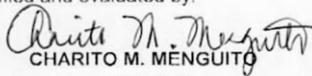
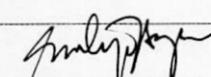
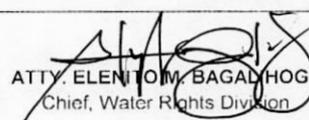




Republic of the Philippines <b>National Water Resources Board</b> 8th Floor NIA Building, EDSA, Quezon City		<b>WATER PERMIT APPLICATION EVALUATION SHEET</b> Groundwater Source																	
		WPA No.: <b>III-BUL-2012-03-131</b>	Control No.																
		Date : 03/30/2012	At: <b>NWRB</b>																
1. Name and Address of Applicant: <b>EAGLE CEMENT CORPORATION</b> 153 Edsa, Mandaluyong City		2. Location of Source: <input checked="" type="checkbox"/> Well # <b>2</b> <input type="checkbox"/> Spring (Barangay, Municipality, Province) Brgy. Akle, San Ildefonso Bulacan																	
		3. Location of Diversion Point a. Map Sheet No. b. Latitude : <b>15-2-38.76</b> c. Longitude : <b>121-3-51.80</b>																	
4. Checklist of documents and data requirements:																			
a. <input checked="" type="checkbox"/> Ownership/right to land established - ✓ b. <input checked="" type="checkbox"/> Brief description of proposed project/development ✓ c. <input checked="" type="checkbox"/> Location plan of water source & pt. of diversion (1:50,000 scale) d. <input type="checkbox"/> Location plan of area to be developed indicating the layout of proposed work e. <input checked="" type="checkbox"/> SEC Registration with Articles of Incorporation and Certification from the Corporate Secretary as to the present capital structure or DTI/ Certificate of Conformance/ CDA ✓ f. <input type="checkbox"/> Investigation Report by NWRB g. <input type="checkbox"/> Water analysis/Bacteriological test (for Domestic use only); h. <input checked="" type="checkbox"/> Pumping test results/Well log data/Well Data ✓		i. <input checked="" type="checkbox"/> Clearances <input type="checkbox"/> NIA - IMO <input checked="" type="checkbox"/> DPWH - DE ✓ <input checked="" type="checkbox"/> DENR (for all uses that affect water quality) <input checked="" type="checkbox"/> ECC/LLDA - Cert. of non-coverage ✓ <input type="checkbox"/> MWSS (within its franchise area only) <input type="checkbox"/> NPC (for hydropower generation only) <input type="checkbox"/> WD (within its franchise area only) j. <input checked="" type="checkbox"/> Others PTD NO. 2012-128 ✓																	
5. Purpose: (Check as appropriate)		6. Related Data:																	
a. <input type="checkbox"/> Domestic and Municipal use b. <input type="checkbox"/> Irrigation c. <input type="checkbox"/> Power Generation d. <input type="checkbox"/> Fisheries e. <input type="checkbox"/> Livestock Raising f. <input checked="" type="checkbox"/> Industrial use ✓ g. <input type="checkbox"/> Recreation h. <input type="checkbox"/> Others		a. Area to be irrigated : NA hectares (for irrigation use) Crop Type : NA (for irrigation use) Water Duty : NA lps/person b. Population to be served by system : NA persons (for domestic use) c. Rated Capacity of Power Plant : NA kw (for hydropower) d. Fishpond area : NA ha. (for fishery) e. Livestock population to be served : NA heads (for livestock) f. Annual production (product) : NA tons (for industrial)																	
7. Water Availability																			
a. Existing MWSS wells within 0.5 km. radius																			
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:25%;">MWSS Well No.</th> <th style="width:50%;">NAME</th> <th style="width:25%;">Lateral Distance (m)</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>				MWSS Well No.	NAME	Lateral Distance (m)													
MWSS Well No.	NAME	Lateral Distance (m)																	
b. Existing wells within ____ km. radius																			
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:25%;">Water Permit No.</th> <th style="width:30%;">NAME</th> <th style="width:25%;">Amt. of water granted (lps)</th> <th style="width:20%;">Lateral Dist. (m)</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>				Water Permit No.	NAME	Amt. of water granted (lps)	Lateral Dist. (m)												
Water Permit No.	NAME	Amt. of water granted (lps)	Lateral Dist. (m)																
c. Pending Application within ____ km. Radius																			
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:25%;">Water Permit No.</th> <th style="width:30%;">NAME</th> <th style="width:25%;">Amt. of water applied for (lps)</th> <th style="width:20%;">Lateral Dist. (m)</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>				Water Permit No.	NAME	Amt. of water applied for (lps)	Lateral Dist. (m)												
Water Permit No.	NAME	Amt. of water applied for (lps)	Lateral Dist. (m)																
8. Hydrogeological data (Sub-area no.): <b>SA BULACAN 2-2510</b>																			
Static Water Level: <b>15.40</b> m		Transmissivity: m <sup>2</sup> /d Mining Yield: <b>4788.74</b> lps																	
		Specific Capacity: <b>14.14</b> lps/m Safe Yield: <b>2520.25</b> lps																	
9. Computation for beneficial use requirement <p style="text-align: center;"><b>Water Requirement = 3072 X 0.0029 = 8.91 lps</b></p>			10. Discharge of the Well/Spring: <p style="text-align: center;"><b>Q = 38.23 lps</b></p>																
11. Prior appropriation:		12. Water available for appropriation: <b>2520.25</b>																	
13. Amount of water applied for (lps): <b>63 lps</b>		14. Amount of Water Recommended for Approval (lps): <b>38.23 lps</b>																	
15. Remarks: (Amount recommended for approval must be equal to either the amount of water available for appropriation, beneficial use requirement, the amount of water applied for or well capacity, whichever is the least.) <p style="text-align: center;"><b>Per evaluation, the capacity of the well is 38.23 lps, hence the same recommended for approval.</b></p>																			
16. <input type="checkbox"/> CPC is required																			
Documents verified and evaluated by: <div style="text-align: center;">   <b>CHARITO M. MENGUITO</b>          Engineer II       </div>																			
Checked by: <div style="text-align: center;">   <b>EVELYN V. AYSON</b>          Head, Evaluation Section       </div>		Submitted by: <div style="text-align: center;">   <b>ATTY. ELEN TOM BAGALHOG</b>          Chief, Water Rights Division       </div>																	



