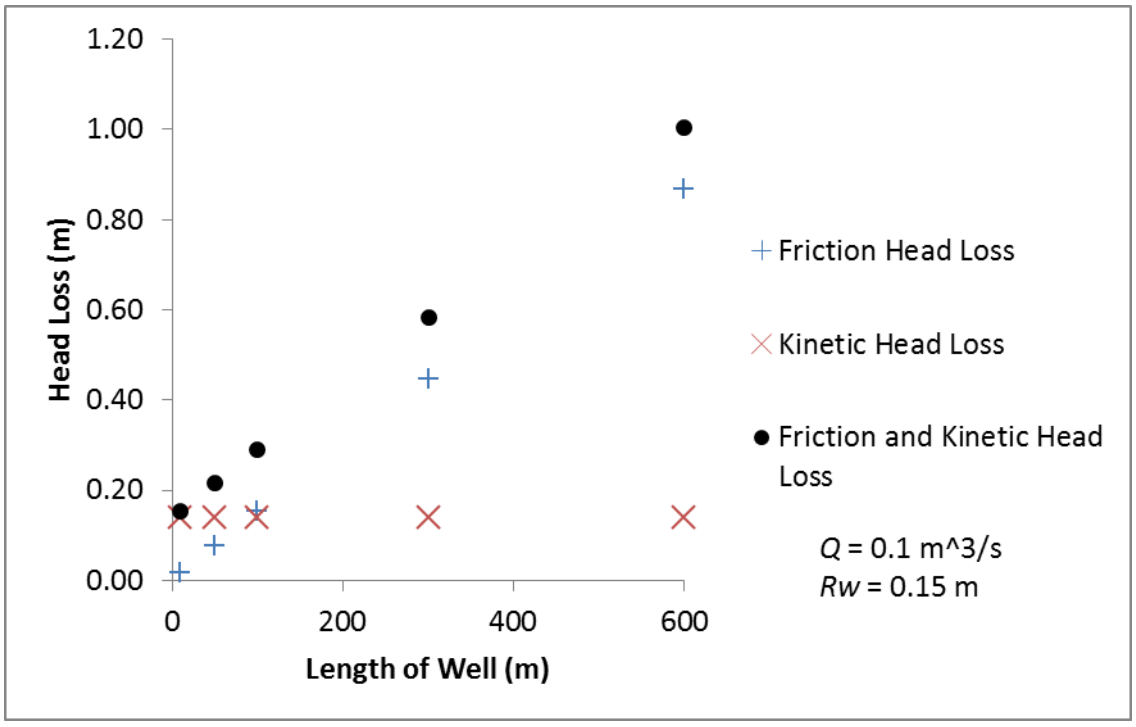

2.50E-04
2.00E-04
1.50E-04
1.00E-04
5.00E-05
0.00E+00
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.001 m^3/s
Rw = 0.15 m

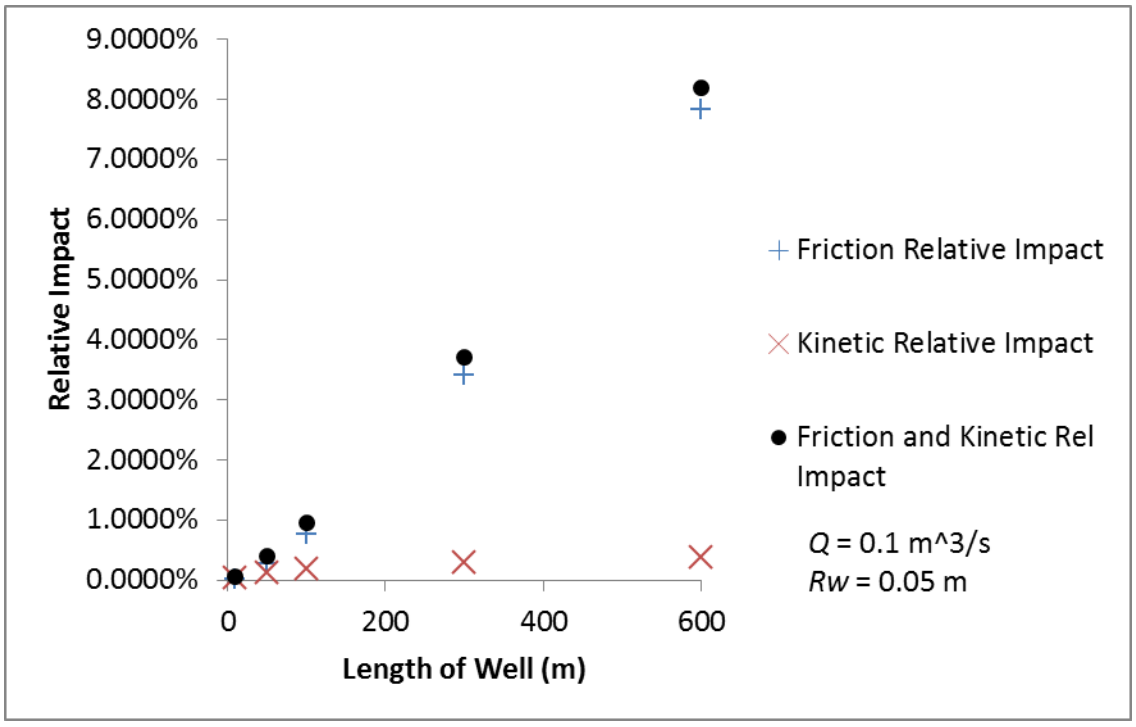

0.45%
0.40%
0.35%
0.30%
0.25%
0.20%
0.15%
0.10%
0.05%
0.00%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.001 m^3/s
Rw = 0.05 m

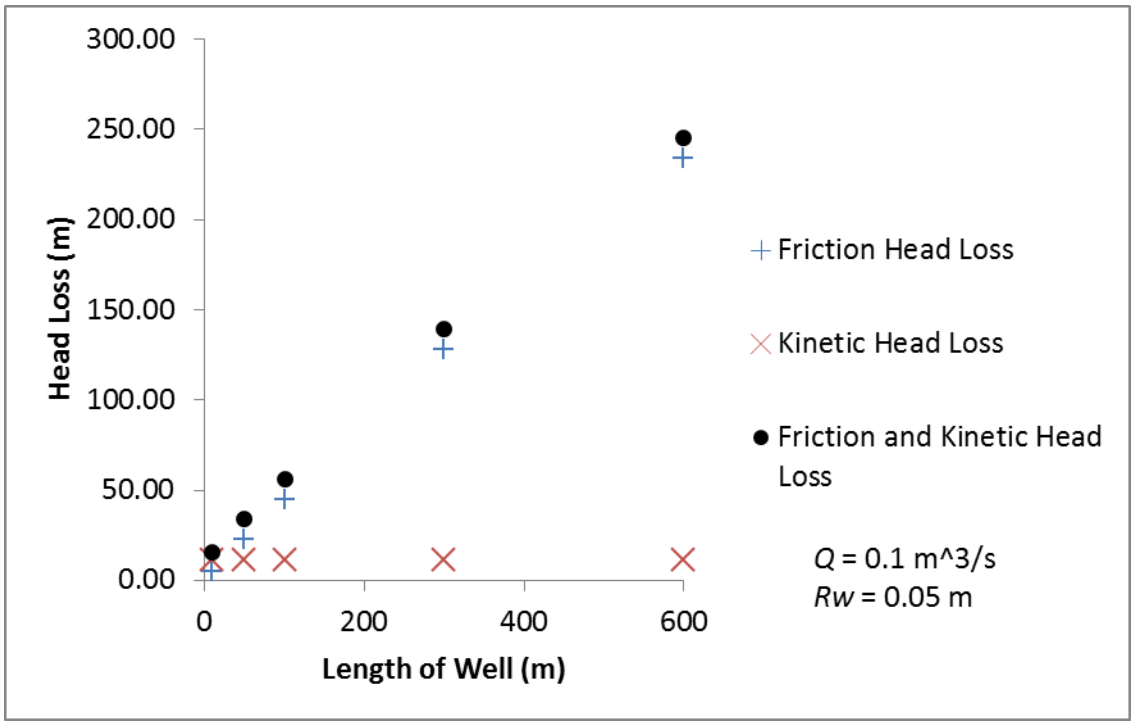

2.50E-02
2.00E-02
1.50E-02
1.00E-02
5.00E-03
0.00E+00
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.001 m^3/s
Rw = 0.05 m

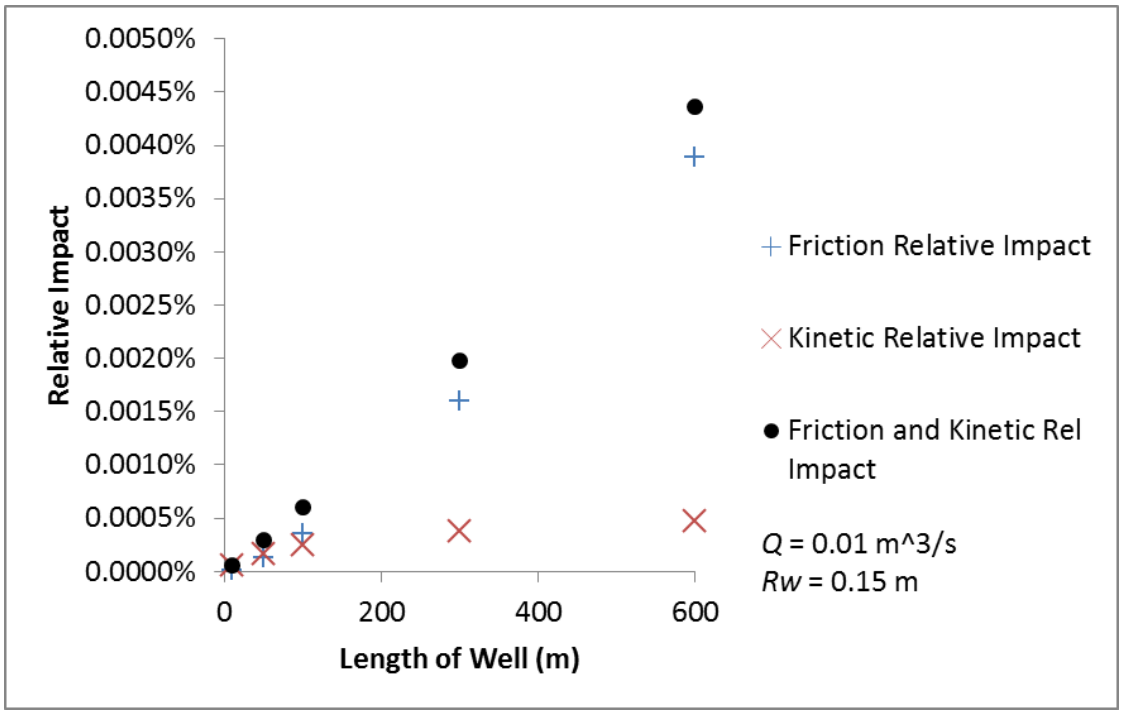
Model Parameters					
a	Infinity	m	K_x	1E-6	m/s
b	Infinity	m	K_y	1E-6	m/s
c	30	m	K_z	1E-6	m/s
x_1	varies	m	S_s	1E-5	1/m
x_2	varies	m	Skin	10	
y_1	0	m	Density	997	Kg/m^3
y_2	0	m	Viscosity	8.9E-4	
z_1	15	m	Gravity	9.8	m/s^2
z_2	15	m	Well Diameter	0.1 & 0.3	m
Bound at $x = 0$	N/A		Abs. Pipe Roughness	0.15E-3	m
Bound at $x = a$	N/A		Friction	varies	
Bound at $y = 0$	N/A		Critical Reynolds	2000	
Bound at $y = b$	N/A		Acceleration	varies	
Bound at $z = 0$	No-flux		Integral Abs Error	1E-4	
Bound at $z = c$	No-flux		Integral Rel. Error	1E-6	
One Time Step	50 years		Discharge Limit	varies	m^3/s
Numb Segments	40				

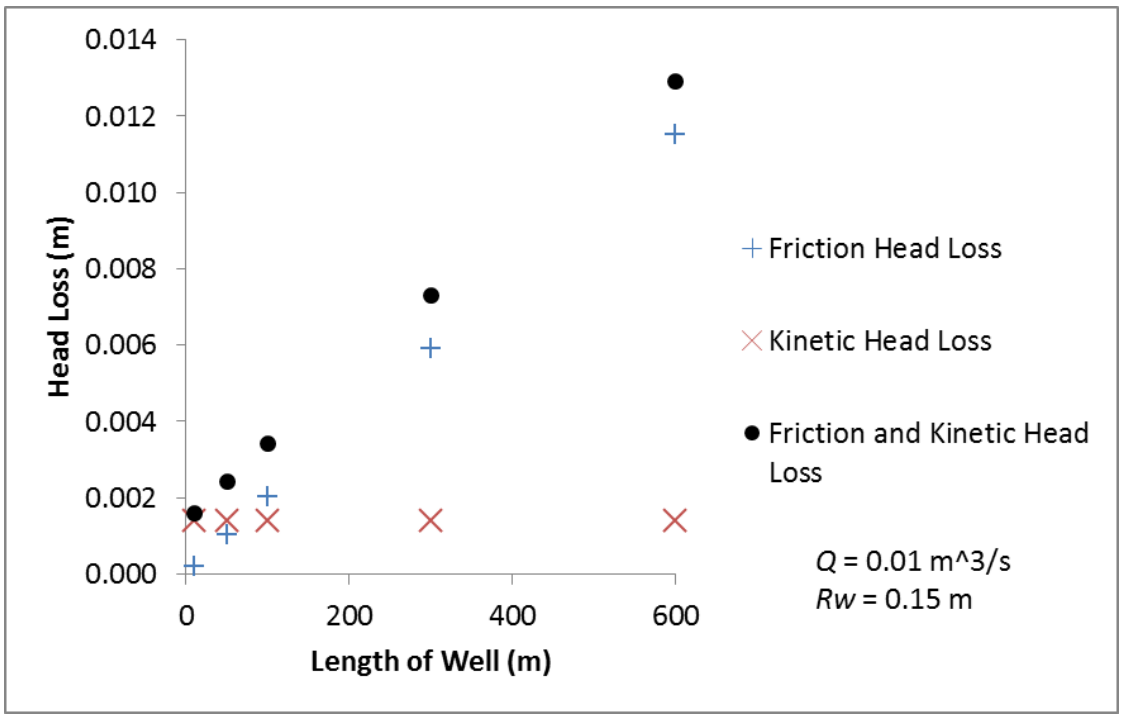

0.040%
0.035%
0.030%
0.025%
0.020%
0.015%
0.010%
0.005%
0.000%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.1 m^3/s
Rw = 0.15 m

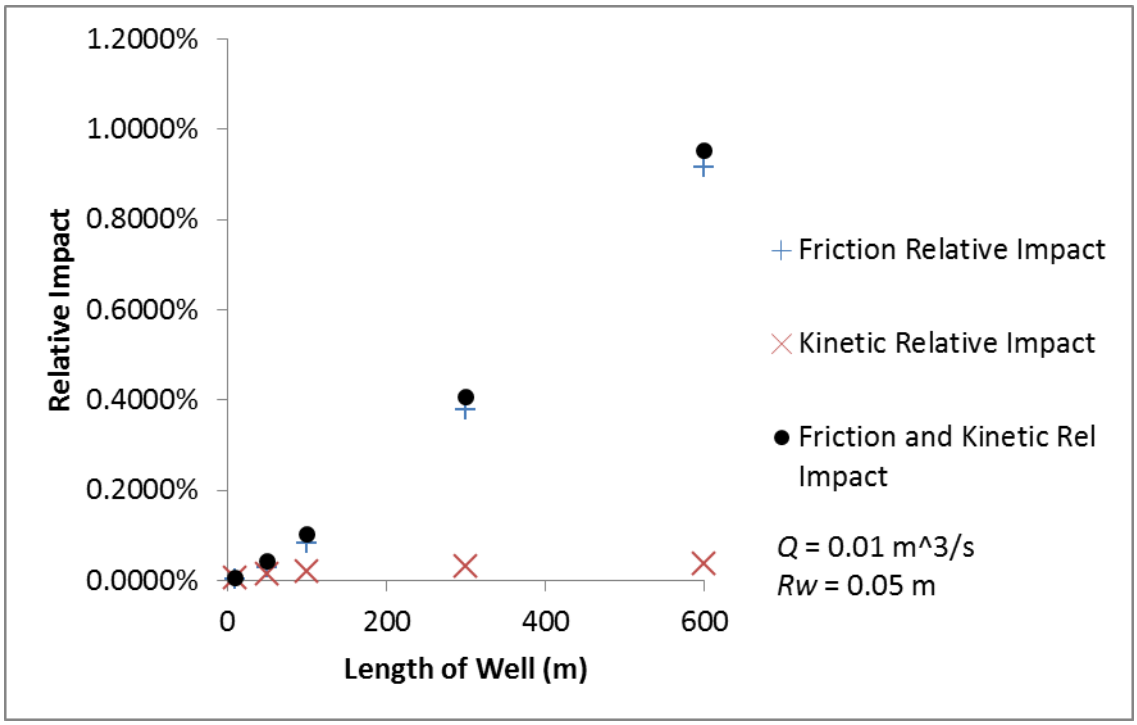

1.20
1.00
0.80
0.60
0.40
0.20
0.00
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.1 m^3/s
Rw = 0.15 m

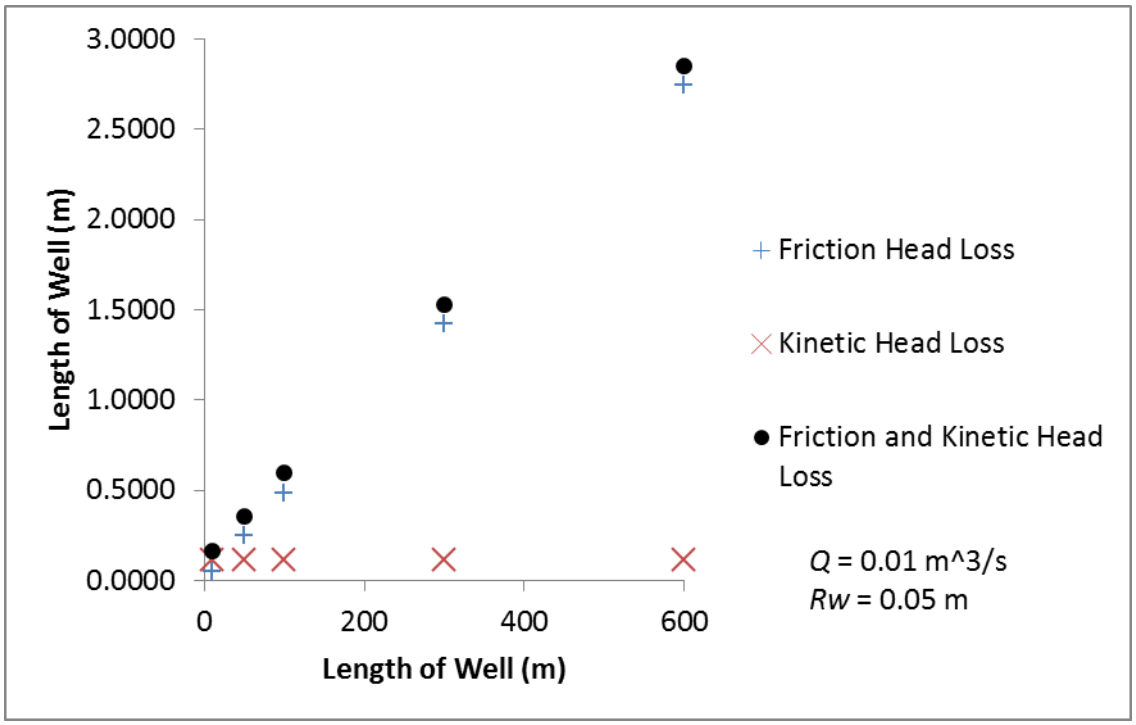

9.0000%
8.0000%
7.0000%
6.0000%
5.0000%
4.0000%
3.0000%
2.0000%
1.0000%
0.0000%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.1 m^3/s
Rw = 0.05 m

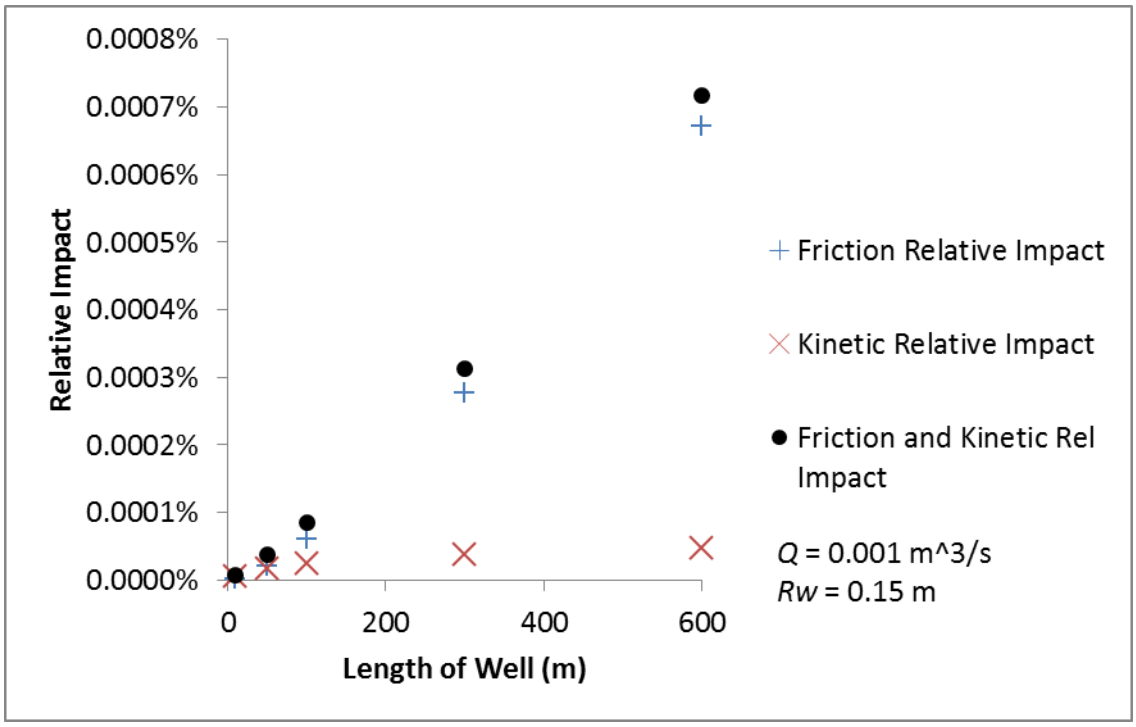

300.00
250.00
200.00
150.00
100.00
50.00
0.00
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.1 m^3/s
Rw = 0.05 m

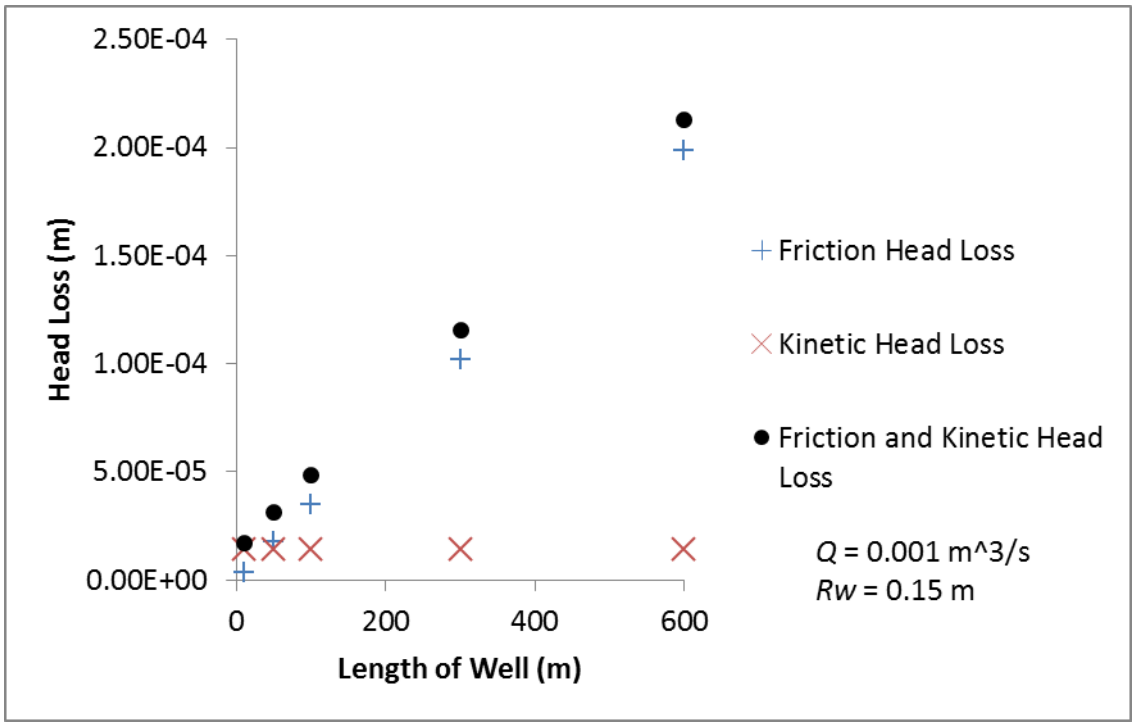

0.0050%
0.0045%
0.0040%
0.0035%
0.0030%
0.0025%
0.0020%
0.0015%
0.0010%
0.0005%
0.0000%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.01 m^3/s
Rw = 0.15 m

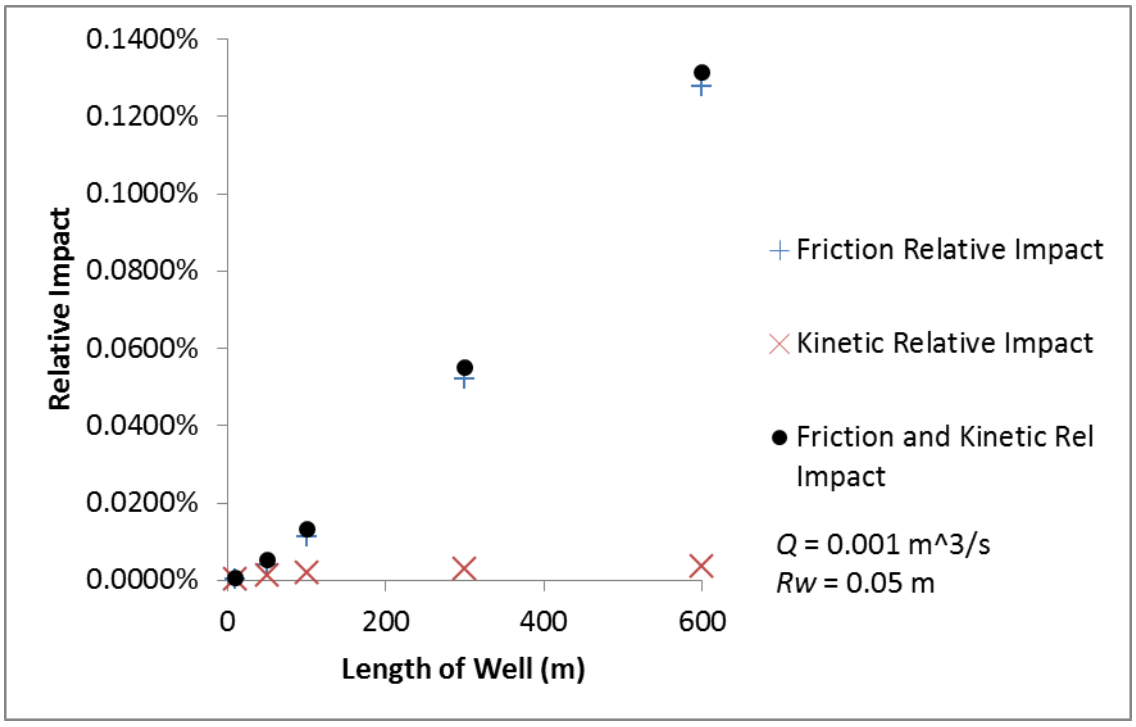

0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.01 m^3/s
Rw = 0.15 m

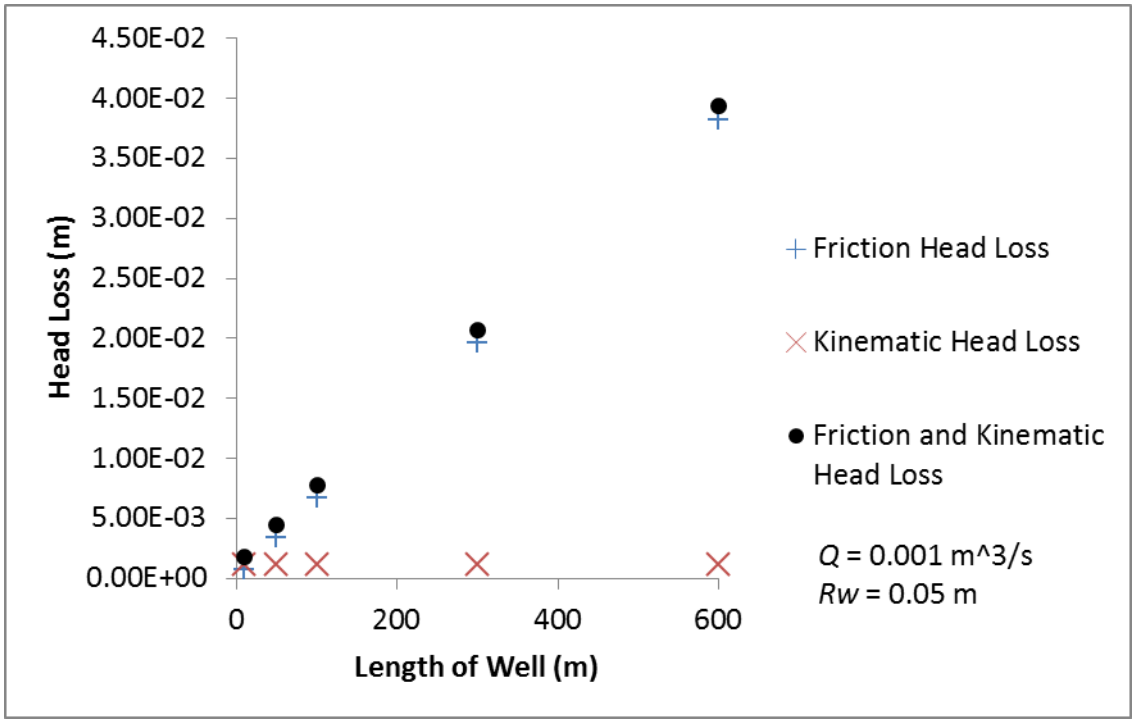

1.2000%
1.0000%
0.8000%
0.6000%
0.4000%
0.2000%
0.0000%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.01 m^3/s
Rw = 0.05 m


3.0000
2.5000
2.0000
1.5000
1.0000
0.5000
0.0000
Length of Well (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.01 m^3/s
Rw = 0.05 m

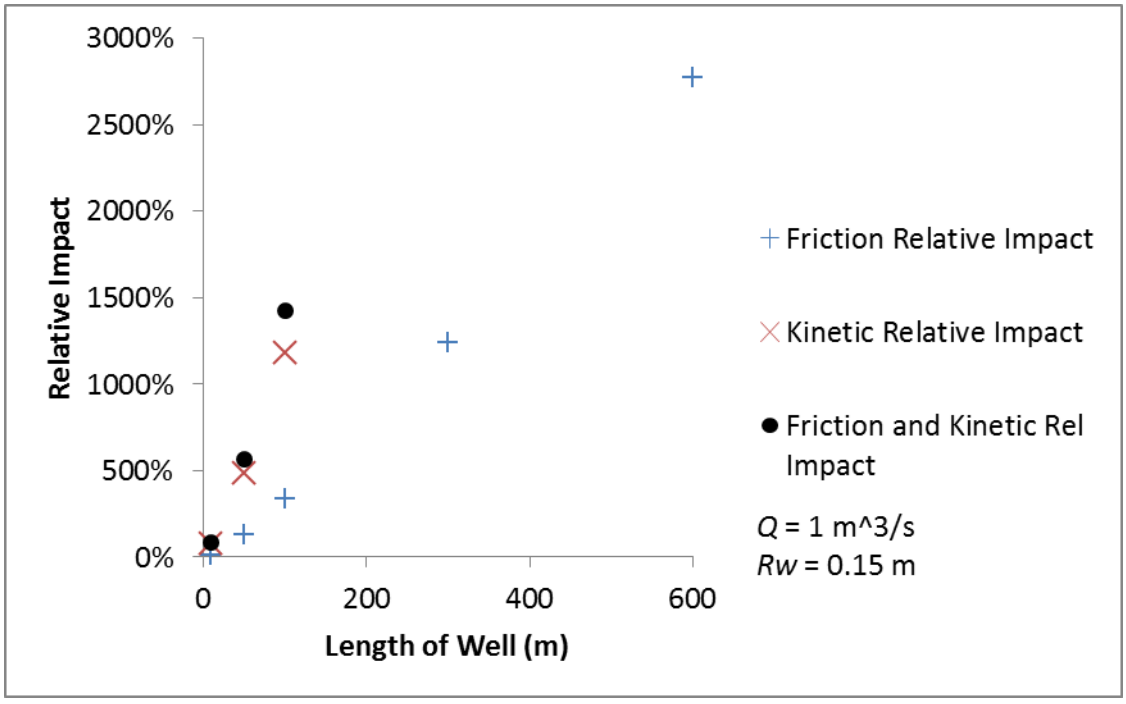

0.0008%
0.0007%
0.0006%
0.0005%
0.0004%
0.0003%
0.0002%
0.0001%
0.0000%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.001 m^3/s
Rw = 0.15 m

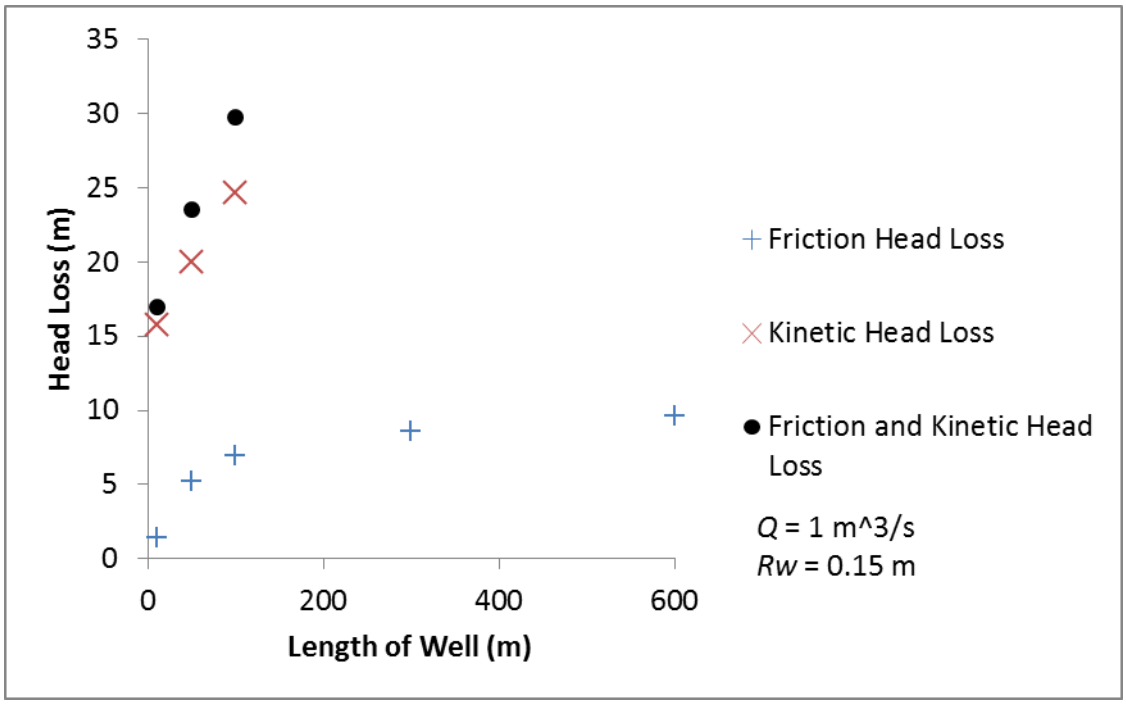

2.50E-04
2.00E-04
1.50E-04
1.00E-04
5.00E-05
0.00E+00
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.001 m^3/s
Rw = 0.15 m

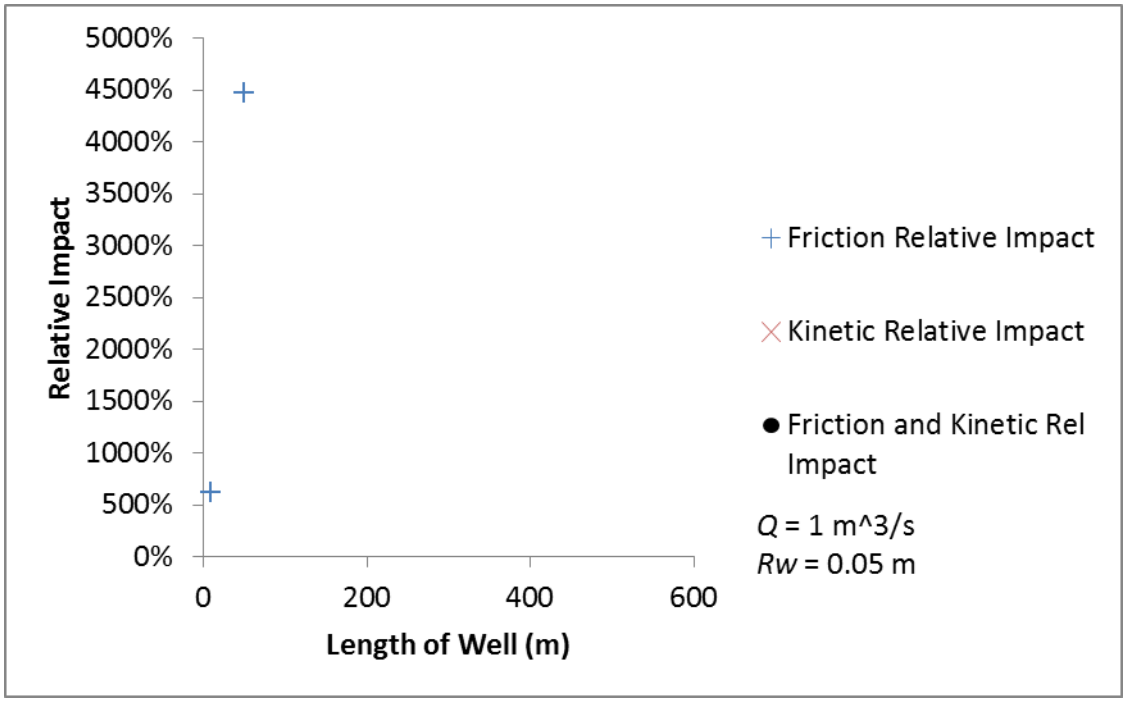

0.1400%
0.1200%
0.1000%
0.0800%
0.0600%
0.0400%
0.0200%
0.0000%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.001 m^3/s
Rw = 0.05 m

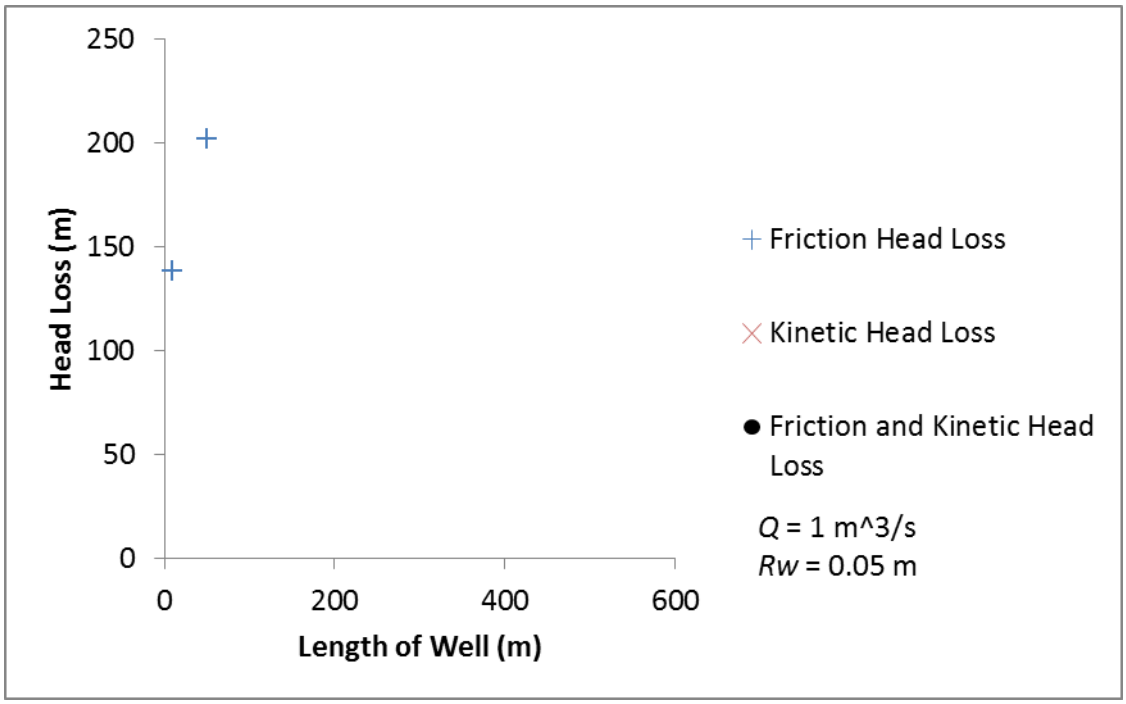

4.50E-02
4.00E-02
3.50E-02
3.00E-02
2.50E-02
2.00E-02
1.50E-02
1.00E-02
5.00E-03
0.00E+00
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinematic Head Loss
Friction and Kinematic Head Loss
Q = 0.001 m^3/s
Rw = 0.05 m

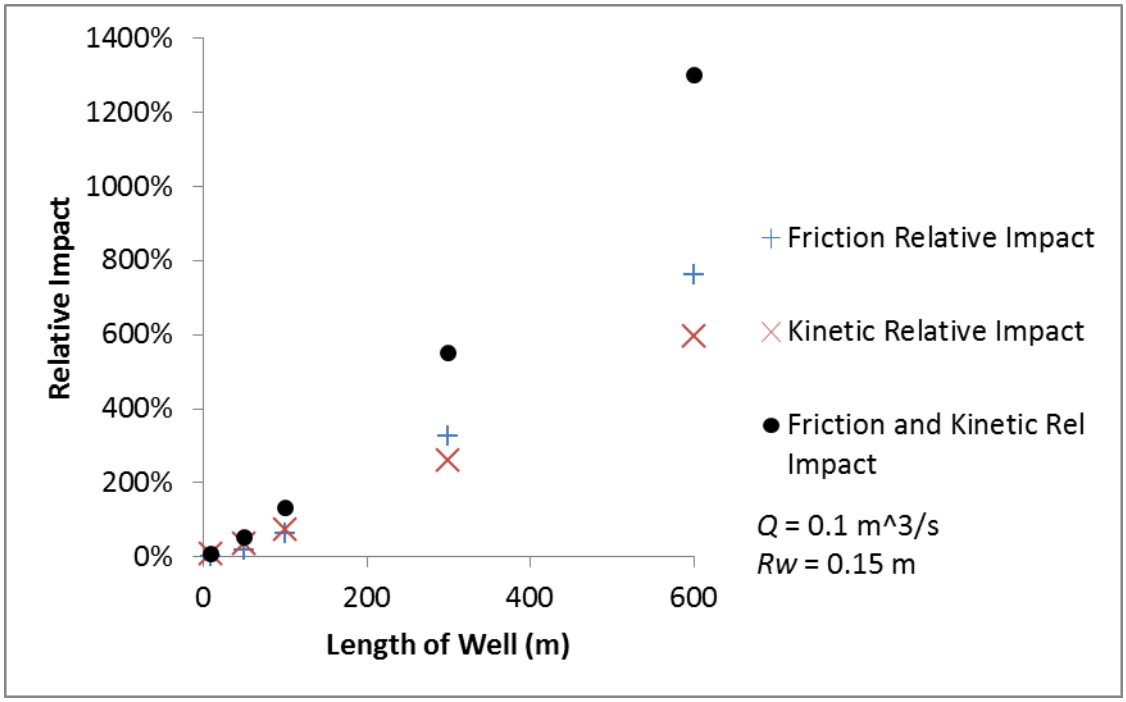
Model Parameters					
a	5000	m	K_x	1E-2	m/s
b	50	m	K_y	1E-2	m/s
c	40	m	K_z	1E-2	m/s
x_1	varies	m	S_s	1E-5	1/m
x_2	varies	m	Skin	10	
y_1	25	m	Density	997	Kg/m^3
y_2	25	m	Viscosity	8.9E-4	
z_1	20	m	Gravity	9.8	m/s^2
z_2	20	m	Well Diameter	0.1 & 0.3	m
Bound at $x = 0$	No flux		Abs. Pipe Roughness	0.15E-3	m
Bound at $x = a$	No flux		Friction	varies	
Bound at $y = 0$	Const Head		Critical Reynolds	2000	
Bound at $y = b$	Const Head		Acceleration	varies	
Bound at $z = 0$	No-flux		Integral Abs Error	1E-4	
Bound at $z = c$	No-flux		Integral Rel. Error	1E-6	
One Time Step	Steady State		Discharge Limit	varies	m^3/s
Numb Segments	40				