# EAGLE CEMENT CORPORATION

Office Address: 153 Epifanio Delos Santos (EDSA), Mandaluyong City, Philippines 1550  
Plant Address: Barangay Akle, San Ildefonso, Bulacan, Philippines  
Tel. no. : +632 727-49-13 Fax no. : +632 723-92-83 E-mail: ecc@eagle-cement.com.ph

12 February 2014

**MR. VICENTE S. PARAGAS**  
Executive Director  
National Water Resources Board  
8<sup>th</sup> Floor, NIA Building, EDSA  
Diliman, Quezon City



**Subject: Eagle Cement's Drilling Permit PTD 2012-128**

Dear Sir,

We are pleased to inform you that our ECC Deepwell No.2 facility which has an approved Drilling Permit PTD 2012-128 has already been completed last September 2013 that has the following profile and configuration:

Deepwell Casing Diameter = 300 mm

Casing Depth = 90 meters

Pump setting = 63 meters

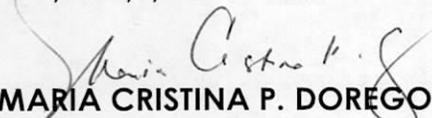
For the installed Submersible pump unit, please find below detailed specification:

Grundfos SP 160 – 2A x 800 gpm x 55 meters TDH x 50 Hp, 60 Hz, S.F.=1.50,  
3-Phase, 440 Volts, with 8x6 riser pipe connector, complete with pump control

We hope you will find the above report acceptable to you.

Thank you very much.