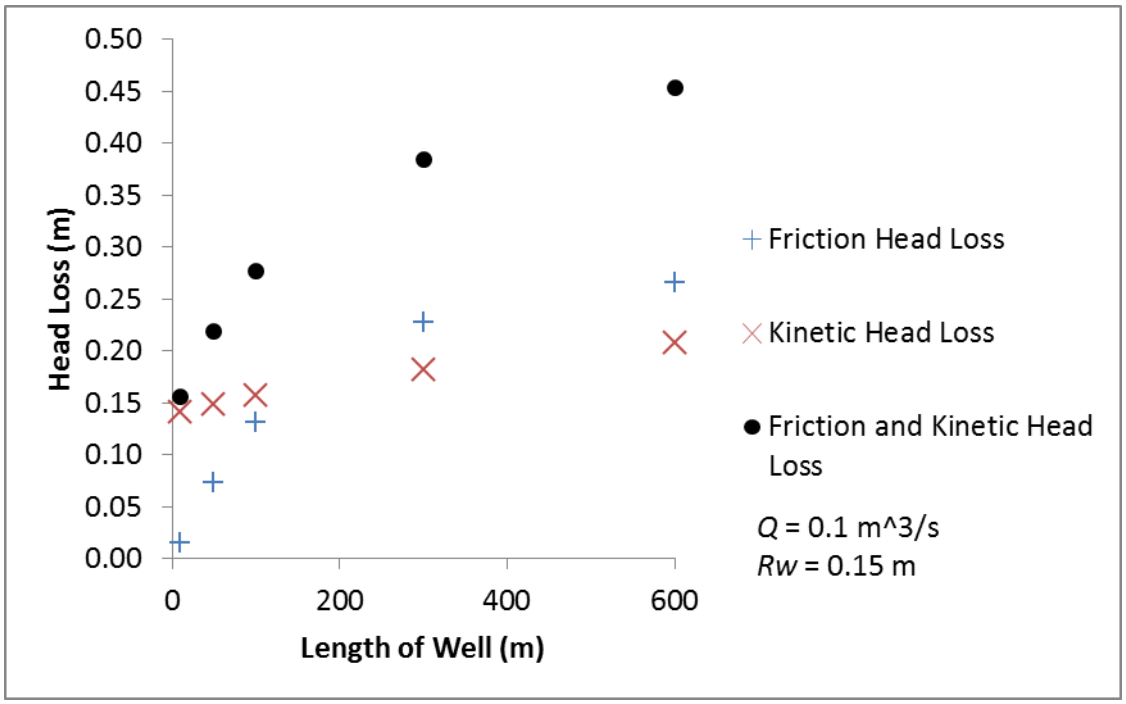

3000%
2500%
2000%
1500%
1000%
500%
0%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 1 m^3/s
Rw = 0.15 m

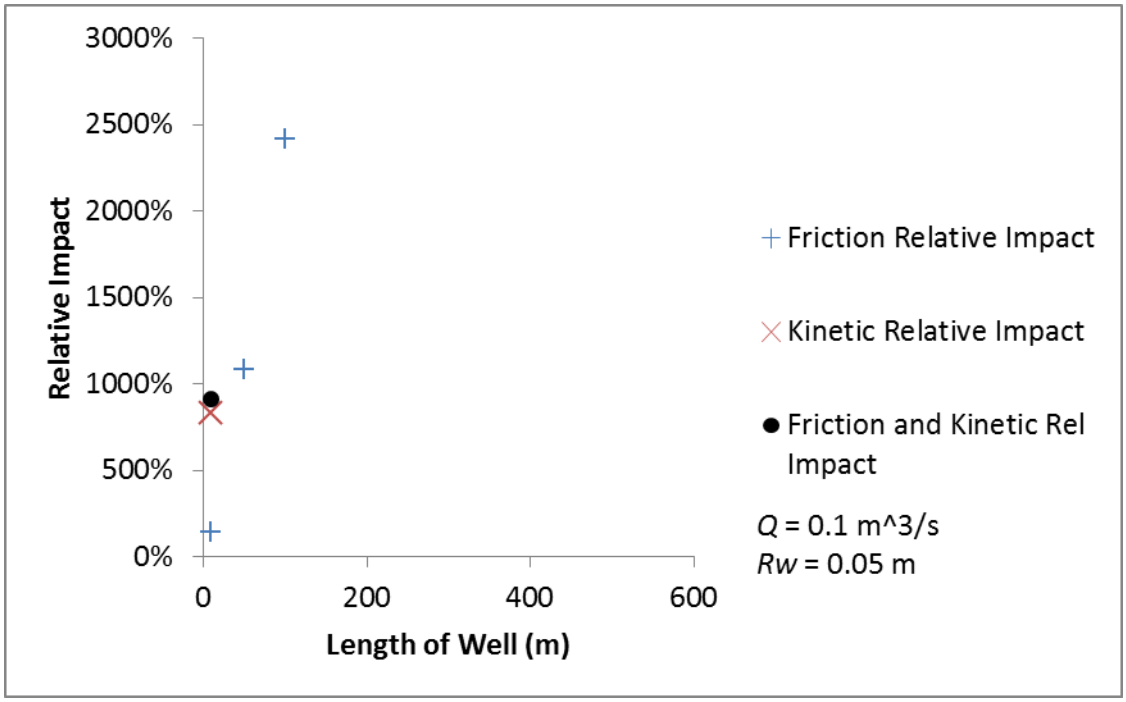

35
30
25
20
15
10
5
0
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 1 m^3/s
Rw = 0.15 m

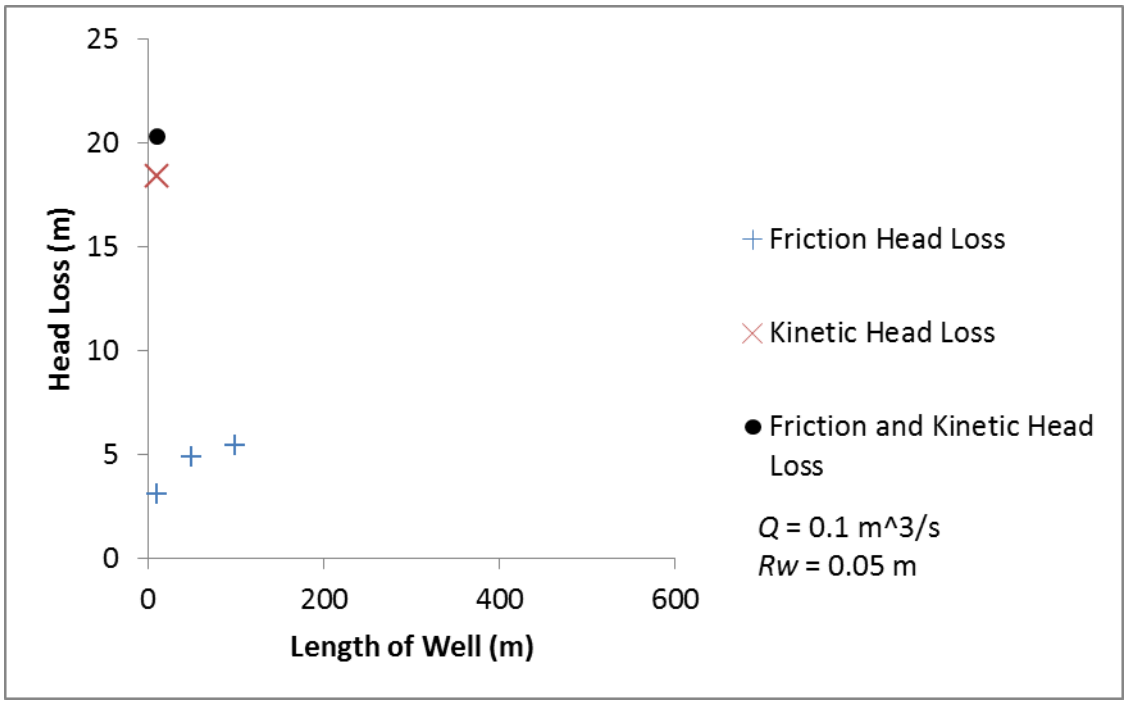

5000%
4500%
4000%
3500%
3000%
2500%
2000%
1500%
1000%
500%
0%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 1 m^3/s
Rw = 0.05 m

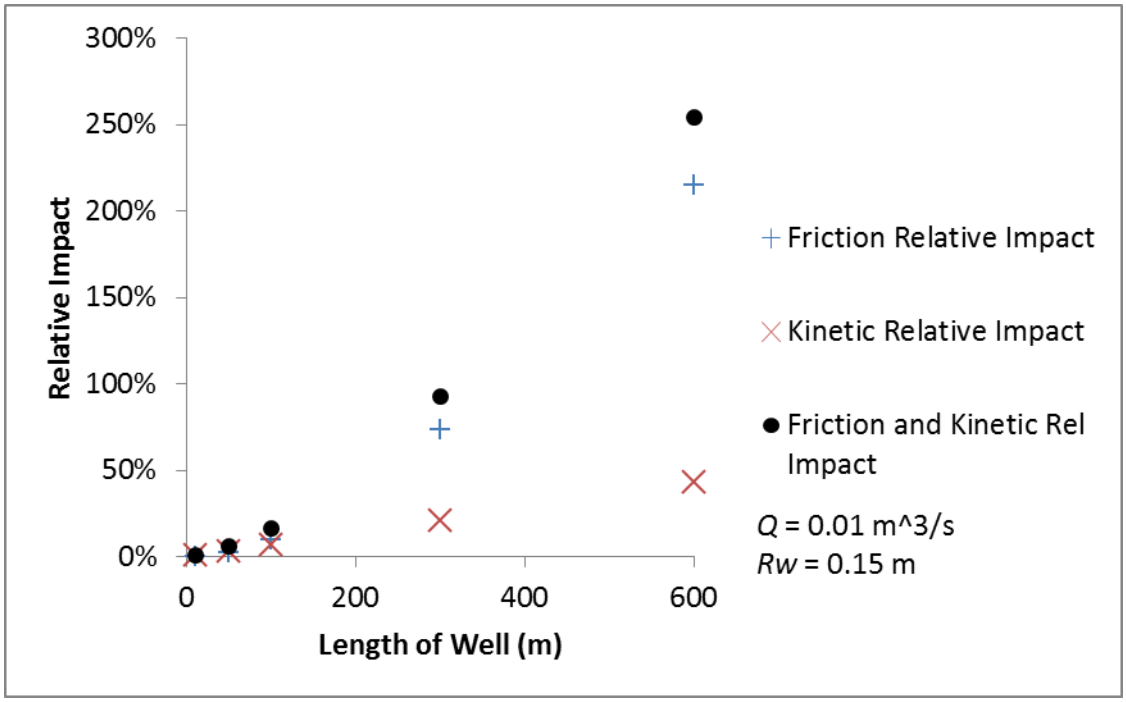

250
200
150
100
50
0
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 1 m^3/s
Rw = 0.05 m

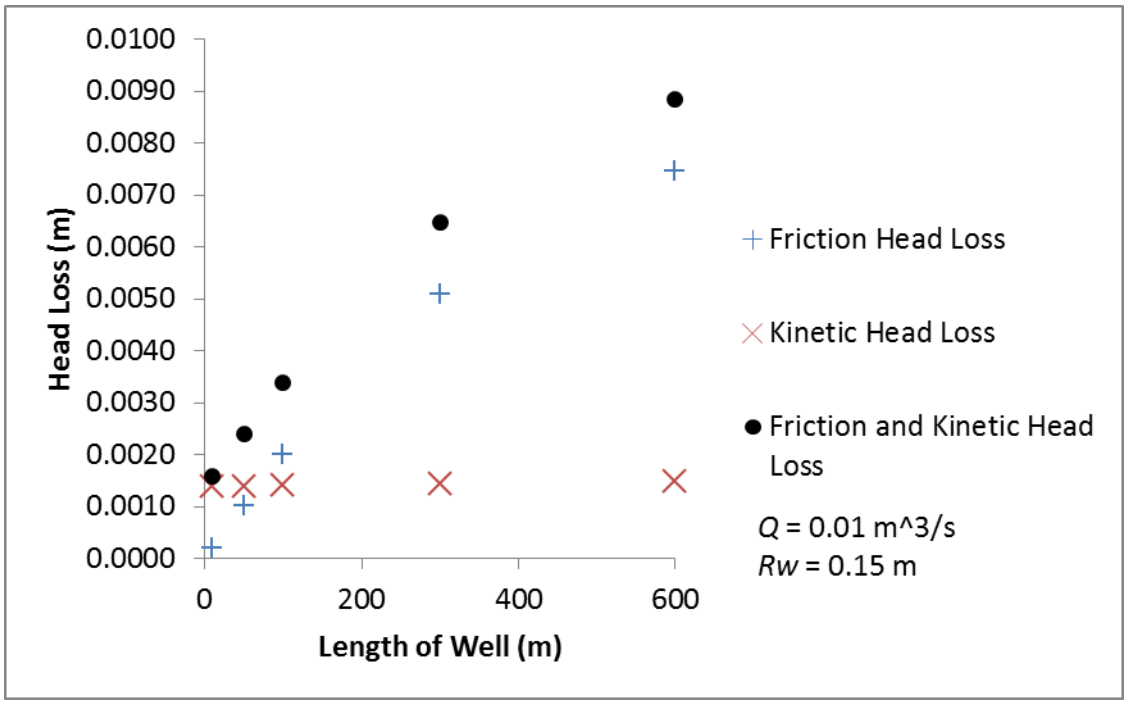

1400%
1200%
1000%
800%
600%
400%
200%
0%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.1 m^3/s
Rw = 0.15 m

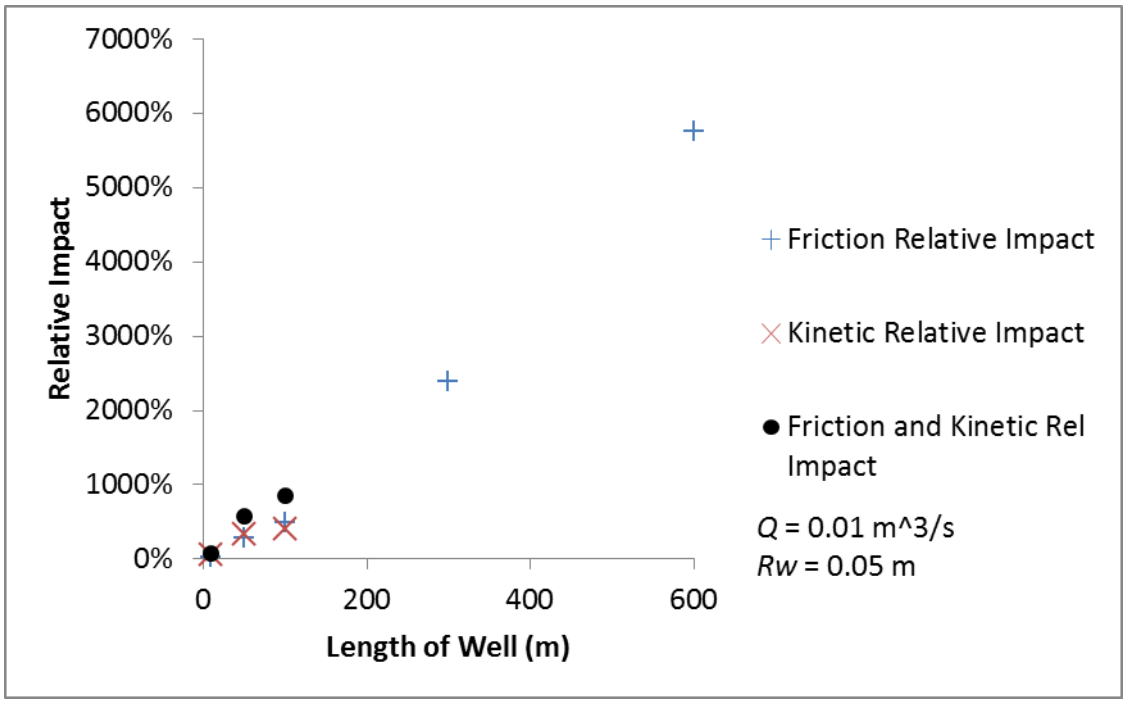

0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.1 m^3/s
Rw = 0.15 m

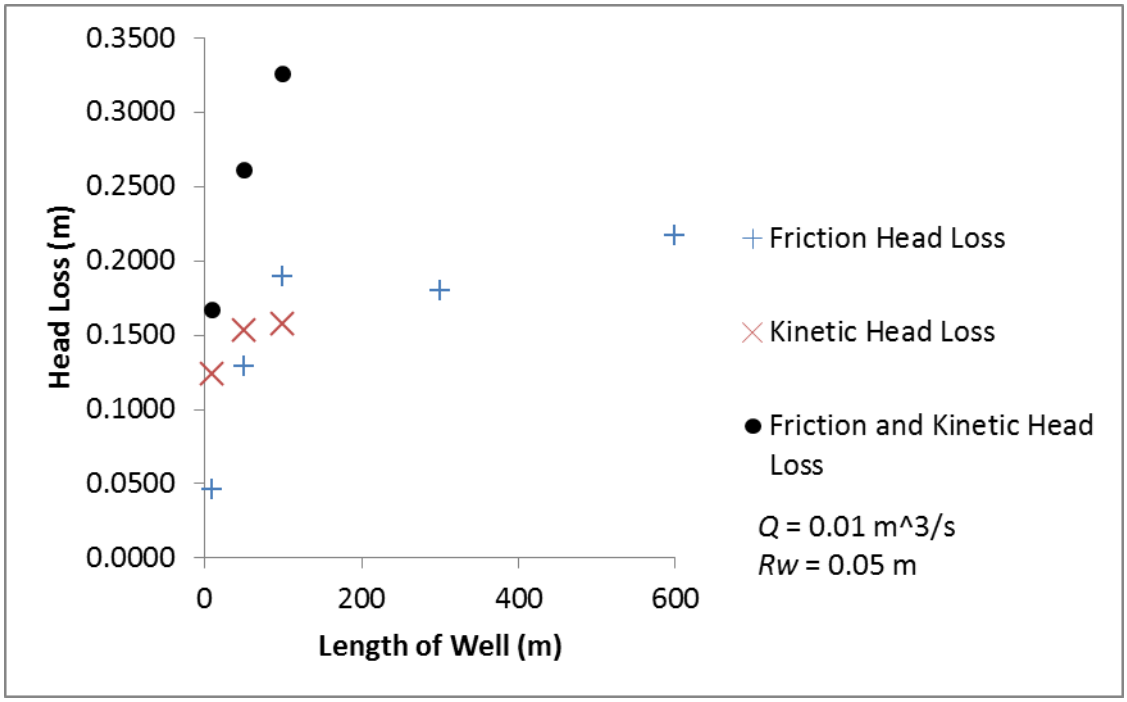

3000%
2500%
2000%
1500%
1000%
500%
0%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.1 m^3/s
Rw = 0.05 m


25
20
15
10
5
0
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.1 m^3/s
Rw = 0.05 m


300%
250%
200%
150%
100%
50%
0%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.01 m^3/s
Rw = 0.15 m


0.0100
0.0090
0.0080
0.0070
0.0060
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.01 m^3/s
Rw = 0.15 m

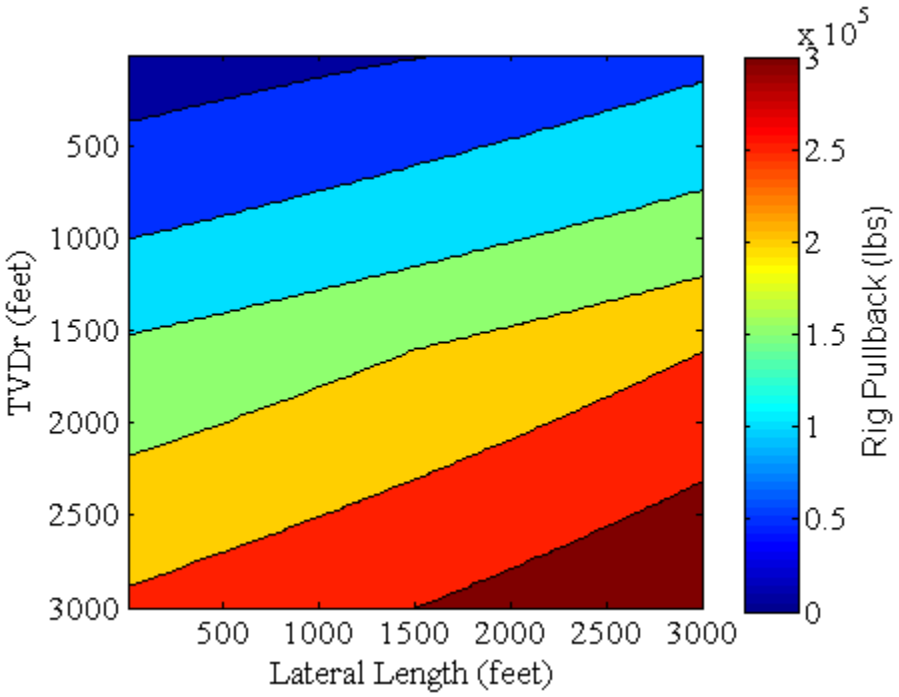

7000%
6000%
5000%
4000%
3000%
2000%
1000%
0%
Relative Impact
0
200
400
600
Length of Well (m)
Friction Relative Impact
Kinetic Relative Impact
Friction and Kinetic Rel Impact
Q = 0.01 m^3/s
Rw = 0.05 m

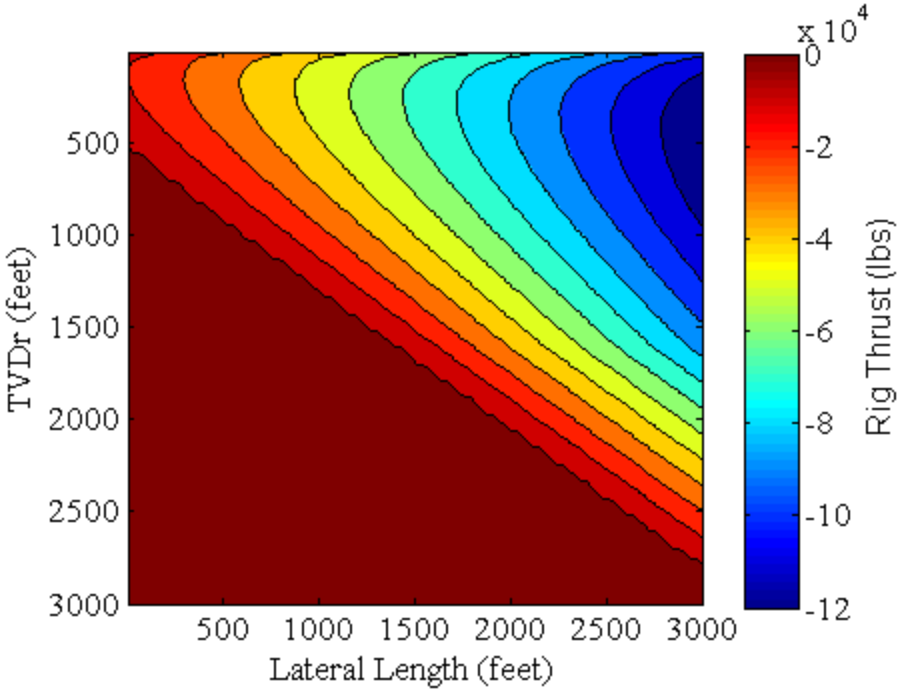

0.3500
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Head Loss (m)
0
200
400
600
Length of Well (m)
Friction Head Loss
Kinetic Head Loss
Friction and Kinetic Head Loss
Q = 0.01 m^3/s
Rw = 0.05 m

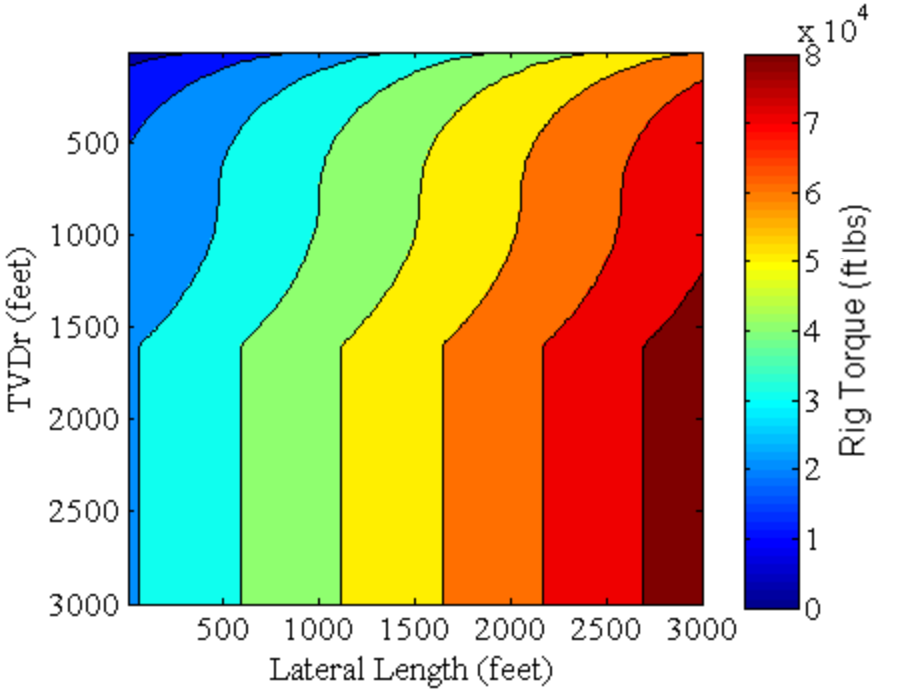
PART B:

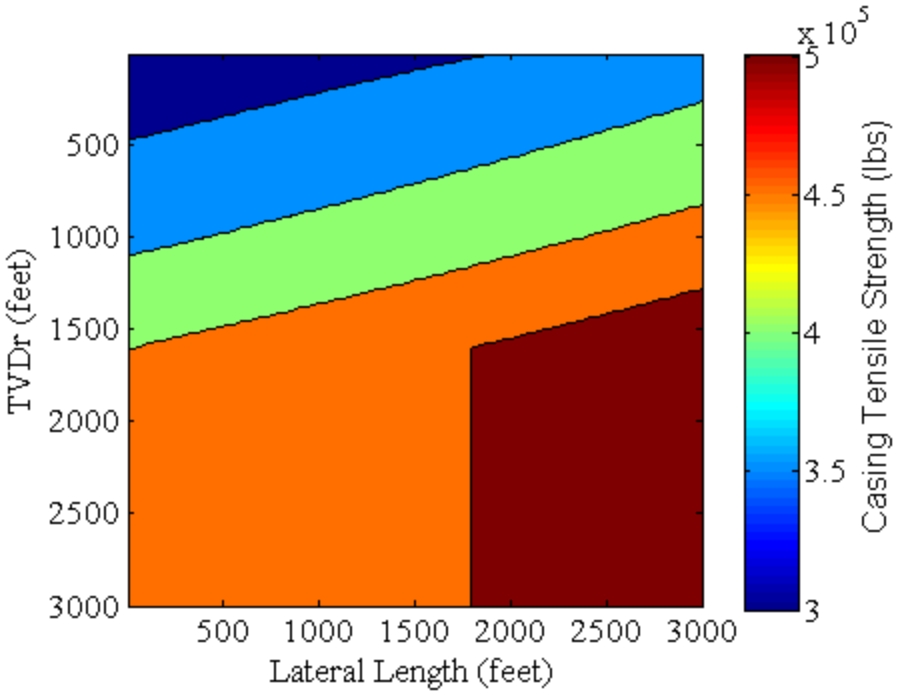
INPUT / OUTPUT OF DRILLING FORCES MODEL

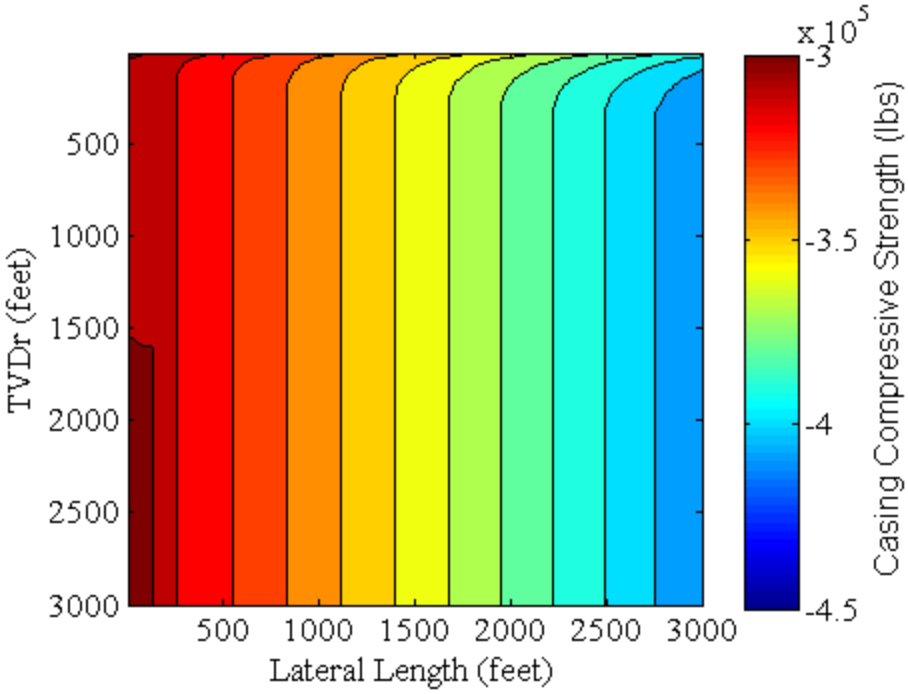
Variable	Value
Casing Type	K-55
Outside Diamter	16 inches
Inside Diameter	15.01 inches
Wt per ft with cplg	84 lbs
Collapse Resistance	1,410 psi
Body Strength	1,326,000 lbs
Friction Coefficient	0.4
Buoyancy Factor	0.85
Radius of Curvature	1,600 feet
Entry Min	0
Entry Max	90
Lateral Angle	0
Young's Modulus	29e6 psi



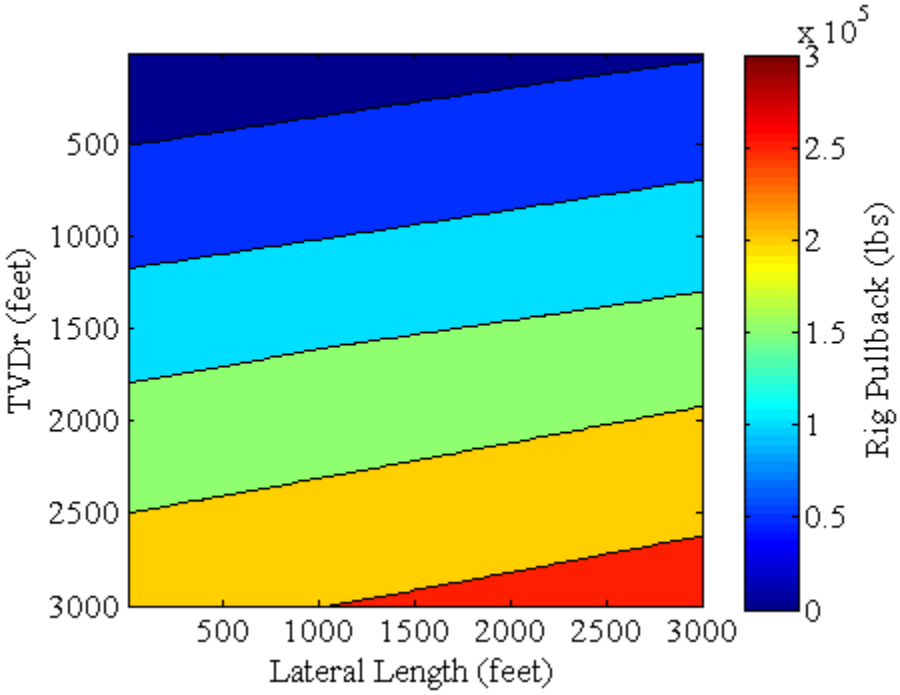

x 10^4
0
-2
-4
-6
-8
-10
-12
Rig Thrust (lbs)
500
1000
1500
2000
2500
3000
TVDr (feet)
500 1000 1500 2000 2500 3000
Lateral Length (feet)

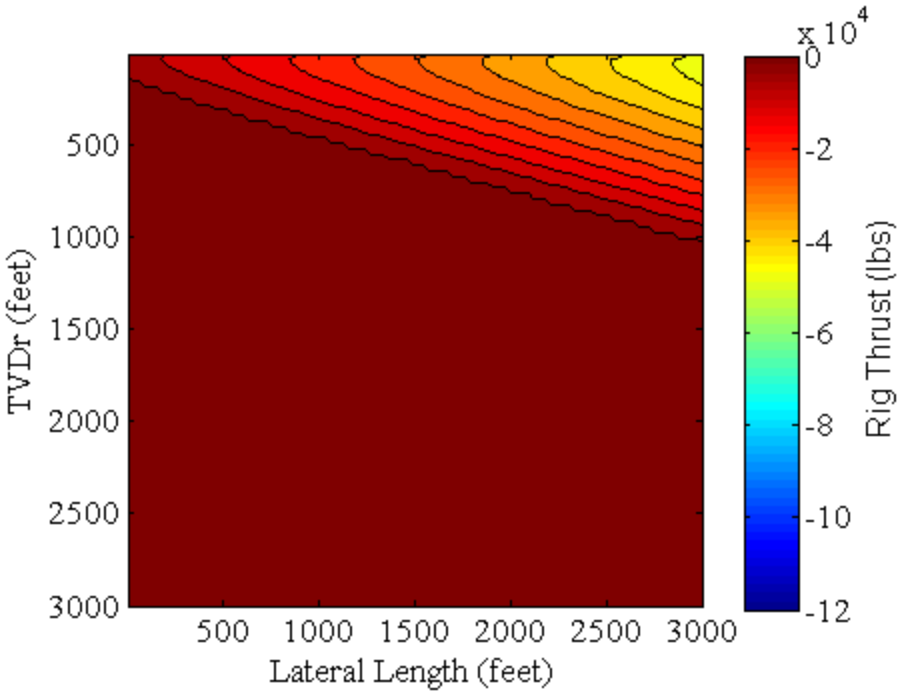

x 10^4
8
7
6
5
4
3
2
1
0
Rig Torque (ft lbs)
500
1000
1500
2000
2500
3000
TVDr (feet)
500 1000 1500 2000 2500 3000
Lateral Length (feet)

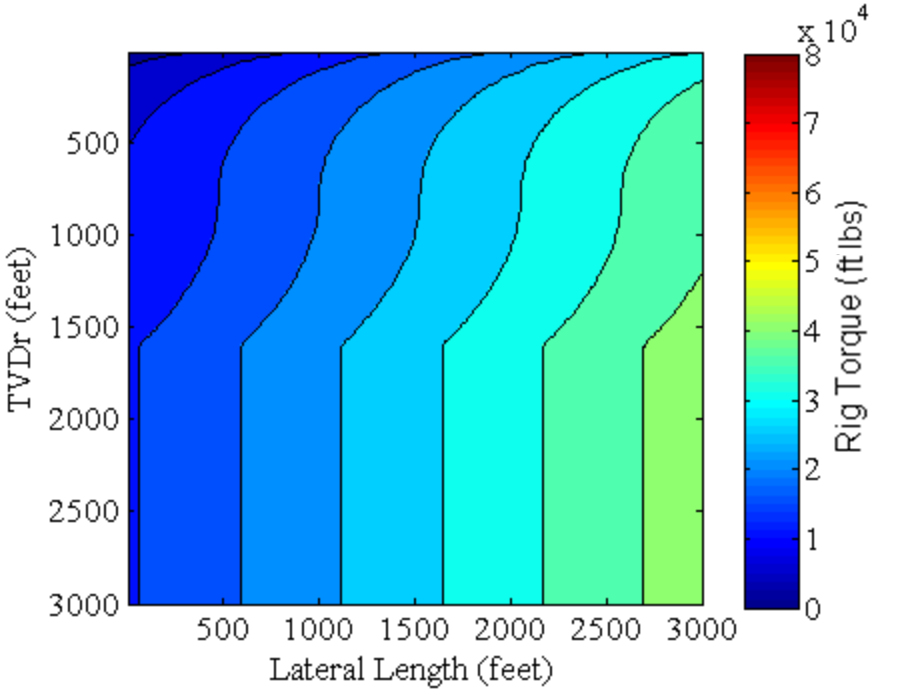

x 10^5
5
4.5
4
3.5
3
Casing Tensile Strength (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

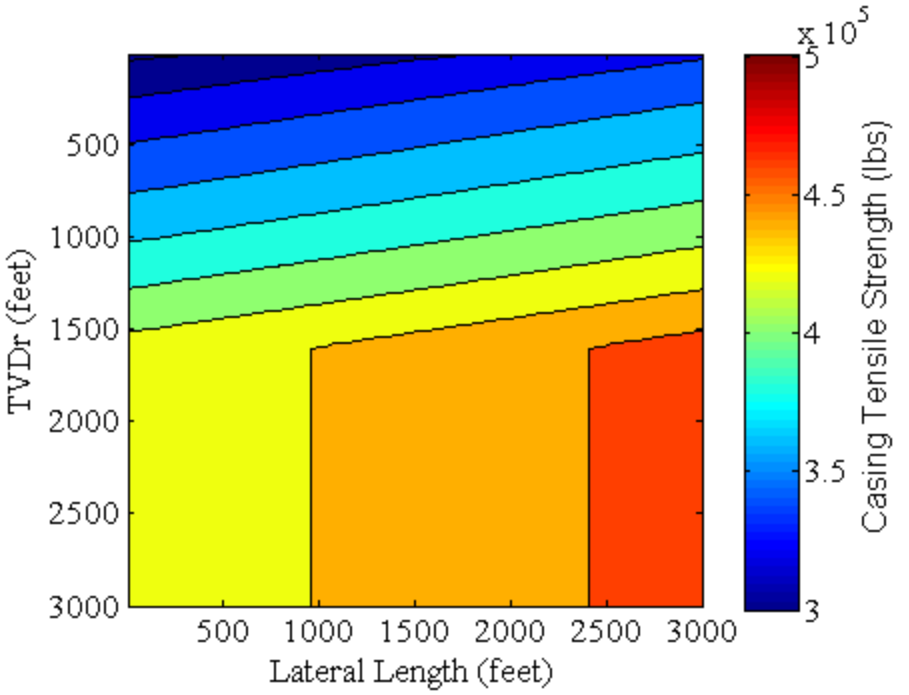

x 10^5
-3
-3.5
-4
-4.5
Casing Compressive Strength (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

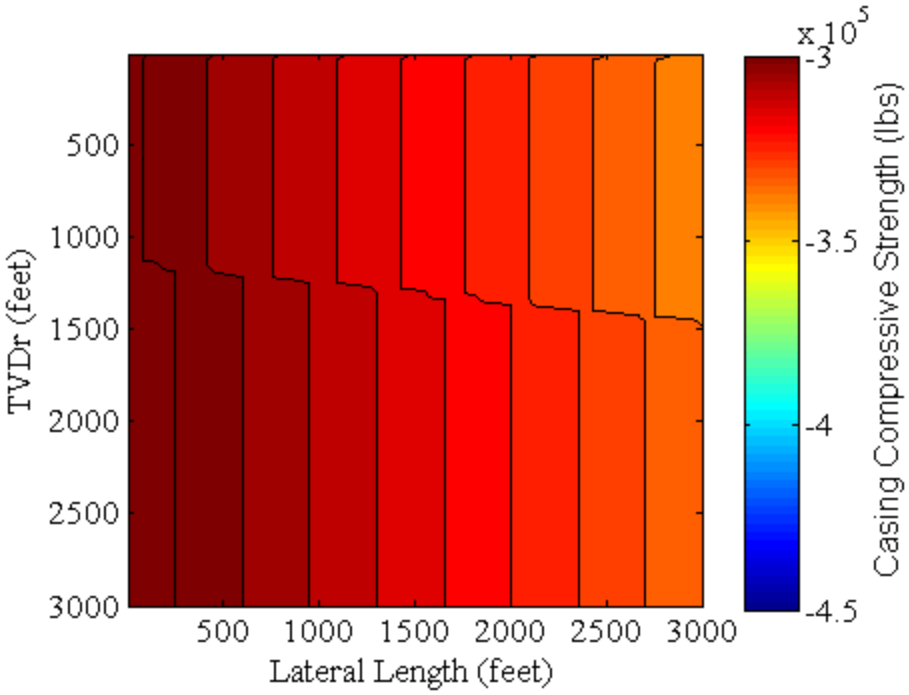
Variable	Value
Casing Type	K-55
Outside Diamter	16 inches
Inside Diameter	15.01 inches
Wt per ft with cplg	84 lbs
Collapse Resistance	1,410 psi
Body Strength	1,326,000 lbs
Friction Coefficient	0.2
Buoyancy Factor	0.85
Radius of Curvature	1,600 feet
Entry Min	0
Entry Max	90
Lateral Angle	0
Young's Modulus	29e6 psi



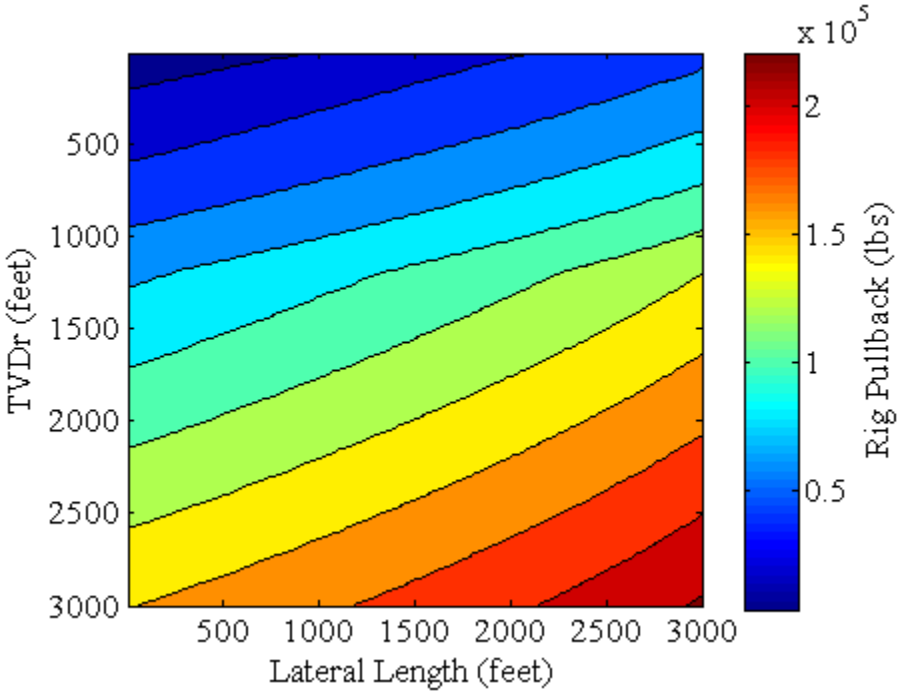

x 10^4
0
-2
-4
-6
-8
-10
-12
Rig Thrust (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

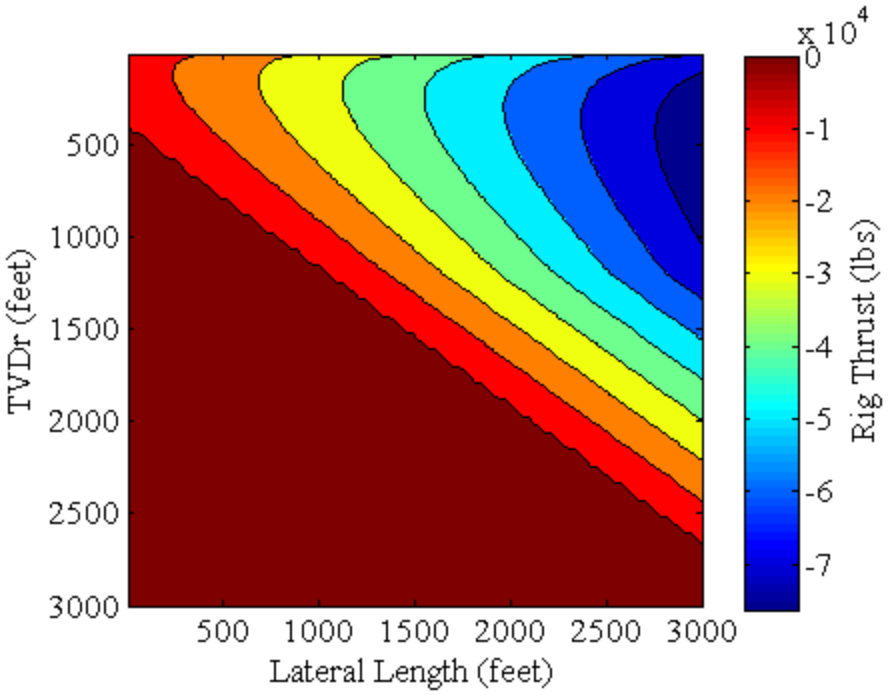

x 10^4
8
7
6
5
4
3
2
1
0
Rig Torque (ft lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