Very truly yours,

  
**MARIA CRISTINA P. DOREGO**  
Executive Assistant

## Deepwell Summary, Constant Discharge Pumping Test Result

### A. Well Data

Well Depth Measured (meter)	90
Well Depth w/ Casing (meter)	90
Size of outer Casing (mm)	400
Size of inner Casing (mm)	300
Casing slot	Slotted

### B. Result of Constant Discharge Pumping Test

Test Duration ( hour)	72.0
Average Test Discharge (gpm)	618.0
Discharge end of test (Q gpm)	606.00
Static Water level (m)	15.40
Pumping water level (m)	18.10
Drawdown (m)	2.70
Specific Capacity (gpm/ft)	69.762

38.13  $\text{L/m}$

14.14  $\text{Lps/m}$

## CONSTANT DISCHARGE PUMPING TEST

WELL NO.:	Deepwell No. 2			Static Water Level :		15.40	meter
LOCATION:	EAGLE CEMENT Brgy. Akle , San Ildefonso, Bulacan			STATUS	New Deepwell		
MOTOR HP	55 HP, Pleuger 5 stages		START OF TEST : April 9, 2013 4:40 pm				
PUMP SETTING (meter)	66		END OF TEST : April 12, 2013 4:40 pm				
PERFORMED BY :	E.T. LUCAS AND SONS DRILLING			DURATION (min) : 4320			
MEASURING POINT (MP) : Above Casing				Casing Dia.	Reducer	Screen Top	
Description of MP			(mag)	(mm)	(mbg)	(mbg)	
Measuring Point			1.25m	300	none		
Date	Hours	Time after start (min)	Water Level (mbMP)	Drawdown (m)	Time to Fill Drum- (sec). (210liters-cap)	Discharge (gpm)	Remarks
4/09/2013	16:40	0	15.40				
	16:41	1	15.92				
	16:42	2	15.95		5.89	565.11	
	16:43	3	15.97				
	16:44	4	15.99				
	16:45	5	16.00				
	16:46	6	16.01		5.45	610.73	
	16:47	7	16.02				
	16:48	8	16.04		5.65	589.12	
	16:49	9	16.06				
	16:50	10	16.07		5.45	610.73	
	16:52	12	16.09				
	16:54	14	16.10		5.86	568.00	
	16:56	16	16.11				
	16:58	18	16.12		5.72	581.91	
	17:00	20	16.16				
	17:05	25	16.18		5.55	599.73	
	17:10	30	16.19				
	17:15	35	16.20		5.67	587.04	
	17:20	40	16.21				
	17:25	45	16.22		5.70	583.95	
	17:30	50	16.23				
	17:35	55	16.24		5.81	572.89	
	17:40	60	16.25				
	17:55	75	16.30		5.65	589.12	
	18:10	90	16.32				
	18:25	105	16.35		5.71	582.92	
	18:40	120	16.38				
	19:10	150	16.40		5.40	616.39	
	19:40	180	16.44				
	20:10	210	16.48		5.33	624.48	
	20:40	240	16.52				
4/09/2013	21:10	270	16.54		5.46	609.62	
	21:40	300	16.57				

## CONSTANT DISCHARGE PUMPING TEST

WELL NO.:	Deepwell No. 2			Static Water Level :		15.40 meter	
LOCATION:	EAGLE CEMENT Brgy. Akle , San Ildefonso, Bulacan			STATUS	New Deepwell		
MOTOR HP	55 HP, Pleuger 5 stages		START OF TEST :		April 9, 2013 4:40 pm		
PUMP SETTING (meter)	66		END OF TEST :		April 12, 2013 4:40 pm		
PERFORMED BY :				DURATION / STEP (min) :			
MEASURING POINT (MP) : Above Casing				Casing Dia.	Reducer	Screen Top	
Description of MP			(mag)	(mm)	(mbg)	(mbg)	
Measuring Point			1.25m	300	none		
Date	Hours	Time after start (min)	Water Level (mbMP)	Drawdown (m)	Time to Fill Drum- (sec). (210liters-cap)	Discharge (gpm)	Remarks
4/09/2013	22:40	360	16.62		5.26	632.79	
	23:40	420	16.66		5.29	629.21	
4/10/2013	0:40	480	16.69		5.50	605.18	
	1:40	540	16.73		5.46	609.62	
	2:40	600	16.75		5.59	595.44	
	3:40	660	16.77		5.48	607.39	
	4:40	720	16.78		5.50	605.18	
	5:40	780	16.80		5.54	600.81	
	6:40	840	16.83		5.32	625.66	
	7:40	900	16.85		5.67	587.04	
	8:40	960	16.88		5.45	610.73	
	9:40	1020	16.91		5.49	606.28	
	10:40	1080	17.12		5.58	596.51	Deepwell No. 1 is running
	11:40	1140	17.13		5.46	609.62	
	12:40	1200	17.13		5.32	625.66	
	13:40	1260	17.15		5.41	615.25	
	14:40	1320	17.15		5.20	640.10	
	15:40	1380	17.16		5.45	610.73	
4/10/2013	16:40	<b>1440</b>	17.40		5.52	602.99	24 hours (Open #2)
	17:40	1500	17.28		5.33	624.48	Deepwell No. 1 is off
	18:40	1560	17.30		5.35	622.15	
	19:40	1620	17.53		5.47	608.50	Deepwell No. 1 is running
	20:40	1680	17.40		5.28	630.40	Deepwell No. 1 is off
	21:40	1740	17.40		5.34	623.31	
	22:40	<b>1800</b>	17.41		5.20	640.10	
	23:40	1860	17.42		5.52	602.99	
4/11/2013	0:40	1920	17.42		5.40	616.39	
	1:40	1980	17.43		5.31	626.84	
	2:40	2040	17.43		5.26	632.79	
	3:40	2100	17.44		5.41	615.25	
	4:40	<b>2160</b>	17.45		5.28	630.40	36 hours
	5:40	2220	17.47		5.25	634.00	
	6:40	2280	17.48		5.36	620.99	
4/11/2013	7:40	2340	17.48		5.50	605.18	

## CONSTANT DISCHARGE PUMPING TEST

WELL NO.:	Deepwell No. 2			Static Water Level :	15.40	meter	
LOCATION:	EAGLE CEMENT Brgy. Akle , San Ildefonso, Bulacan			STATUS	New Deepwell		
MOTOR HP	55 HP, Pleuger 5 stages		START OF TEST : April 9, 2013 4:40 pm				
PUMP SETTING (meter)	66		END OF TEST : April 12, 2013 4:40 pm				
PERFORMED BY :	E.T. LUCAS AND SONS DRILLING			DURATION (min) : 4320			
MEASURING POINT (MP) : Above casing				Casing Dia.	Reducer	Screen Top	
Description of MP			(mag)	(mamsl)	(mm)	(mbg)	
Measuring Point			1.25		300	none	
Date	Hours	Time after start (min)	Water Level (mbMP)	Drawdown (m)	Time to Fill Drum- (sec). (200liters-cap)	Discharge (gpm)	Remarks
4/11/2013	8:40	2400	17.50		5.59	595.44	
	9:40	2460	17.53		5.51	604.08	
	10:40	2520	17.67		5.67	587.04	Deepwell No. 1 is running
	11:40	2580	17.53		5.41	615.25	Deepwell No. 1 is off
	12:40	2640	17.58		5.20	640.10	
	13:40	2700	17.58		5.19	641.33	
	14:40	2760	17.58		5.23	636.42	
	15:40	2820	17.59		5.27	631.59	
4/11/2013	16:40	2880	17.59		5.32	625.66	48 hour
	17:40	2940	17.59		5.29	629.21	
	18:40	3000	17.83		5.36	620.99	Deepwell No. 1 is running
	19:40	3060	17.74		5.45	610.73	Deepwell No. 1 is off
	20:40	3120	17.75		5.52	602.99	
	21:40	3180	17.75		5.28	630.40	
	22:40	3240	17.76		5.30	628.02	
	23:40	3300	17.76		5.47	608.50	
4/12/2013	0:40	3360	17.76		5.41	615.25	
	1:40	3420	17.77		5.37	619.83	
	2:40	3480	17.77		5.26	632.79	
	3:40	3540	17.78		5.35	622.15	
	4:40	3600	17.78		5.29	629.21	
	5:40	3660	17.78		5.21	638.87	
	6:40	3720	17.78		5.39	617.53	
	7:40	3780	17.79		5.36	620.99	
	8:40	3840	17.95		5.42	614.11	Deepwell No. 1 is running
	9:40	3900	17.80		5.38	618.68	Deepwell No. 1 is off
	10:40	3960	17.80		5.26	632.79	
	11:40	4020	17.80		5.31	626.84	
12:40	4080	17.81		5.46	609.62		
13:40	4140	17.81		5.55	599.73		
14:40	4200	17.97		5.29	629.21	Deepwell No. 1 is running	
15:40	4260	18.91		5.72	581.91	Deepwell No. 1 is running	
4/12/2013	16:40	4320	18.10		5.49	606.28	72 hours (Open)
							Deepwell No. 1 is running