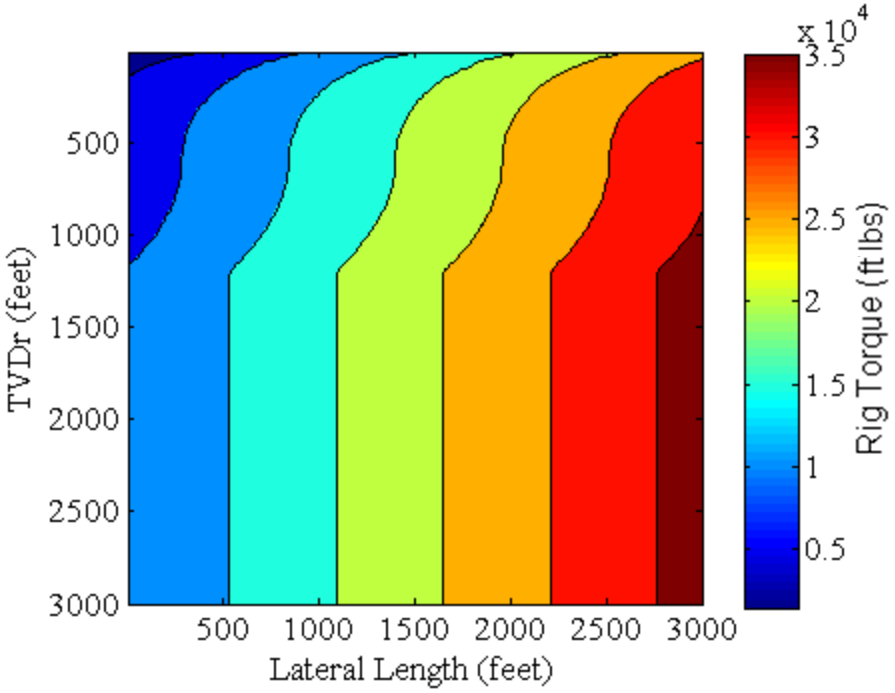

x 10^5
5
4.5
4
3.5
3
Casing Tensile Strength (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

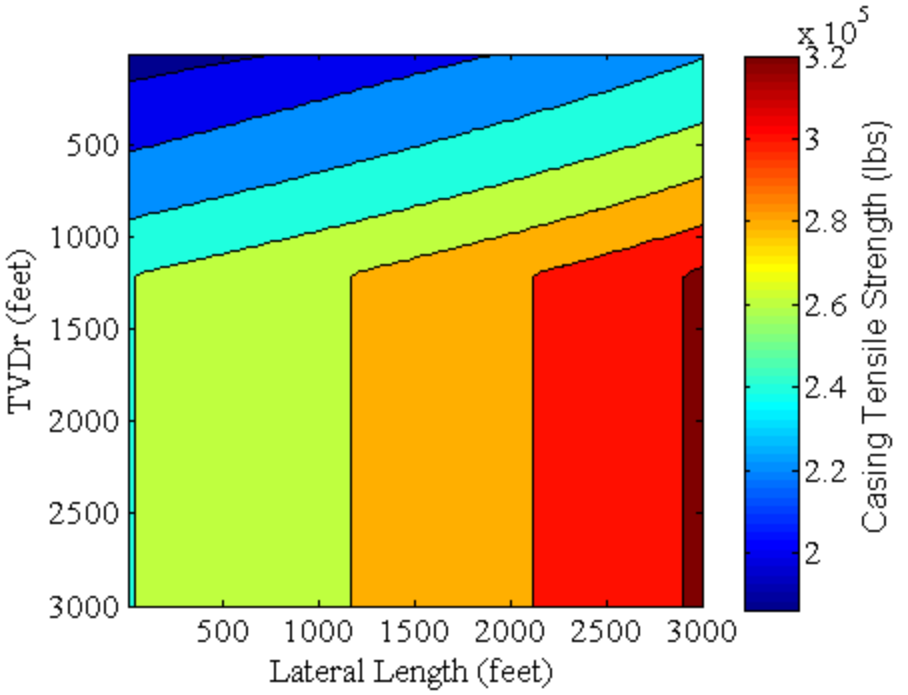

x 10^5
-3
-3.5
-4
-4.5
Casing Compressive Strength (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

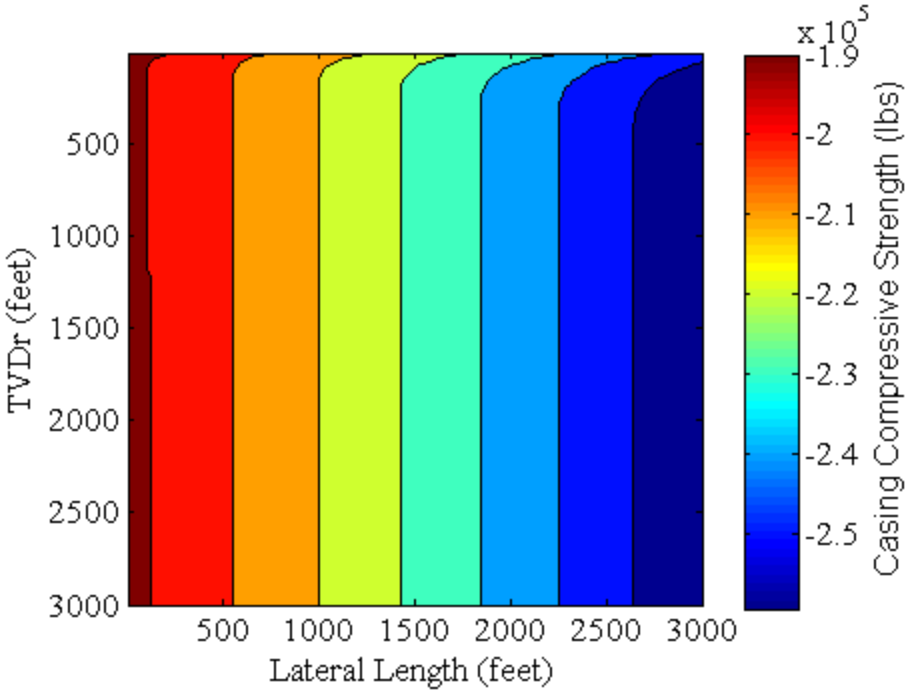
Variable	Value
Casing Type	K-55
Outside Diameter	11.75 inches
Inside Diameter	10.88 inches
Wt per ft with cplg	54 lbs
Collapse Resistance	2,070 psi
Body Strength	850,000 lbs
Friction Coefficient	0.4
Buoyancy Factor	0.85
Radius of Curvature	1,200 feet
Entry Min	0
Entry Max	90
Lateral Angle	0
Young's Modulus	29e6 psi



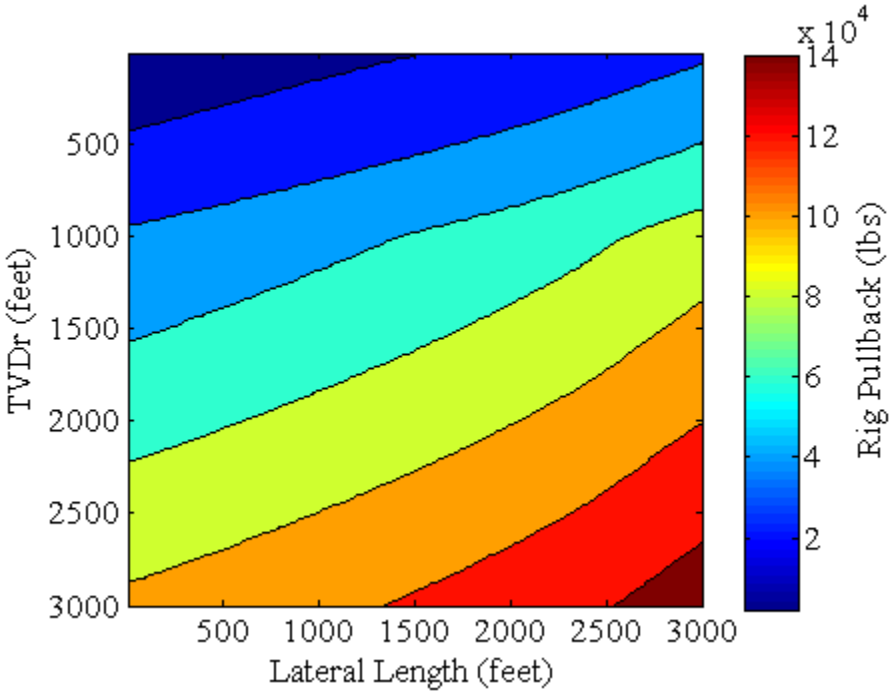

x 10^4
0
-1
-2
-3
-4
-5
-6
-7
Rig Thrust (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

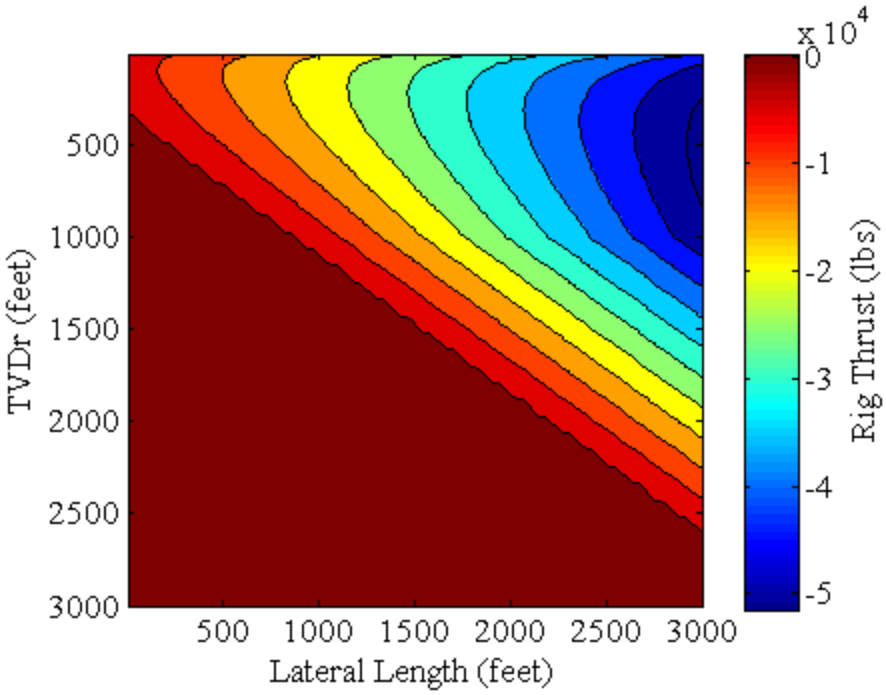

x 10^4
3.5
3
2.5
2
1.5
1
0.5
Rig Torque (ft lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

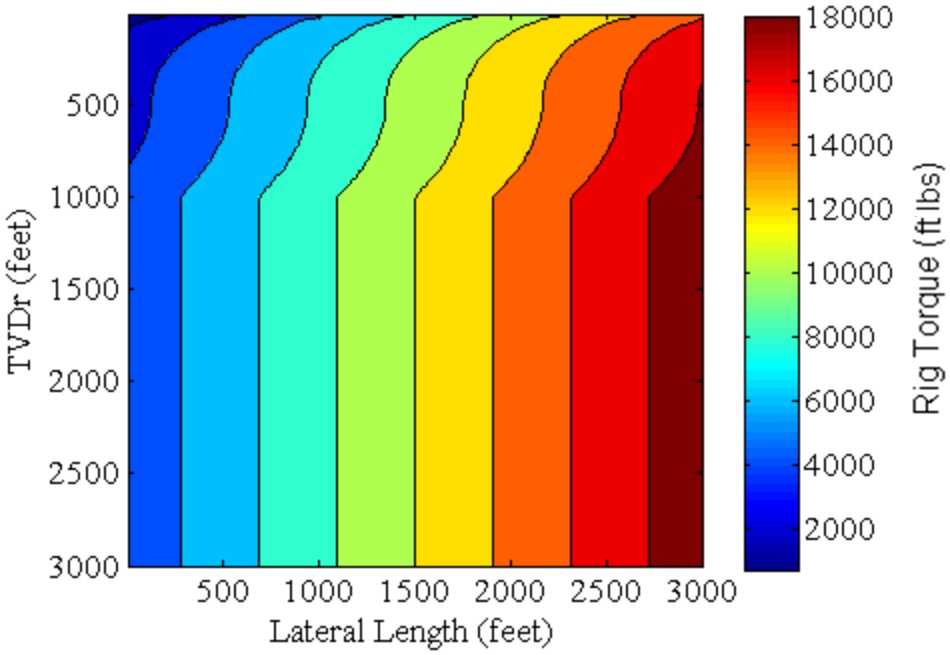

x 10^5
3.2
3
2.8
2.6
2.4
2.2
2
Casing Tensile Strength (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

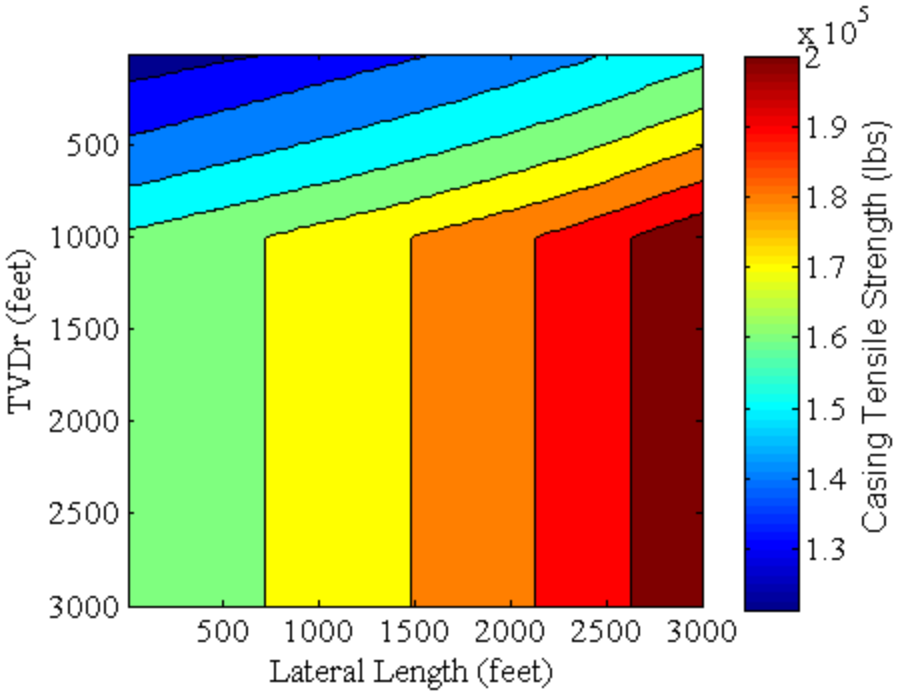

x 10^5
-1.9
-2
-2.1
-2.2
-2.3
-2.4
-2.5
Casing Compressive Strength (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

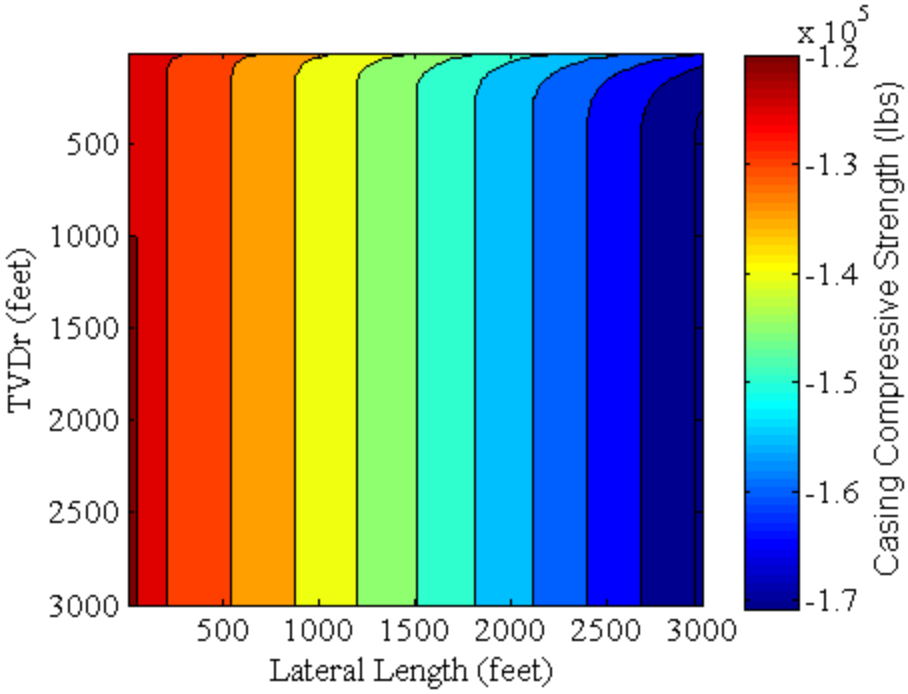
Variable	Value
Casing Type	K-55
Outside Diamter	9.625 inches
Inside Diameter	8.921 inches
Wt per ft with cplg	36 lbs
Collapse Resistance	2,020 psi
Body Strength	564,000 lbs
Friction Coefficient	0.4
Buoyancy Factor	0.85
Radius of Curvature	1,000 feet
Entry Min	0
Entry Max	90
Lateral Angle	0
Young's Modulus	29e6 psi



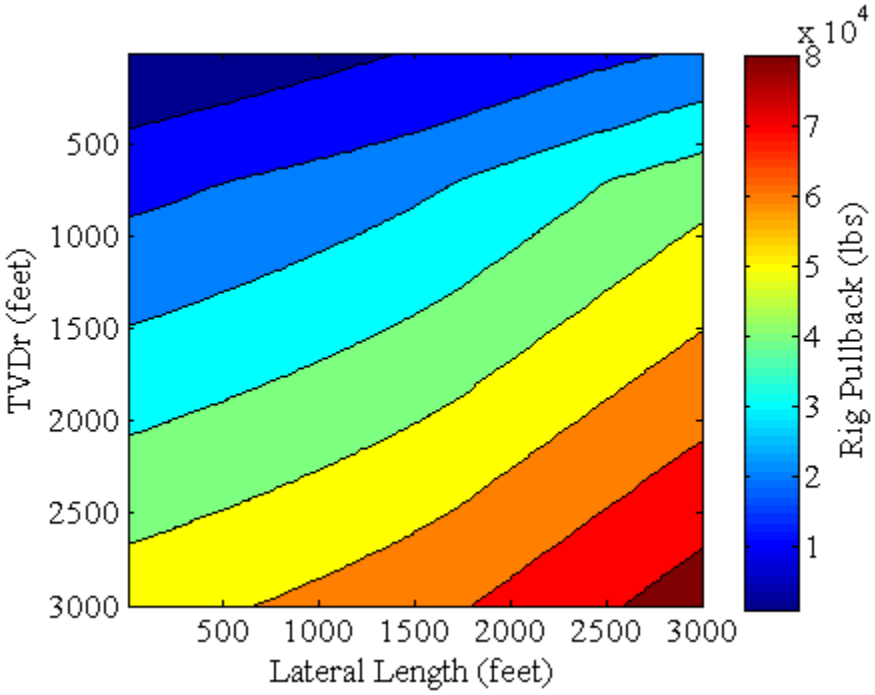

x 10^4
0
-1
-2
-3
-4
-5
Rig Thrust (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

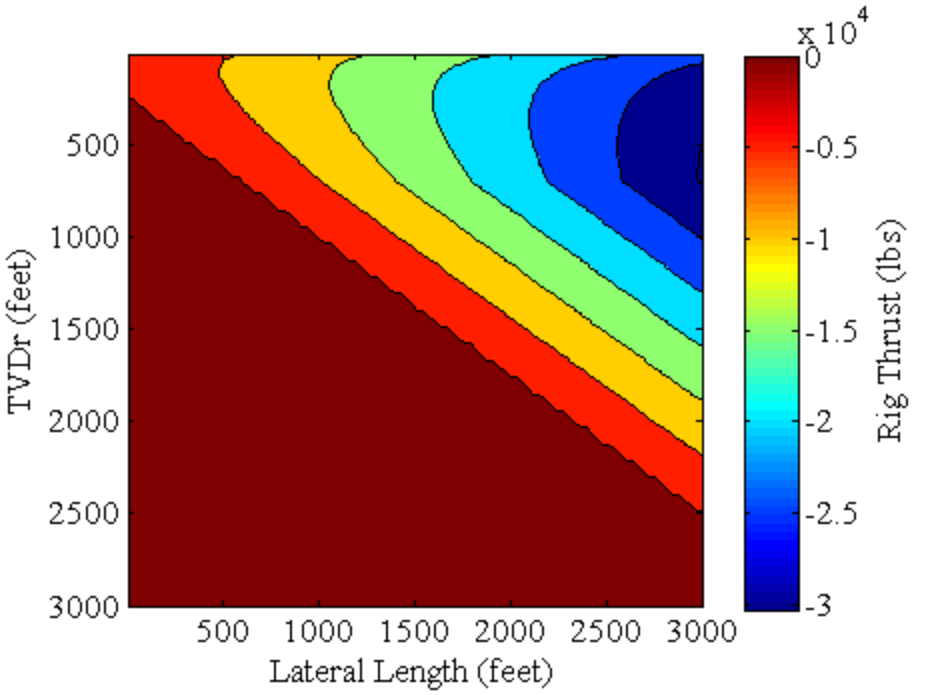

18000
16000
14000
12000
10000
8000
6000
4000
2000
Rig Torque (ft lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

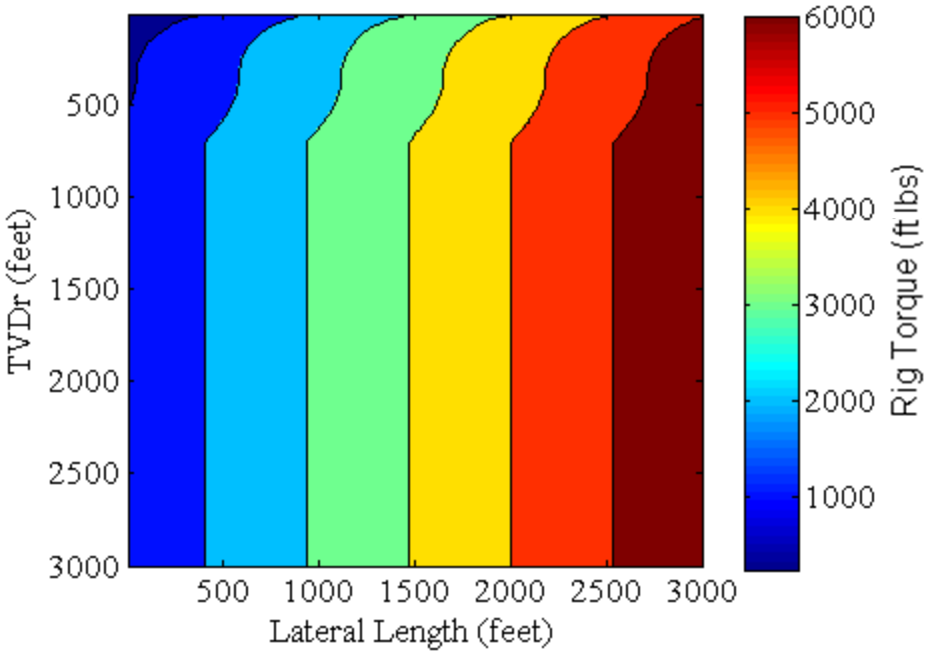

x 10^5
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
Casing Tensile Strength (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

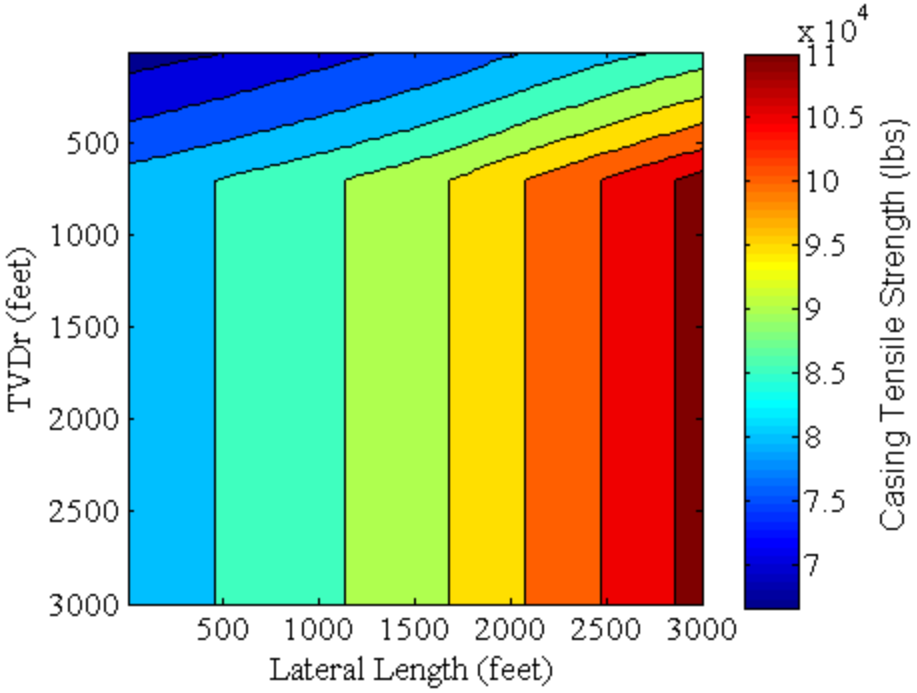

x 10^5
-1.2
-1.3
-1.4
-1.5
-1.6
-1.7
Casing Compressive Strength (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

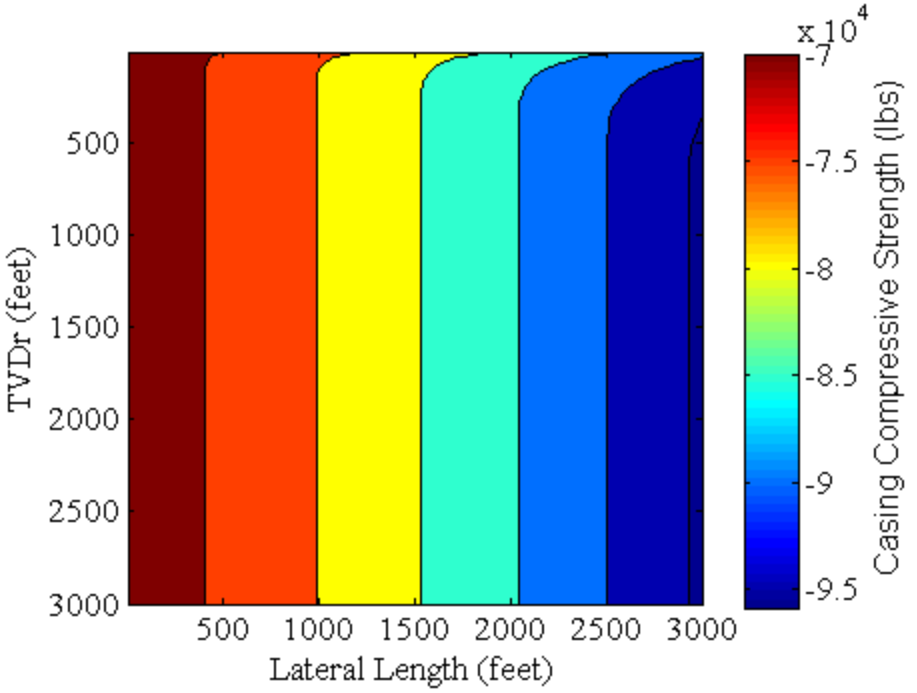
Variable	Value
Casing Type	K-55
Outside Diamter	6.625 inches
Inside Diameter	6.049 inches
Wt per ft with cplg	20 lbs
Collapse Resistance	2,970 psi
Body Strength	315,000 lbs
Friction Coefficient	0.4
Buoyancy Factor	0.85
Radius of Curvature	700 feet
Entry Min	0
Entry Max	90
Lateral Angle	0
Young's Modulus	29e6 psi




x 10^4
0
-0.5
-1
-1.5
-2
-2.5
-3
Rig Thrust (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)


6000
5000
4000
3000
2000
1000
Rig Torque (ft lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)


x 10^4
11
10.5
10
9.5
9
8.5
8
7.5
7
Casing Tensile Strength (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)


x 10^4
-7
-7.5
-8
-8.5
-9
-9.5
Casing Compressive Strength (lbs)
TVDr (feet)
500
1000
1500
2000
2500
3000
500 1000 1500 2000 2500 3000
Lateral Length (feet)

PART C:

INPUT / OUTPUT OF WELL COST MODEL

Parameter	Value	Unit	Parameter	Value	Unit
TVD	50	feet	Upper Section Length	50	feet
Borehole Diameter	17.5	inch	Buildup Section Length	0	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	0	feet
Radius of Curvature	N/A	feet	Total Well Length	50	feet
Horizontal Section Angle	N/A	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	2,040	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	1,428	lbs
Rig Up / Down, Complete	1.5	days	Selected Rig Pullback	10,000	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	0	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	50	psi
Directional Factor	N/A		Calc. Casing Compress	0	lbs
			Calc. Casing Tensile	2,040	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	0.25	inch	Rig Mobilization	$7,332	
Outside diameter	12.75	inch	Rig Rate	$7,332	/day
Inside diameter	12.25	inch	Days to D&C Slow	3	days
Collapse Resistance	306	psi	Days to D&C Fast	3	days
Body Yield Strength	343,612	lbs	**Total Rig Cost Slow**	**$29,327**	
			Total Rig Cost Fast	**$29,327**	
Casing Specifications			Directional Rate	N/A	/day
Casing Type	F-25		Directional Days	N/A	days
Min Yield Strength	25,000	psi	**Total Directional Cost**	**$0**	
Outside Diameter	13.38	inch	Casing cost	$24	/ft
Inside Diameter	12.715	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	48	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	560	psi	**Depth Depend. Total Cos**	**$2,597**	
Body Yield Strength	338,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$1,032	
Safety Factor			**Fixed Cost**	**$8,032**	
Collapse Resistance	11.2				
Body Strength	165.7		Total Well Cost Slow	$39,956	
			Total Well Cost Fast	$39,956	
Length Dependent Cost			Contingency	5%	
Casing Cost	$255	/ft^3	**Final Well Cost Slow**	**$41,954**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$41,954**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	50	feet	Upper Section Length	0	feet
Borehole Diameter	17.5	inch	Buildup Section Length	367	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	500	feet
Radius of Curvature	1,338	feet	Total Well Length	867	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	15.71	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	14,878	lbs
Rig Up / Down, Complete	N/A	days	Overpull	10,415	lbs
Rig Type	Utility		Selected Rig Pullback	25,293	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-13,241	lbs
Max Rig Entry Angle	23	deg	Overthrust	-9,269	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-22,510	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	7,804	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	50	psi
			Calc. Casing Compress	-177,927	lbs
			Calc. Casing Tensile	179,564	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$183	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$158,366**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	F-25		Casing cost	$24	/ft
Min Yield Strength	25,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cos**	**$45,038**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	560	psi	Geophysical Logging	$5,000	
Body Yield Strength	338,000	lbs	Well Develop / Testing	$25,196	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$35,196**	
Safety Factor			Total Well Cost	$238,600	
Collapse Resistance	11.2		Contingency	10%	
Body Strength	1.9		**Final Well Cost Estimate**	**$262,460**	
Length Dependent Cost					
Casing Cost	$255	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	50	feet	Upper Section Length	0	feet
Borehole Diameter	17.5	inch	Buildup Section Length	367	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	1,000	feet
Radius of Curvature	1,338	feet	Total Well Length	1,367	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	15.71	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	22,191	lbs
Rig Up / Down, Complete	N/A	days	Overpull	15,534	lbs
Rig Type	Utility		Selected Rig Pullback	37,725	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-22,347	lbs
Max Rig Entry Angle	23	deg	Overthrust	-15,643	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-37,990	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	12,343	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	50	psi
			Calc. Casing Compress	-187,033	lbs
			Calc. Casing Tensile	186,876	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$200	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$273,996**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	F-25		Casing cost	$24	/ft
Min Yield Strength	25,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cos**	**$71,012**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	560	psi	Geophysical Logging	$5,000	
Body Yield Strength	338,000	lbs	Well Develop / Testing	$49,752	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$59,752**	
Safety Factor			Total Well Cost	$404,760	
Collapse Resistance	11.2		Contingency	10%	
Body Strength	1.8		**Final Well Cost Estimate**	**$445,236**	
Length Dependent Cost					
Casing Cost	$255	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	50	feet	Upper Section Length	0	feet
Borehole Diameter	17.5	inch	Buildup Section Length	367	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	1,500	feet
Radius of Curvature	1,338	feet	Total Well Length	1,867	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	15.71	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	29,502	lbs
Rig Up / Down, Complete	N/A	days	Overpull	20,651	lbs
Rig Type	Utility		Selected Rig Pullback	50,153	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-31,453	lbs
Max Rig Entry Angle	23	deg	Overthrust	-22,017	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-53,470	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	16,902	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	50	psi
			Calc. Casing Compress	-196,139	lbs
			Calc. Casing Tensile	194,188	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$222	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$414,676**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	F-25		Casing cost	$24	/ft
Min Yield Strength	25,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cos**	**$96,986**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	560	psi	Geophysical Logging	$5,000	
Body Yield Strength	338,000	lbs	Well Develop / Testing	$74,308	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$84,308**	
Safety Factor			Total Well Cost	$595,970	
Collapse Resistance	11.2		Contingency	10%	
Body Strength	1.7		**Final Well Cost Estimate**	**$655,567**	
Length Dependent Cost					
Casing Cost	$255	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	50	feet	Upper Section Length	0	feet
Borehole Diameter	17.5	inch	Buildup Section Length	367	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	2,000	feet
Radius of Curvature	1,338	feet	Total Well Length	2,367	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	15.71	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	36,814	lbs
Rig Up / Down, Complete	N/A	days	Overpull	25,770	lbs
Rig Type	Utility		Selected Rig Pullback	62,584	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-40,560	lbs
Max Rig Entry Angle	23	deg	Overthrust	-28,392	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-68,952	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	21,452	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	50	psi
			Calc. Casing Compress	-205,245	lbs
			Calc. Casing Tensile	201,501	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$244	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$577,034**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	F-25		Casing cost	$24	/ft
Min Yield Strength	25,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cos**	**$122,960**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	560	psi	Geophysical Logging	$5,000	
Body Yield Strength	338,000	lbs	Well Develop / Testing	$98,864	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$108,864**	
Safety Factor			Total Well Cost	$808,858	
Collapse Resistance	11.2		Contingency	10%	
Body Strength	1.6		**Final Well Cost Estimate**	**$889,743**	
Length Dependent Cost					
Casing Cost	$255	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	50	feet	Upper Section Length	0	feet
Borehole Diameter	17.5	inch	Buildup Section Length	367	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	3,000	feet
Radius of Curvature	1,338	feet	Total Well Length	3,367	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	15.71	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	51,439	lbs
Rig Up / Down, Complete	N/A	days	Overpull	36,007	lbs
Rig Type	Utility		Selected Rig Pullback	87,446	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-58,772	lbs
Max Rig Entry Angle	23	deg	Overthrust	-41,140	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-99,912	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	30,550	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	50	psi
			Calc. Casing Compress	-223,457	lbs
			Calc. Casing Tensile	216,125	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$287	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$966,758**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	F-25		Casing cost	$24	/ft
Min Yield Strength	25,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depnd. Total Cost**	**$174,907**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	560	psi	Geophysical Logging	$5,000	
Body Yield Strength	338,000	lbs	Well Develop / Testing	$147,976	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$157,976**	
Safety Factor			Total Well Cost	$1,299,641	
Collapse Resistance	11.2		Contingency	10%	
Body Strength	1.5		**Final Well Cost Estimate**	**$1,429,605**	
Length Dependent Cost					
Casing Cost	$255	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	250	feet	Upper Section Length	250	feet
Borehole Diameter	17.5	inch	Buildup Section Length	0	feet
Casing Diameter	13.38	inch	Horizontal Section Length	0	feet
Radius of Curvature	N/A	feet	Total Well Length	250	feet
Horizontal Section Angle	N/A	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	10,200	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	7,140	lbs
Rig Up / Down, Complete	2	days	Selected Rig Pullback	17,340	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	0	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	250	psi
Directional Factor	N/A		Calc. Casing Compress	0	lbs
			Calc. Casing Tensile	10,200	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	0.25	inch	Rig Mobilization	$7,542	
Outside diameter	12.75	inch	Rig Rate	$7,542	/day
Inside diameter	12.25	inch	Days to D&C Slow	7	days
Collapse Resistance	306	psi	Days to D&C Fast	3	days
Body Yield Strength	343,612	lbs	**Total Rig Cost Slow**	**$60,340**	
			Total Rig Cost Fast	**$30,170**	
Casing Specifications			Directional Rate	N/A	/day
Casing Type	F-25		Directional Days	N/A	days
Min Yield Strength	25,000	psi	**Total Directional Cost**	**$0**	
Outside Diameter	13.38	inch	Casing cost	$24	/ft
Inside Diameter	12.715	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	48	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	560	psi	**Depth Depend. Total Cost**	**$12,987**	
Body Yield Strength	338,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$4,306	
Safety Factor			**Fixed Cost**	**$11,306**	
Collapse Resistance	2.24				
Body Strength	33.1		Total Well Cost Slow	$84,633	
			Total Well Cost Fast	$54,463	
Length Dependent Cost			Contingency	5%	
Casing Cost	$255	/ft^3	**Final Well Cost Slow**	**$88,864**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$57,186**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	250	feet	Upper Section Length	367	feet
Borehole Diameter	17.5	inch	Buildup Section Length	537	feet
Casing Diameter	13.38	inch	Horizontal Section Length	500	feet
Radius of Curvature	1,338	feet	Total Well Length	1,404	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	23	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	30,321	lbs
Rig Up / Down, Complete	N/A	days	Overpull	21,225	lbs
Rig Type	Utility		Selected Rig Pullback	51,546	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-13,925	lbs
Max Rig Entry Angle	23	deg	Overthrust	-9,748	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-23,673	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	12,254	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	250	psi
			Calc. Casing Compress	-178,949	lbs
			Calc. Casing Tensile	183,623	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$219	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$308,057**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	F-25		Casing cost	$24	/ft
Min Yield Strength	25,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cost**	**$72,934**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	560	psi	Geophysical Logging	$5,000	
Body Yield Strength	338,000	lbs	Well Develop / Testing	$25,196	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$35,196**	
Safety Factor			Total Well Cost	$416,187	
Collapse Resistance	2.24		Contingency	10%	
Body Strength	1.8		**Final Well Cost Estimate**	**$457,806**	
Length Dependent Cost					
Casing Cost	$255	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	250	feet	Upper Section Length	367	feet
Borehole Diameter	17.5	inch	Buildup Section Length	537	feet
Casing Diameter	13.38	inch	Horizontal Section Length	1,000	feet
Radius of Curvature	1,338	feet	Total Well Length	1,904	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	23	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	37,270	lbs
Rig Up / Down, Complete	N/A	days	Overpull	26,089	lbs
Rig Type	Utility		Selected Rig Pullback	63,359	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-23,507	lbs
Max Rig Entry Angle	23	deg	Overthrust	-16,455	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-39,962	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	16,803	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	250	psi
			Calc. Casing Compress	-188,530	lbs
			Calc. Casing Tensile	190,537	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$236	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$449,254**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	F-25		Casing cost	$24	/ft
Min Yield Strength	25,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cost**	**$98,908**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	560	psi	Geophysical Logging	$5,000	
Body Yield Strength	338,000	lbs	Well Develop / Testing	$49,752	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$59,752**	
Safety Factor			Total Well Cost	$607,914	
Collapse Resistance	2.24		Contingency	10%	
Body Strength	1.8		**Final Well Cost Estimate**	**$668,705**	
Length Dependent Cost					
Casing Cost	$255	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	250	feet	Upper Section Length	367	feet
Borehole Diameter	17.5	inch	Buildup Section Length	537	feet
Casing Diameter	13.38	inch	Horizontal Section Length	1,500	feet
Radius of Curvature	1,338	feet	Total Well Length	2,404	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	23	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	44,220	lbs
Rig Up / Down, Complete	N/A	days	Overpull	30,954	lbs
Rig Type	Utility		Selected Rig Pullback	75,174	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-33,088	lbs
Max Rig Entry Angle	23	deg	Overthrust	-23,162	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-56,250	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	21,352	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	250	psi
			Calc. Casing Compress	-198,111	lbs
			Calc. Casing Tensile	197,523	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$252	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$606,995**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	F-25		Casing cost	$24	/ft
Min Yield Strength	25,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cost**	**$124,882**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	560	psi	Geophysical Logging	$5,000	
Body Yield Strength	338,000	lbs	Well Develop / Testing	$74,308	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$84,308**	
Safety Factor			Total Well Cost	$816,184	
Collapse Resistance	2.24		Contingency	10%	
Body Strength	1.7		**Final Well Cost Estimate**	**$897,803**	
Length Dependent Cost					
Casing Cost	$255	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	250	feet	Upper Section Length	367	feet
Borehole Diameter	17.5	inch	Buildup Section Length	537	feet
Casing Diameter	13.38	inch	Horizontal Section Length	2,000	feet
Radius of Curvature	1,338	feet	Total Well Length	2,904	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	23	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	51,169	lbs
Rig Up / Down, Complete	N/A	days	Overpull	35,818	lbs
Rig Type	Utility		Selected Rig Pullback	86,987	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-42,699	lbs
Max Rig Entry Angle	23	deg	Overthrust	-29,889	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-72,588	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	25,901	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	250	psi
			Calc. Casing Compress	-207,693	lbs
			Calc. Casing Tensile	204,472	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$269	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$781,270**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	F-25		Casing cost	$24	/ft
Min Yield Strength	25,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cost**	**$150,855**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	560	psi	Geophysical Logging	$5,000	
Body Yield Strength	338,000	lbs	Well Develop / Testing	$98,864	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$108,864**	
Safety Factor			Total Well Cost	$1,040,989	
Collapse Resistance	2.24		Contingency	10%	
Body Strength	1.6		**Final Well Cost Estimate**	**$1,145,088**	
Length Dependent Cost					
Casing Cost	$255	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	250	feet	Upper Section Length	367	feet
Borehole Diameter	17.5	inch	Buildup Section Length	537	feet
Casing Diameter	13.38	inch	Horizontal Section Length	3,000	feet
Radius of Curvature	1,338	feet	Total Well Length	3,904	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	23	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	65,192	lbs
Rig Up / Down, Complete	N/A	days	Overpull	45,634	lbs
Rig Type	Utility		Selected Rig Pullback	110,826	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-61,832	lbs
Max Rig Entry Angle	23	deg	Overthrust	-43,282	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-105,114	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	35,000	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	250	psi
			Calc. Casing Compress	-226,855	lbs
			Calc. Casing Tensile	218,495	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$302	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$1,180,597**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	F-25		Casing cost	$24	/ft
Min Yield Strength	25,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depnd. Total Cost**	**$202,803**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	560	psi	Geophysical Logging	$5,000	
Body Yield Strength	338,000	lbs	Well Develop / Testing	$147,976	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$157,976**	
Safety Factor			Total Well Cost	$1,541,376	
Collapse Resistance	2.24		Contingency	10%	
Body Strength	1.5		**Final Well Cost Estimate**	**$1,695,513**	
Length Dependent Cost					
Casing Cost	$255	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	500	feet	Upper Section Length	500	feet
Borehole Diameter	17.5	inch	Buildup Section Length	0	feet
Casing Diameter	13.38	inch	Horizontal Section Length	0	feet
Radius of Curvature	N/A	feet	Total Well Length	500	feet
Horizontal Section Angle	N/A	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	20,400	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	14,280	lbs
Rig Up / Down, Complete	3	days	Selected Rig Pullback	34,680	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	0	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	500	psi
Directional Factor	N/A		Calc. Casing Compress	0	lbs
			Calc. Casing Tensile	20,400	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	0.25	inch	Rig Mobilization	$8,040	
Outside diameter	12.75	inch	Rig Rate	$8,040	/day
Inside diameter	12.25	inch	Days to D&C Slow	13	days
Collapse Resistance	306	psi	Days to D&C Fast	4	days
Body Yield Strength	343,612	lbs	**Total Rig Cost Slow**	**$112,562**	
			Total Rig Cost Fast	**$40,201**	
Casing Specifications			Directional Rate	N/A	/day
Casing Type	F-25		Directional Days	N/A	days
Min Yield Strength	25,000	psi	**Total Directional Cost**	**$0**	
Outside Diameter	13.38	inch	Casing cost	$24	/ft
Inside Diameter	12.715	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	48	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	560	psi	**Depth Depend. Total Cost**	**$25,974**	
Body Yield Strength	338,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$25,196	
Safety Factor			**Fixed Cost**	**$32,196**	
Collapse Resistance	1.12				
Body Strength	16.6		Total Well Cost Slow	$170,731	
			Total Well Cost Fast	$98,370	
Length Dependent Cost			Contingency	5%	
Casing Cost	$255	/ft^3	**Final Well Cost Slow**	**$179,268**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$103,289**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	500	feet	Upper Section Length	1,007	feet
Borehole Diameter	17.5	inch	Buildup Section Length	537	feet
Casing Diameter	13.38	inch	Horizontal Section Length	500	feet
Radius of Curvature	1,338	feet	Total Well Length	2,044	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	23	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	50,133	lbs
Rig Up / Down, Complete	N/A	days	Overpull	35,093	lbs
Rig Type	Utility		Selected Rig Pullback	85,226	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-13,337	lbs
Max Rig Entry Angle	23	deg	Overthrust	-9,336	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-22,673	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	17,613	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	500	psi
			Calc. Casing Compress	-178,949	lbs
			Calc. Casing Tensile	183,623	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$267	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$544,862**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	H-40		Casing cost	$28	/ft
Min Yield Strength	40,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cost**	**$114,306**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	770	psi	Geophysical Logging	$5,000	
Body Yield Strength	541,000	lbs	Well Develop / Testing	$25,196	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$35,196**	
Safety Factor			Total Well Cost	$694,364	
Collapse Resistance	1.54		Contingency	10%	
Body Strength	2.9		**Final Well Cost Estimate**	**$763,800**	
Length Dependent Cost					
Casing Cost	$297	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	500	feet	Upper Section Length	1,007	feet
Borehole Diameter	17.5	inch	Buildup Section Length	537	feet
Casing Diameter	13.38	inch	Horizontal Section Length	1,000	feet
Radius of Curvature	1,338	feet	Total Well Length	2,544	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	23	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	57,082	lbs
Rig Up / Down, Complete	N/A	days	Overpull	39,957	lbs
Rig Type	Utility		Selected Rig Pullback	97,039	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-22,919	lbs
Max Rig Entry Angle	23	deg	Overthrust	-16,043	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-38,962	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	22,162	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	500	psi
			Calc. Casing Compress	-188,530	lbs
			Calc. Casing Tensile	190,537	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$283	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$720,220**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	H-40		Casing cost	$28	/ft
Min Yield Strength	40,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cost**	**$142,267**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	770	psi	Geophysical Logging	$5,000	
Body Yield Strength	541,000	lbs	Well Develop / Testing	$49,752	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$59,752**	
Safety Factor			Total Well Cost	$922,239	
Collapse Resistance	1.54		Contingency	10%	
Body Strength	2.8		**Final Well Cost Estimate**	**$1,014,463**	
Length Dependent Cost					
Casing Cost	$297	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	500	feet	Upper Section Length	1,007	feet
Borehole Diameter	17.5	inch	Buildup Section Length	537	feet
Casing Diameter	13.38	inch	Horizontal Section Length	1,500	feet
Radius of Curvature	1,338	feet	Total Well Length	3,044	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	23	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	64,032	lbs
Rig Up / Down, Complete	N/A	days	Overpull	44,822	lbs
Rig Type	Utility		Selected Rig Pullback	108,854	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-32,500	lbs
Max Rig Entry Angle	23	deg	Overthrust	-22,750	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-55,250	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	26,711	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	500	psi
			Calc. Casing Compress	-198,111	lbs
			Calc. Casing Tensile	197,523	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$300	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$912,123**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	H-40		Casing cost	$28	/ft
Min Yield Strength	40,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cost**	**$170,228**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	770	psi	Geophysical Logging	$5,000	
Body Yield Strength	541,000	lbs	Well Develop / Testing	$74,308	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$84,308**	
Safety Factor			Total Well Cost	$1,166,659	
Collapse Resistance	1.54		Contingency	10%	
Body Strength	2.7		**Final Well Cost Estimate**	**$1,283,325**	
Length Dependent Cost					
Casing Cost	$297	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	500	feet	Upper Section Length	1,007	feet
Borehole Diameter	17.5	inch	Buildup Section Length	537	feet
Casing Diameter	13.38	inch	Horizontal Section Length	2,000	feet
Radius of Curvature	1,338	feet	Total Well Length	3,544	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	23	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	70,981	lbs
Rig Up / Down, Complete	N/A	days	Overpull	49,687	lbs
Rig Type	Utility		Selected Rig Pullback	120,668	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-42,081	lbs
Max Rig Entry Angle	23	deg	Overthrust	-29,457	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-71,538	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	31,260	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	500	psi
			Calc. Casing Compress	-207,693	lbs
			Calc. Casing Tensile	204,472	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$316	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$1,120,559**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	H-40		Casing cost	$28	/ft
Min Yield Strength	40,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depend. Total Cost**	**$198,190**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	770	psi	Geophysical Logging	$5,000	
Body Yield Strength	541,000	lbs	Well Develop / Testing	$98,864	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$108,864**	
Safety Factor			Total Well Cost	$1,427,613	
Collapse Resistance	1.54		Contingency	10%	
Body Strength	2.6		**Final Well Cost Estimate**	**$1,570,374**	
Length Dependent Cost					
Casing Cost	$297	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	500	feet	Upper Section Length	1,007	feet
Borehole Diameter	17.5	inch	Buildup Section Length	537	feet
Casing Diameter	13.38	inch	Horizontal Section Length	3,000	feet
Radius of Curvature	1,338	feet	Total Well Length	4,544	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	23	deg
Rate of Penetration	N/A	ft/day	Calc. Rig Pullback	85,004	lbs
Rig Up / Down, Complete	N/A	days	Overpull	59,503	lbs
Rig Type	Utility		Selected Rig Pullback	144,507	lbs
Min Rig Entry Angle	7	deg	Calc. Rig Thrust	-61,244	lbs
Max Rig Entry Angle	23	deg	Overthrust	-42,871	lbs
Friction Coefficient	0.4		Selected Rig Thrust	-104,115	lbs
Buoyancy Factor	0.85		Calc. Rig Torque	40,359	ft-lbs
Directional Factor	N/A		Calc. Collapse Resistance	500	psi
			Calc. Casing Compress	-226,855	lbs
			Calc. Casing Tensile	218,495	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$50,000	
Outside diameter	N/A	inch	Rig Rate	$350	/ft
Inside diameter	N/A	inch	Days to Drill & Complete	N/A	days
Collapse Resistance	N/A	psi	**Total Rig Cost**	**$1,588,398**	
Body Yield Strength	N/A	lbs	Directional Rate	N/A	/day
			Directional Days	N/A	days
Casing Specifications			**Total Directional Cost**	**$0**	
Casing Type	H-40		Casing cost	$28	/ft
Min Yield Strength	40,000	psi	Cement / Filter Pack	$11	/ft
Outside Diameter	13.38	inch	Mud disposal	$17	/ft
Inside Diameter	12.715	inch	**Depth Depnd. Total Cost**	**$254,112**	
Wt per ft with cplg	48	lbs/ft	Site Prep	$5,000	
Collapse Resistance	770	psi	Geophysical Logging	$5,000	
Body Yield Strength	541,000	lbs	Well Develop / Testing	$147,976	
Young's Modulus	2.9E+07	psi	**Fixed Cost**	**$157,976**	
Safety Factor			Total Well Cost	$2,000,487	
Collapse Resistance	1.54		Contingency	10%	
Body Strength	2.4		**Final Well Cost Estimate**	**$2,200,536**	
Length Dependent Cost					
Casing Cost	$297	/ft^3			
Cement/Filter Pack Cost	$16	/ft^3			
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,000	feet	Upper Section Length	1,000	feet
Borehole Diameter	17.5	inch	Buildup Section Length	0	feet
Casing Diameter	13.38	inch	Horizontal Section Length	0	feet
Radius of Curvature	N/A	feet	Total Well Length	1,000	feet
Horizontal Section Angle	N/A	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	40,800	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	28,560	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	69,360	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	0	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,000	psi
Directional Factor	N/A		Calc. Casing Compress	0	lbs
			Calc. Casing Tensile	40,800	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	0.31	inch	Rig Mobilization	$9,035	
Outside diameter	12.75	inch	Rig Rate	$9,035	/day
Inside diameter	12.125	inch	Days to D&C Slow	24	days
Collapse Resistance	521	psi	Days to D&C Fast	5	days
Body Yield Strength	427,400	lbs	**Total Rig Cost Slow**	**$225,886**	
			Total Rig Cost Fast	**$54,213**	
Casing Specifications			Directional Rate	N/A	/day
Casing Type	H-40		Directional Days	N/A	days
Min Yield Strength	40,000	psi	**Total Directional Cost**	**$0**	
Outside Diameter	13.38	inch	Casing cost	$28	/ft
Inside Diameter	12.715	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	48	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	770	psi	**Depth Depend. Total Cost**	**$55,923**	
Body Yield Strength	541,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$25,196	
Safety Factor			**Fixed Cost**	**$32,196**	
Collapse Resistance	0.77				
Body Strength	13.3		Total Well Cost Slow	$314,004	
			Total Well Cost Fast	$142,331	
Length Dependent Cost			Contingency	5%	
Casing Cost	$297	/ft^3	**Final Well Cost Slow**	**$329,705**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$149,448**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,000	feet	Upper Section Length	0	feet
Borehole Diameter	17.5	inch	Buildup Section Length	1,760	feet
Casing Diameter	13.38	inch	Horizontal Section Length	500	feet
Radius of Curvature	1,338	feet	Total Well Length	2,260	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	75.37	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	79,582	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	55,707	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	135,289	lbs
Rig Type	Slant Petrol		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	45	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	17,384	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,000	psi
Directional Factor	1.3		Calc. Casing Compress	-183,033	lbs
			Calc. Casing Tensile	244,267	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$22,500	
Outside diameter	N/A	inch	Rig Rate	$22,500	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	59	days
Body Yield Strength	N/A	lbs	Directional Days Fast	3	days
			Days to D&C Slow	63	days
Casing Specifications			Days to D&C Fast	7	days
Casing Type	J-55		**Total Rig Cost Slow**	**$2,089,000**	
Min Yield Strength	55,000	psi	**Total Rig Cost Fast**	**$213,000**	
Outside Diameter	13.38	inch	Casing cost	$41	/ft
Inside Diameter	12.515	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	61	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	1540	psi	**Depth Depend. Total Cost**	**$156,459**	
Body Yield Strength	962,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$25,196	
Safety Factor			**Fixed Cost**	**$32,196**	
Collapse Resistance	1.54				
Body Strength	3.9		Total Well Cost Slow	$2,277,655	
			Total Well Cost Fast	$401,655	
Length Dependent Cost			Contingency	20%	
Casing Cost	$339	/ft^3	**Final Well Cost Slow**	**$2,733,186**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$481,986**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,000	feet	Upper Section Length	0	feet
Borehole Diameter	17.5	inch	Buildup Section Length	1,760	feet
Casing Diameter	13.38	inch	Horizontal Section Length	1,000	feet
Radius of Curvature	1,338	feet	Total Well Length	2,760	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	75.37	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	88,748	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	62,124	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	150,872	lbs
Rig Type	Slant Petrol		Calc. Rig Thrust	-9,061	lbs
Min Rig Entry Angle	45	deg	Overthrust	-6,343	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	-15,404	lbs
Friction Coefficient	0.4		Calc. Rig Torque	23,165	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,000	psi
Directional Factor	1.3		Calc. Casing Compress	-195,766	lbs
			Calc. Casing Tensile	253,434	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$22,500	
Outside diameter	N/A	inch	Rig Rate	$22,500	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	72	days
Body Yield Strength	N/A	lbs	Directional Days Fast	4	days
			Days to D&C Slow	76	days
Casing Specifications			Days to D&C Fast	8	days
Casing Type	J-55		**Total Rig Cost Slow**	**$2,524,500**	
Min Yield Strength	55,000	psi	**Total Rig Cost Fast**	**$246,500**	
Outside Diameter	13.38	inch	Casing cost	$41	/ft
Inside Diameter	12.515	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	61	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	1540	psi	**Depth Depend. Total Cost**	**$191,074**	
Body Yield Strength	962,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$49,752	
Safety Factor			**Fixed Cost**	**$56,752**	
Collapse Resistance	1.54				
Body Strength	3.8		Total Well Cost Slow	$2,772,326	
			Total Well Cost Fast	$494,326	
Length Dependent Cost			Contingency	20%	
Casing Cost	$339	/ft^3	**Final Well Cost Slow**	**$3,326,791**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$593,191**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,000	feet	Upper Section Length	0	feet
Borehole Diameter	17.5	inch	Buildup Section Length	1,760	feet
Casing Diameter	13.38	inch	Horizontal Section Length	1,500	feet
Radius of Curvature	1,338	feet	Total Well Length	3,260	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	75.37	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	98,511	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	68,958	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	167,469	lbs
Rig Type	Slant Petrol		Calc. Rig Thrust	-26,612	lbs
Min Rig Entry Angle	45	deg	Overthrust	-18,628	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	-45,240	lbs
Friction Coefficient	0.4		Calc. Rig Torque	28,946	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,000	psi
Directional Factor	1.3		Calc. Casing Compress	-208,861	lbs
			Calc. Casing Tensile	263,197	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$22,500	
Outside diameter	N/A	inch	Rig Rate	$22,500	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	85	days
Body Yield Strength	N/A	lbs	Directional Days Fast	5	days
			Days to D&C Slow	89	days
Casing Specifications			Days to D&C Fast	9	days
Casing Type	J-55		**Total Rig Cost Slow**	**$2,960,000**	
Min Yield Strength	55,000	psi	**Total Rig Cost Fast**	**$280,000**	
Outside Diameter	13.38	inch	Casing cost	$41	/ft
Inside Diameter	12.515	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	61	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	1540	psi	**Depth Depend. Total Cost**	**$225,688**	
Body Yield Strength	962,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$74,308	
Safety Factor			**Fixed Cost**	**$81,308**	
Collapse Resistance	1.54				
Body Strength	3.7		Total Well Cost Slow	$3,266,996	
			Total Well Cost Fast	$586,996	
Length Dependent Cost			Contingency	20%	
Casing Cost	$339	/ft^3	**Final Well Cost Slow**	**$3,920,396**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$704,396**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,000	feet	Upper Section Length	0	feet
Borehole Diameter	17.5	inch	Buildup Section Length	1,760	feet
Casing Diameter	13.38	inch	Horizontal Section Length	2,000	feet
Radius of Curvature	1,338	feet	Total Well Length	3,760	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	75.37	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	108,999	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	76,299	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	185,298	lbs
Rig Type	Slant Petrol		Calc. Rig Thrust	-44,162	lbs
Min Rig Entry Angle	45	deg	Overthrust	-30,913	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	-75,075	lbs
Friction Coefficient	0.4		Calc. Rig Torque	34,727	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,000	psi
Directional Factor	1.3		Calc. Casing Compress	-222,345	lbs
			Calc. Casing Tensile	273,685	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$22,500	
Outside diameter	N/A	inch	Rig Rate	$22,500	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	98	days
Body Yield Strength	N/A	lbs	Directional Days Fast	5	days
			Days to D&C Slow	102	days
Casing Specifications			Days to D&C Fast	9	days
Casing Type	J-55		**Total Rig Cost Slow**	**$3,395,500**	
Min Yield Strength	55,000	psi	**Total Rig Cost Fast**	**$280,000**	
Outside Diameter	13.38	inch	Casing cost	$41	/ft
Inside Diameter	12.515	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	61	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	1540	psi	**Depth Depend. Total Cost**	**$260,303**	
Body Yield Strength	962,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$98,864	
Safety Factor			**Fixed Cost**	**$105,864**	
Collapse Resistance	1.54				
Body Strength	3.5		Total Well Cost Slow	$3,761,667	
			Total Well Cost Fast	$646,167	
Length Dependent Cost			Contingency	20%	
Casing Cost	$339	/ft^3	**Final Well Cost Slow**	**$4,514,001**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$775,401**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,000	feet	Upper Section Length	0	feet
Borehole Diameter	17.5	inch	Buildup Section Length	1,760	feet
Casing Diameter	13.38	inch	Horizontal Section Length	3,000	feet
Radius of Curvature	1,338	feet	Total Well Length	4,760	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	75.37	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	133,181	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	93,227	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	226,408	lbs
Rig Type	Slant Petrol		Calc. Rig Thrust	-79,263	lbs
Min Rig Entry Angle	45	deg	Overthrust	-55,484	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	-134,747	lbs
Friction Coefficient	0.4		Calc. Rig Torque	46,290	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,000	psi
Directional Factor	1.3		Calc. Casing Compress	-250,623	lbs
			Calc. Casing Tensile	297,866	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$22,500	
Outside diameter	N/A	inch	Rig Rate	$22,500	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	124	days
Body Yield Strength	N/A	lbs	Directional Days Fast	7	days
			Days to D&C Slow	128	days
Casing Specifications			Days to D&C Fast	11	days
Casing Type	J-55		**Total Rig Cost Slow**	**$4,266,500**	
Min Yield Strength	55,000	psi	**Total Rig Cost Fast**	**$347,000**	
Outside Diameter	13.38	inch	Casing cost	$41	/ft
Inside Diameter	12.515	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	61	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	1540	psi	**Depth Depend. Total Cost**	**$329,533**	
Body Yield Strength	962,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$147,976	
Safety Factor			**Fixed Cost**	**$154,976**	
Collapse Resistance	1.54				
Body Strength	3.2		Total Well Cost Slow	$4,751,009	
			Total Well Cost Fast	$831,509	
Length Dependent Cost			Contingency	20%	
Casing Cost	$339	/ft^3	**Final Well Cost Slow**	**$5,701,210**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$997,810**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,500	feet	Upper Section Length	1,500	feet
Borehole Diameter	17.5	inch	Buildup Section Length	0	feet
Casing Diameter	13.38	inch	Horizontal Section Lengt	0	feet
Radius of Curvature	N/A	feet	Total Well Length	1,500	feet
Horizontal Section Angle	N/A	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	61,200	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	42,840	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	104,040	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	0	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,500	psi
Directional Factor	N/A		Calc. Casing Compress	0	lbs
			Calc. Casing Tensile	61,200	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	0.31	inch	Rig Mobilization	$10,031	
Outside diameter	12.75	inch	Rig Rate	$10,031	/day
Inside diameter	12.125	inch	Days to D&C Slow	34	days
Collapse Resistance	521	psi	Days to D&C Fast	6	days
Body Yield Strength	427,400	lbs	**Total Rig Cost Slow**	**$351,076**	
			Total Rig Cost Fast	**$70,215**	
Casing Specifications			Directional Rate	N/A	/day
Casing Type	H-40		Directional Days	N/A	days
Min Yield Strength	40,000	psi	**Total Directional Cost**	**$0**	
Outside Diameter	13.38	inch	Casing cost	$28	/ft
Inside Diameter	12.715	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	48	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	770	psi	**Depth Depend. Total Cos**	**$83,884**	
Body Yield Strength	541,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$25,196	
Safety Factor			**Fixed Cost**	**$32,196**	
Collapse Resistance	0.51				
Body Strength	8.8		Total Well Cost Slow	$467,156	
			Total Well Cost Fast	$186,295	
Length Dependent Cost			Contingency	8%	
Casing Cost	$297	/ft^3	**Final Well Cost Slow**	**$502,193**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$200,267**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,500	feet	Upper Section Length	162	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengt	500	feet
Radius of Curvature	1,338	feet	Total Well Length	2,763	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	134,585	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	94,210	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	228,795	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	23,997	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,500	psi
Directional Factor	1.3		Calc. Casing Compress	-186,342	lbs
			Calc. Casing Tensile	289,356	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$13,611	
Outside diameter	N/A	inch	Rig Rate	$13,611	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	68	days
Body Yield Strength	N/A	lbs	Directional Days Fast	4	days
			Days to D&C Slow	75	days
Casing Specifications			Days to D&C Fast	8	days
Casing Type	C-75		**Total Rig Cost Slow**	**$1,782,451**	
Min Yield Strength	75,000	psi	**Total Rig Cost Fast**	**$166,501**	
Outside Diameter	13.38	inch	Casing cost	$57	/ft
Inside Diameter	12.347	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	72	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	2590	psi	**Depth Depend. Total Cos**	**$235,051**	
Body Yield Strength	1,558,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$25,196	
Safety Factor			**Fixed Cost**	**$32,196**	
Collapse Resistance	1.7266667				
Body Strength	5.4		Total Well Cost Slow	$2,049,699	
			Total Well Cost Fast	$433,748	
Length Dependent Cost			Contingency	20%	
Casing Cost	$395	/ft^3	**Final Well Cost Slow**	**$2,459,639**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$520,498**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,500	feet	Upper Section Length	162	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengt	1,000	feet
Radius of Curvature	1,338	feet	Total Well Length	3,263	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	146,569	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	102,598	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	249,167	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	30,821	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,500	psi
Directional Factor	1.3		Calc. Casing Compress	-201,371	lbs
			Calc. Casing Tensile	301,340	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$14,196	
Outside diameter	N/A	inch	Rig Rate	$14,196	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	81	days
Body Yield Strength	N/A	lbs	Directional Days Fast	5	days
			Days to D&C Slow	88	days
Casing Specifications			Days to D&C Fast	9	days
Casing Type	C-75		**Total Rig Cost Slow**	**$2,154,435**	
Min Yield Strength	75,000	psi	**Total Rig Cost Fast**	**$196,959**	
Outside Diameter	13.38	inch	Casing cost	$57	/ft
Inside Diameter	12.347	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	72	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	2590	psi	**Depth Depend. Total Cos**	**$277,587**	
Body Yield Strength	1,558,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$49,752	
Safety Factor			**Fixed Cost**	**$56,752**	
Collapse Resistance	1.7266667				
Body Strength	5.2		Total Well Cost Slow	$2,488,774	
			Total Well Cost Fast	$531,298	
Length Dependent Cost			Contingency	20%	
Casing Cost	$395	/ft^3	**Final Well Cost Slow**	**$2,986,529**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$637,558**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,500	feet	Upper Section Length	162	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengt	1,500	feet
Radius of Curvature	1,338	feet	Total Well Length	3,763	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	159,332	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	111,532	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	270,864	lbs
Rig Type	Vertical		Calc. Rig Thrust	-4,239	lbs
Min Rig Entry Angle	90	deg	Overthrust	-2,967	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	-7,206	lbs
Friction Coefficient	0.4		Calc. Rig Torque	37,645	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,500	psi
Directional Factor	1.3		Calc. Casing Compress	-216,827	lbs
			Calc. Casing Tensile	314,103	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$14,819	
Outside diameter	N/A	inch	Rig Rate	$14,819	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	94	days
Body Yield Strength	N/A	lbs	Directional Days Fast	5	days
			Days to D&C Slow	101	days
Casing Specifications			Days to D&C Fast	9	days
Casing Type	C-75		**Total Rig Cost Slow**	**$2,545,498**	
Min Yield Strength	75,000	psi	**Total Rig Cost Fast**	**$203,186**	
Outside Diameter	13.38	inch	Casing cost	$57	/ft
Inside Diameter	12.347	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	72	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	2590	psi	**Depth Depend. Total Cos**	**$320,123**	
Body Yield Strength	1,558,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$74,308	
Safety Factor			**Fixed Cost**	**$81,308**	
Collapse Resistance	1.7266667				
Body Strength	5.0		Total Well Cost Slow	$2,946,929	
			Total Well Cost Fast	$604,617	
Length Dependent Cost			Contingency	20%	
Casing Cost	$395	/ft^3	**Final Well Cost Slow**	**$3,536,314**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$725,540**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,500	feet	Upper Section Length	162	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengt	2,000	feet
Radius of Curvature	1,338	feet	Total Well Length	4,263	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	173,042	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	121,129	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	294,171	lbs
Rig Type	Vertical		Calc. Rig Thrust	-27,183	lbs
Min Rig Entry Angle	90	deg	Overthrust	-19,028	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	-46,211	lbs
Friction Coefficient	0.4		Calc. Rig Torque	44,469	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,500	psi
Directional Factor	1.3		Calc. Casing Compress	-232,743	lbs
			Calc. Casing Tensile	327,813	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$15,488	
Outside diameter	N/A	inch	Rig Rate	$15,488	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	107	days
Body Yield Strength	N/A	lbs	Directional Days Fast	6	days
			Days to D&C Slow	114	days
Casing Specifications			Days to D&C Fast	10	days
Casing Type	C-75		**Total Rig Cost Slow**	**$2,958,065**	
Min Yield Strength	75,000	psi	**Total Rig Cost Fast**	**$236,363**	
Outside Diameter	13.38	inch	Casing cost	$57	/ft
Inside Diameter	12.347	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	72	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	2590	psi	**Depth Depend. Total Cos**	**$362,658**	
Body Yield Strength	1,558,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$98,864	
Safety Factor			**Fixed Cost**	**$105,864**	
Collapse Resistance	1.7266667				
Body Strength	4.8		Total Well Cost Slow	$3,426,587	
			Total Well Cost Fast	$704,885	
Length Dependent Cost			Contingency	20%	
Casing Cost	$395	/ft^3	**Final Well Cost Slow**	**$4,111,904**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$845,862**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	1,500	feet	Upper Section Length	162	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengt	3,000	feet
Radius of Curvature	1,338	feet	Total Well Length	5,263	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	204,654	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	143,258	lbs
Rig Up / Down, Complete	4	days	Selected Rig Pullback	347,912	lbs
Rig Type	Vertical		Calc. Rig Thrust	-73,069	lbs
Min Rig Entry Angle	90	deg	Overthrust	-51,148	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	-124,217	lbs
Friction Coefficient	0.4		Calc. Rig Torque	58,116	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	1,500	psi
Directional Factor	1.3		Calc. Casing Compress	-266,120	lbs
			Calc. Casing Tensile	359,425	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$17,030	
Outside diameter	N/A	inch	Rig Rate	$17,030	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	133	days
Body Yield Strength	N/A	lbs	Directional Days Fast	7	days
			Days to D&C Slow	140	days
Casing Specifications			Days to D&C Fast	11	days
Casing Type	C-75		**Total Rig Cost Slow**	**$3,864,211**	
Min Yield Strength	75,000	psi	**Total Rig Cost Fast**	**$281,358**	
Outside Diameter	13.38	inch	Casing cost	$57	/ft
Inside Diameter	12.347	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	72	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	2590	psi	**Depth Depend. Total Cos**	**$447,729**	
Body Yield Strength	1,558,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$147,976	
Safety Factor			**Fixed Cost**	**$154,976**	
Collapse Resistance	1.7266667				
Body Strength	4.3		Total Well Cost Slow	$4,466,917	
			Total Well Cost Fast	$884,064	
Length Dependent Cost			Contingency	20%	
Casing Cost	$395	/ft^3	**Final Well Cost Slow**	**$5,360,300**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$1,060,876**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	2,000	feet	Upper Section Length	2,000	feet
Borehole Diameter	17.5	inch	Buildup Section Length	0	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	0	feet
Radius of Curvature	N/A	feet	Total Well Length	2,000	feet
Horizontal Section Angle	N/A	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slov	50	ft/day	Calc. Rig Pullback	81,600	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	57,120	lbs
Rig Up / Down, Complet	4	days	Selected Rig Pullback	138,720	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	0	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	2,000	psi
Directional Factor	N/A		Calc. Casing Compress	0	lbs
			Calc. Casing Tensile	61,200	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	0.31	inch	Rig Mobilization	$11,026	
Outside diameter	12.75	inch	Rig Rate	$11,026	/day
Inside diameter	12.125	inch	Days to D&C Slow	44	days
Collapse Resistance	521	psi	Days to D&C Fast	6	days
Body Yield Strength	427,400	lbs	**Total Rig Cost Slow**	**$496,173**	
			Total Rig Cost Fast	**$77,182**	
Casing Specifications			Directional Rate	N/A	/day
Casing Type	H-40		Directional Days	N/A	days
Min Yield Strength	40,000	psi	**Total Directional Cost**	**$0**	
Outside Diameter	13.38	inch	Casing cost	$28	/ft
Inside Diameter	12.715	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	48	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	770	psi	**Depth Depend. Total Cos**	**$111,845**	
Body Yield Strength	541,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$25,196	
Safety Factor			**Fixed Cost**	**$32,196**	
Collapse Resistance	0.39				
Body Strength	8.8		Total Well Cost Slow	$640,214	
			Total Well Cost Fast	$221,224	
Length Dependent Cost			Contingency	10%	
Casing Cost	$297	/ft^3	**Final Well Cost Slow**	**$704,236**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$243,346**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	2,000	feet	Upper Section Length	662	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	500	feet
Radius of Curvature	1,338	feet	Total Well Length	3,263	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slov	50	ft/day	Calc. Rig Pullback	176,656	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	123,659	lbs
Rig Up / Down, Complet	4	days	Selected Rig Pullback	300,315	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	25,664	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	2,000	psi
Directional Factor	1.3		Calc. Casing Compress	-187,846	lbs
			Calc. Casing Tensile	298,014	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$15,664	
Outside diameter	N/A	inch	Rig Rate	$15,664	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	68	days
Body Yield Strength	N/A	lbs	Directional Days Fast	4	days
			Days to D&C Slow	85	days
Casing Specifications			Days to D&C Fast	9	days
Casing Type	N-80		**Total Rig Cost Slow**	**$2,095,091**	
Min Yield Strength	80,000	psi	**Total Rig Cost Fast**	**$200,638**	
Outside Diameter	13.38	inch	Casing cost	$63	/ft
Inside Diameter	12.275	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	77	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	3100	psi	**Depth Depend. Total Cos**	**$297,115**	
Body Yield Strength	1,661,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$25,196	
Safety Factor			**Fixed Cost**	**$32,196**	
Collapse Resistance	1.55				
Body Strength	5.6		Total Well Cost Slow	$2,424,402	
			Total Well Cost Fast	$529,949	
Length Dependent Cost			Contingency	20%	
Casing Cost	$409	/ft^3	**Final Well Cost Slow**	**$2,909,282**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$635,939**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	2,000	feet	Upper Section Length	662	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	1,000	feet
Radius of Curvature	1,338	feet	Total Well Length	3,763	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slov	50	ft/day	Calc. Rig Pullback	189,472	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	132,630	lbs
Rig Up / Down, Complet	4	days	Selected Rig Pullback	322,102	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	32,962	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	2,000	psi
Directional Factor	1.3		Calc. Casing Compress	-203,918	lbs
			Calc. Casing Tensile	310,830	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$16,289	
Outside diameter	N/A	inch	Rig Rate	$16,289	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	81	days
Body Yield Strength	N/A	lbs	Directional Days Fast	5	days
			Days to D&C Slow	98	days
Casing Specifications			Days to D&C Fast	9	days
Casing Type	N-80		**Total Rig Cost Slow**	**$2,503,625**	
Min Yield Strength	80,000	psi	**Total Rig Cost Fast**	**$217,891**	
Outside Diameter	13.38	inch	Casing cost	$63	/ft
Inside Diameter	12.275	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	77	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	3100	psi	**Depth Depend. Total Cos**	**$342,643**	
Body Yield Strength	1,661,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$49,752	
Safety Factor			**Fixed Cost**	**$56,752**	
Collapse Resistance	1.55				
Body Strength	5.3		Total Well Cost Slow	$2,903,019	
			Total Well Cost Fast	$617,286	
Length Dependent Cost			Contingency	20%	
Casing Cost	$409	/ft^3	**Final Well Cost Slow**	**$3,483,623**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$740,743**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	2,000	feet	Upper Section Length	662	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	1,500	feet
Radius of Curvature	1,338	feet	Total Well Length	4,263	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slov	50	ft/day	Calc. Rig Pullback	203,121	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	142,185	lbs
Rig Up / Down, Complet	4	days	Selected Rig Pullback	345,306	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	40,259	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	2,000	psi
Directional Factor	1.3		Calc. Casing Compress	-220,448	lbs
			Calc. Casing Tensile	324,479	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$16,955	
Outside diameter	N/A	inch	Rig Rate	$16,955	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	94	days
Body Yield Strength	N/A	lbs	Directional Days Fast	5	days
			Days to D&C Slow	111	days
Casing Specifications			Days to D&C Fast	10	days
Casing Type	N-80		**Total Rig Cost Slow**	**$2,932,968**	
Min Yield Strength	80,000	psi	**Total Rig Cost Fast**	**$241,506**	
Outside Diameter	13.38	inch	Casing cost	$63	/ft
Inside Diameter	12.275	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	77	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	3100	psi	**Depth Depend. Total Cos**	**$388,170**	
Body Yield Strength	1,661,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$74,308	
Safety Factor			**Fixed Cost**	**$81,308**	
Collapse Resistance	1.55				
Body Strength	5.1		Total Well Cost Slow	$3,402,447	
			Total Well Cost Fast	$710,984	
Length Dependent Cost			Contingency	20%	
Casing Cost	$409	/ft^3	**Final Well Cost Slow**	**$4,082,936**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$853,181**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	2,000	feet	Upper Section Length	662	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	2,000	feet
Radius of Curvature	1,338	feet	Total Well Length	4,763	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slov	50	ft/day	Calc. Rig Pullback	217,784	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	152,449	lbs
Rig Up / Down, Complet	4	days	Selected Rig Pullback	370,233	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	47,557	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	2,000	psi
Directional Factor	1.3		Calc. Casing Compress	-237,469	lbs
			Calc. Casing Tensile	339,142	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$17,670	
Outside diameter	N/A	inch	Rig Rate	$17,670	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	107	days
Body Yield Strength	N/A	lbs	Directional Days Fast	6	days
			Days to D&C Slow	124	days
Casing Specifications			Days to D&C Fast	10	days
Casing Type	N-80		**Total Rig Cost Slow**	**$3,385,810**	
Min Yield Strength	80,000	psi	**Total Rig Cost Fast**	**$260,375**	
Outside Diameter	13.38	inch	Casing cost	$63	/ft
Inside Diameter	12.275	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	77	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	3100	psi	**Depth Depend. Total Cos**	**$433,698**	
Body Yield Strength	1,661,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$98,864	
Safety Factor			**Fixed Cost**	**$105,864**	
Collapse Resistance	1.55				
Body Strength	4.9		Total Well Cost Slow	$3,925,372	
			Total Well Cost Fast	$799,938	
Length Dependent Cost			Contingency	20%	
Casing Cost	$409	/ft^3	**Final Well Cost Slow**	**$4,710,447**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$959,925**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	2,000	feet	Upper Section Length	662	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	3,000	feet
Radius of Curvature	1,338	feet	Total Well Length	5,763	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slov	50	ft/day	Calc. Rig Pullback	251,591	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	176,114	lbs
Rig Up / Down, Complet	4	days	Selected Rig Pullback	427,705	lbs
Rig Type	Vertical		Calc. Rig Thrust	-45,419	lbs
Min Rig Entry Angle	90	deg	Overthrust	-31,793	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	-77,212	lbs
Friction Coefficient	0.4		Calc. Rig Torque	62,152	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	2,000	psi
Directional Factor	1.3		Calc. Casing Compress	-273,165	lbs
			Calc. Casing Tensile	372,949	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$19,320	
Outside diameter	N/A	inch	Rig Rate	$19,320	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	133	days
Body Yield Strength	N/A	lbs	Directional Days Fast	7	days
			Days to D&C Slow	150	days
Casing Specifications			Days to D&C Fast	12	days
Casing Type	N-80		**Total Rig Cost Slow**	**$4,380,309**	
Min Yield Strength	80,000	psi	**Total Rig Cost Fast**	**$328,159**	
Outside Diameter	13.38	inch	Casing cost	$63	/ft
Inside Diameter	12.275	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	77	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	3100	psi	**Depth Depend. Total Cos**	**$524,754**	
Body Yield Strength	1,661,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$147,976	
Safety Factor			**Fixed Cost**	**$154,976**	
Collapse Resistance	1.55				
Body Strength	4.5		Total Well Cost Slow	$5,060,039	
			Total Well Cost Fast	$1,007,889	
Length Dependent Cost			Contingency	20%	
Casing Cost	$409	/ft^3	**Final Well Cost Slow**	**$6,072,046**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$1,209,467**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	3,000	feet	Upper Section Length	3,000	feet
Borehole Diameter	17.5	inch	Buildup Section Length	0	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	0	feet
Radius of Curvature	N/A	feet	Total Well Length	3,000	feet
Horizontal Section Angle	N/A	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	138,975	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	97,283	lbs
Rig Up / Down, Complete	5	days	Selected Rig Pullback	236,258	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	0	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	3,000	psi
Directional Factor	N/A		Calc. Casing Compress	0	lbs
			Calc. Casing Tensile	138,975	lbs
Extrapolated AWWA A 100-84 Min Req			Well Cost		
Wall Thickness	0.38	inch	Rig Mobilization	$13,825	
Outside diameter	12.75	inch	Rig Rate	$13,825	/day
Inside diameter	12	inch	Days to D&C Slow	65	days
Collapse Resistance	795	psi	Days to D&C Fast	8	days
Body Yield Strength	524,000	lbs	**Total Rig Cost Slow**	**$912,476**	
			Total Rig Cost Fast	**$124,429**	
Casing Specifications			Directional Rate	N/A	/day
Casing Type	J-55		Directional Days	N/A	days
Min Yield Strength	55,000	psi	**Total Directional Cost**	**$0**	
Outside Diameter	13.38	inch	Casing cost	$37	/ft
Inside Diameter	12.615	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	54.5	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	1130	psi	**Depth Depend. Total Cos**	**$193,747**	
Body Yield Strength	853,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$25,196	
Safety Factor			**Fixed Cost**	**$32,196**	
Collapse Resistance	0.38				
Body Strength	6.1		Total Well Cost Slow	$1,138,418	
			Total Well Cost Fast	$350,371	
Length Dependent Cost			Contingency	10%	
Casing Cost	$339	/ft^3	**Final Well Cost Slow**	**$1,252,260**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$385,408**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	3,000	feet	Upper Section Length	1,662	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	500	feet
Radius of Curvature	1,338	feet	Total Well Length	4,263	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	308,135	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	215,695	lbs
Rig Up / Down, Complete	5	days	Selected Rig Pullback	523,830	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	32,663	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	3,000	psi
Directional Factor	1.3		Calc. Casing Compress	-194,162	lbs
			Calc. Casing Tensile	334,376	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$22,079	
Outside diameter	N/A	inch	Rig Rate	$22,079	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	68	days
Body Yield Strength	N/A	lbs	Directional Days Fast	4	days
			Days to D&C Slow	106	days
Casing Specifications			Days to D&C Fast	11	days
Casing Type	N-80		**Total Rig Cost Slow**	**$3,110,422**	
Min Yield Strength	80,000	psi	**Total Rig Cost Fast**	**$308,944**	
Outside Diameter	13.38	inch	Casing cost	$82	/ft
Inside Diameter	11.937	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	98	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	5910	psi	**Depth Depend. Total Cos**	**$466,008**	
Body Yield Strength	2,287,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$25,196	
Safety Factor			**Fixed Cost**	**$32,196**	
Collapse Resistance	1.97				
Body Strength	6.8		Total Well Cost Slow	$3,608,625	
			Total Well Cost Fast	$807,148	
Length Dependent Cost			Contingency	20%	
Casing Cost	$409	/ft^3	**Final Well Cost Slow**	**$4,330,350**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$968,578**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	3,000	feet	Upper Section Length	1,662	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	1,000	feet
Radius of Curvature	1,338	feet	Total Well Length	4,763	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	324,447	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	227,113	lbs
Rig Up / Down, Complete	5	days	Selected Rig Pullback	551,560	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	41,951	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	3,000	psi
Directional Factor	1.3		Calc. Casing Compress	-214,618	lbs
			Calc. Casing Tensile	350,688	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$22,875	
Outside diameter	N/A	inch	Rig Rate	$22,875	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	81	days
Body Yield Strength	N/A	lbs	Directional Days Fast	5	days
			Days to D&C Slow	119	days
Casing Specifications			Days to D&C Fast	11	days
Casing Type	N-80		**Total Rig Cost Slow**	**$3,635,948**	
Min Yield Strength	80,000	psi	**Total Rig Cost Fast**	**$329,495**	
Outside Diameter	13.38	inch	Casing cost	$82	/ft
Inside Diameter	11.937	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	98	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	5910	psi	**Depth Depend. Total Cos**	**$520,665**	
Body Yield Strength	2,287,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$49,752	
Safety Factor			**Fixed Cost**	**$56,752**	
Collapse Resistance	1.97				
Body Strength	6.5		Total Well Cost Slow	$4,213,365	
			Total Well Cost Fast	$906,912	
Length Dependent Cost			Contingency	20%	
Casing Cost	$409	/ft^3	**Final Well Cost Slow**	**$5,056,038**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$1,088,294**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	3,000	feet	Upper Section Length	1,662	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	1,500	feet
Radius of Curvature	1,338	feet	Total Well Length	5,263	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	341,818	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	239,273	lbs
Rig Up / Down, Complete	5	days	Selected Rig Pullback	581,091	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	51,239	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	3,000	psi
Directional Factor	1.3		Calc. Casing Compress	-235,656	lbs
			Calc. Casing Tensile	368,059	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$23,722	
Outside diameter	N/A	inch	Rig Rate	$23,722	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	94	days
Body Yield Strength	N/A	lbs	Directional Days Fast	5	days
			Days to D&C Slow	132	days
Casing Specifications			Days to D&C Fast	12	days
Casing Type	N-80		**Total Rig Cost Slow**	**$4,189,039**	
Min Yield Strength	80,000	psi	**Total Rig Cost Fast**	**$363,387**	
Outside Diameter	13.38	inch	Casing cost	$82	/ft
Inside Diameter	11.937	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	98	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	5910	psi	**Depth Depend. Total Cos**	**$575,322**	
Body Yield Strength	2,287,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$74,308	
Safety Factor			**Fixed Cost**	**$81,308**	
Collapse Resistance	1.97				
Body Strength	6.2		Total Well Cost Slow	$4,845,670	
			Total Well Cost Fast	$1,020,018	
Length Dependent Cost			Contingency	20%	
Casing Cost	$409	/ft^3	**Final Well Cost Slow**	**$5,814,803**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$1,224,021**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	3,000	feet	Upper Section Length	1,662	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	2,000	feet
Radius of Curvature	1,338	feet	Total Well Length	5,763	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	360,480	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	252,336	lbs
Rig Up / Down, Complete	5	days	Selected Rig Pullback	612,816	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	60,527	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	3,000	psi
Directional Factor	1.3		Calc. Casing Compress	-257,320	lbs
			Calc. Casing Tensile	386,721	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$24,633	
Outside diameter	N/A	inch	Rig Rate	$24,633	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	107	days
Body Yield Strength	N/A	lbs	Directional Days Fast	6	days
			Days to D&C Slow	145	days
Casing Specifications			Days to D&C Fast	12	days
Casing Type	N-80		**Total Rig Cost Slow**	**$4,773,362**	
Min Yield Strength	80,000	psi	**Total Rig Cost Fast**	**$386,224**	
Outside Diameter	13.38	inch	Casing cost	$82	/ft
Inside Diameter	11.937	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	98	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	5910	psi	**Depth Depend. Total Cos**	**$629,979**	
Body Yield Strength	2,287,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$98,864	
Safety Factor			**Fixed Cost**	**$105,864**	
Collapse Resistance	1.97				
Body Strength	5.9		Total Well Cost Slow	$5,509,206	
			Total Well Cost Fast	$1,122,068	
Length Dependent Cost			Contingency	20%	
Casing Cost	$409	/ft^3	**Final Well Cost Slow**	**$6,611,047**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$1,346,481**	
Mud Disposal Cost	$10	/ft^3			

Parameter	Value	Unit	Parameter	Value	Unit
TVD	3,000	feet	Upper Section Length	1,662	feet
Borehole Diameter	17.5	inch	Buildup Section Length	2,101	feet
Casing Diameter	13.38	inch	Horizontal Section Lengtl	3,000	feet
Radius of Curvature	1,338	feet	Total Well Length	6,763	feet
Horizontal Section Angle	0	deg	Calc. Optimal Rig Angle	N/A	deg
Rate of Penetration Slow	50	ft/day	Calc. Rig Pullback	403,507	lbs
Rate of Penetration Fast	1,000	ft/day	Overpull	282,455	lbs
Rig Up / Down, Complete	5	days	Selected Rig Pullback	685,962	lbs
Rig Type	Vertical		Calc. Rig Thrust	0	lbs
Min Rig Entry Angle	90	deg	Overthrust	0	lbs
Max Rig Entry Angle	90	deg	Selected Rig Thrust	0	lbs
Friction Coefficient	0.4		Calc. Rig Torque	79,103	ft-lbs
Buoyancy Factor	0.85		Calc. Collapse Resistance	3,000	psi
Directional Factor	1.3		Calc. Casing Compress	-302,750	lbs
			Calc. Casing Tensile	429,748	lbs
AWWA A 100-84 Min Requirements			Well Cost		
Wall Thickness	N/A	inch	Rig Mobilization	$26,732	
Outside diameter	N/A	inch	Rig Rate	$26,732	/day
Inside diameter	N/A	inch	Directional Rate	$11,000	/day
Collapse Resistance	N/A	psi	Directional Days Slow	133	days
Body Yield Strength	N/A	lbs	Directional Days Fast	7	days
			Days to D&C Slow	171	days
Casing Specifications			Days to D&C Fast	14	days
Casing Type	N-80		**Total Rig Cost Slow**	**$6,060,888**	
Min Yield Strength	80,000	psi	**Total Rig Cost Fast**	**$477,979**	
Outside Diameter	13.38	inch	Casing cost	$82	/ft
Inside Diameter	11.937	inch	Cement / Filter Pack	$11	/ft
Wt per ft with cplg	98	lbs/ft	Mud disposal	$17	/ft
Collapse Resistance	5910	psi	**Depth Depend. Total Cos**	**$739,294**	
Body Yield Strength	2,287,000	lbs	Site Prep	$5,000	
Young's Modulus	2.9E+07	psi	Geophysical Logging	$2,000	
			Well Develop / Testing	$147,976	
Safety Factor			**Fixed Cost**	**$154,976**	
Collapse Resistance	1.97				
Body Strength	5.3		Total Well Cost Slow	$6,955,158	
			Total Well Cost Fast	$1,372,249	
Length Dependent Cost			Contingency	20%	
Casing Cost	$409	/ft^3	**Final Well Cost Slow**	**$8,346,189**	
Cement/Filter Pack Cost	$16	/ft^3	**Final Well Cost Fast**	**$1,646,698**	
Mud Disposal Cost	$10	/ft^3			