**RECOVERY TEST DATA**

WELL NO.:	Deepwell No. 2			Static Water Level :	15.40 meter	
LOCATION:	EAGLE CEMENT Akle , San Ildefonso, Bulacan		Brgy.	STATUS	New Deepwell	
MOTOR HP	55 HP, Pleuger 5 stages		START OF TEST :		April 12, 2013 16:40 pm	
PUMP SETTING (meter)	66		END OF TEST :		April 12, 2013 16:40 pm	
PERFORMED BY :	E.T. LUCAS AND SONS DRILLING			DURATION (min) :		
MEASURING POINT (MP) : Above Casing				Casing Dia.	Reducer	Screen Top (mbg)
Description of MP		(mag)		(mm)	(mbg)	
Measuring Point		1.25m		200	none	
Date	Hours	Time after start (min)	Water Level (mbMP)			
4/12/2013	16:40	0	18.10			
	16:41	1	17.50			
	16:42	2	17.46			
	16:43	3	17.45			
	16:44	4	17.42			
	16:45	5	17.39			
	16:46	6	17.37			
	16:47	7	17.36			
	16:48	8	17.35			
	16:49	9	17.33			
	16:50	10	17.32			
	16:52	12	17.31			
	16:54	14	17.29			
	16:56	16	17.26			
	16:58	18	17.24			
	17:00	20	17.23			
	17:05	25	17.18			
	17:10	30	17.16			
	17:15	35	17.13			
	17:20	40	17.11			
	17:25	45	17.09			
	17:30	50	17.08			
	17:35	55	17.07			
	17:40	60	17.00			
	17:55	75	16.96			
	18:10	90	16.90			
	18:25	105	16.84			
	18:40	120	16.81			
	19:10	150	16.79			
	19:40	180	16.77			
	20:10	210	16.73			
	20:40	240	16.72			
	21:10	270	16.69			
	21:40	300	16.67			
	22:40	360	16.65			
	23:40	420	16.62			
	0:40	480	16.59			Deepwell No. 1 is running

Submitted by:

**E. T. LUCAS AND SONS DRILLING & CONRTACTOR CORPORATION**

**Recommended Pump and Motor:**

Static Water Level – 15.40 m  
Pumping Water Level – 17.97 m  
Test Discharge – 140.45 cum/hr / 39.01 lps  
Drawdown – 2.57 m  
Specific Capacity – 54.65 cum/hr/m  
Pump Setting – 66 m  
Well Casing Diameter – 300 mm

**Pipeline from well 2 to cistern – 150 mm**

Pipeline Length – 161.00 m  
Water Level Elevation at Cistern – 101.50 masl  
Water level in Deepwell 2 during pumping – 70.27 masl

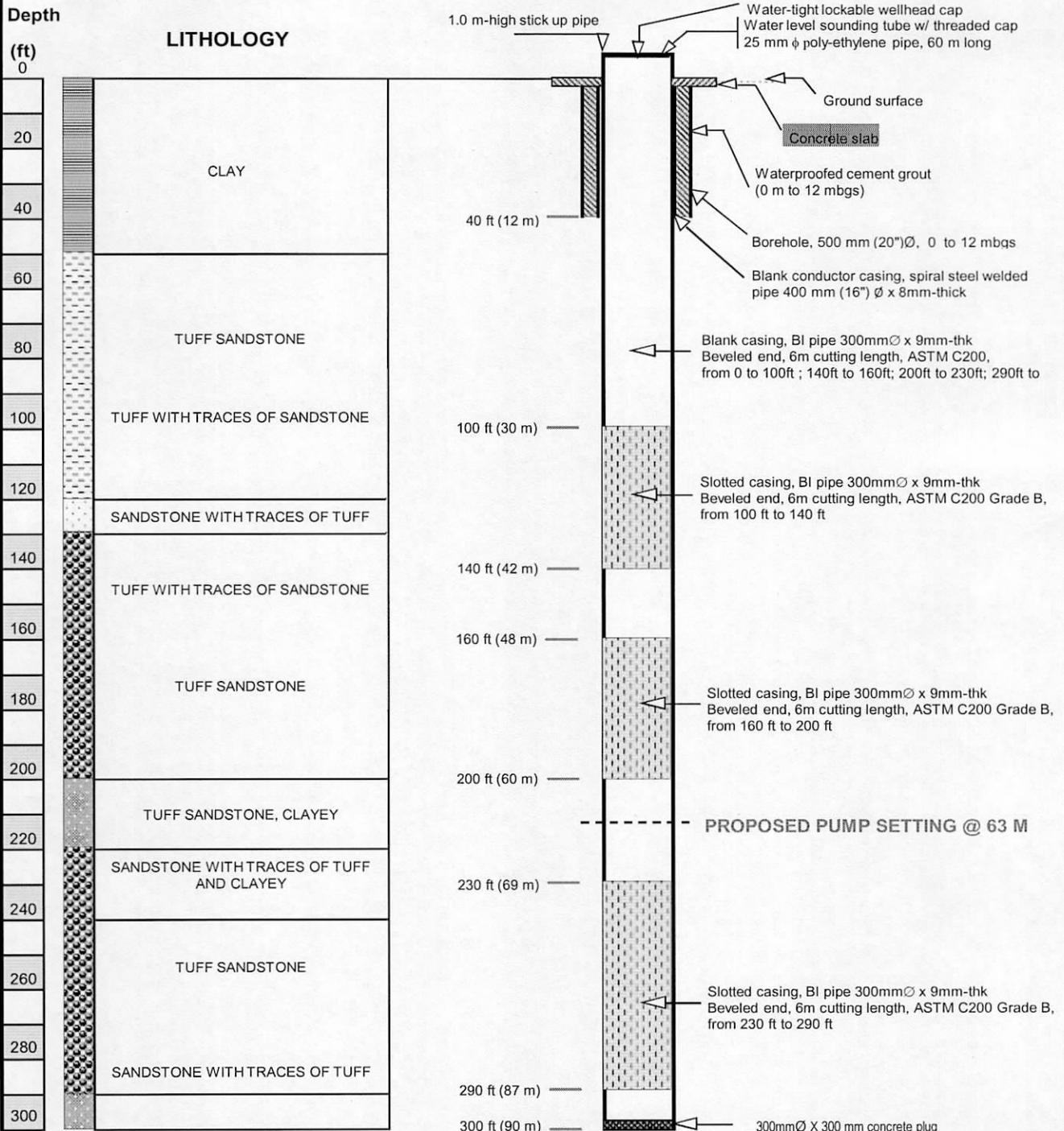
**Riser Pipe Diameter and length – 150 mm x 6 m x 11 pcs**

Total Dynamic Head for 6 inches pipe  
Line Losses – 12.89 m  
Static Elevation - 31.23 m  
Riser Pipe Losses - 5.28 m  
TDH - 49.40 m + 10% allowance = 54.34 m say 55 meters

Recommended Pump and submersible motors:

**Grundfos SP 160 – 2 A x 800 gpm x 55 meters TDH x 50 hp  
60 Hz, S.F. 1.15, three phase, 440 V, with 8x6 riser pipe connector, complete  
with pump control and protection**

# EAGLE CEMENT CORPORATION



Project Title:	<b>DRILLING OF DEEPWELL NO. 2</b>	Figure Title:	<b>FINAL WELL DESIGN</b>	Attachment No:
Client :	EAGLE CEMENT CORPORATION	Digitized/Drawn by/Date:	mdp/10.12	Noted/Date:
			rpa/10.12	Revision No./Date: