DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-53	SHEET No. 1 OF 2

1. PROJECT: HELSTF Groundwater Study (TO7)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number): HMW-53	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER: Tierra John Findley	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE: [X] Vertical [ ] Inclined ____ Degrees from Vertical	16. DATE HOLE: 9-15-06 — STARTED: 0853 — COMPLETED: 9-15-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE: 45' — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR: Barry T. Dan

ELEVATION a	DEPTH b (ft)	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	2.5			No Recovery		
	5					used vacuum extractor 6ft down To check Utilities
	7.5					
	10		ML-Silt w/VF Sand Made up of Gypsum, White N9 Friable, poorly Sorted	100%		50 Blow counts slightly moist
	12.5					Drillers saw a lot water coming up at 12 ft
	15		ML-Silt w/Minor VF Sand (Gypsum) Low placisity (Soft, malleable) yellowish gray (5Y 8/1)	10%		32 Blow count remides me (J.D) of Rock floor
	17.5					
	20		9 In ML-Silt w/VF Sand, minor clay, Rest 14 in SW-SM well graded sand w/silt, med to fine grain sand poorly Sorted, Pale yellowish brown (10YR 6/2)			50 Blow counts Moist (water b/w grains) Top of Sand layer, at bottom of sand is moist but not as like Top

12 UP

3

U.F. Very Fine

Rock color chart by USGS

could see Break from Gypsum To Sand layer

DRILLING LOG (Continuation Sheet)

INSTALLATION	HOLE No.	SHEET No.
	HMW-53	2 OF 2

1. PROJECT: HELSTF Groundwater Study (TO 7)

11. ELEVATION OF TOP HOLE:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	22.5					
	25		CL-Lean clay w/ VF Sand Hard to Moderate Placisty (Top-Bot) Gypsum X-salt. Scatter Thur core Light Brown (5YR 5/6)	60%		25 Blow count
	27.5					
	30		CL-Lean clay w/ VF Sand Scatter, common Gypsum X-stal Moderate Placisty, Moderate brown (5YR 4/4)	90%		29 Blow counts Dry
	32.5					
	35		CL-Lean clay w/ Very F Sand For 1st Foot. 2nd Ft has more sand, (T) Moderate to low (B) placisity - ~~Sand~~ Clayey Sand Near Bottom, Scatter, fewer Gypsum X-stals. Moderate yellowish brown (10YR 5/4)	100%		20 Blow counts Become more sandier Downward Gypsum becoming less Dry
	37.5					
	40		CL-Lean clay VF Sand, Zones of Gypsum, Moderate to Hard Placisity, Light Brown (5YR 5/6)	100%		23 Blow count Dry
	42.5					
	45		~~Drilling down to 45 ft Set Sump~~ JD CL-Lean clay w/ Sand (VF) Zones Gypsum, Zones Sand (Lens) Moderate To Hard placisity Moderate yellowish brown (10YR 5/4)	95%		More sand, but is still a clay, Sand Increasing Little moist
	47.5					
	50		TD of well 45 feet.			
	52.5					
	55					

WL at DRW 7/8/11

Screen

DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-54	SHEET No. 1 OF 3

1. PROJECT HELSTF Groundwater Study	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL CME-75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number) HMW-54	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER Tierra John Findley	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE [X] Vertical [ ] Inclined _____ Degrees from Vertical	16. DATE HOLE — STARTED — COMPLETED 11-25-06 — 11-27-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE 83' — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR Bruce T. Dan

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significent) g
	0					Vacuum Excavation Down to 6ft bgs to chek for utilities
	5		No Recovery			
	10		ML-Gypsum silt, yellowish gray (5Y 8/1)	80%		41 Blow Counts Dry
	15		ML-Silt Gypsum w/ Diesel - yellowish gray (5Y 8/1) Bottom 8in - SW-SC - Gypsum Sand w/ little Clay; Middle - Dusky yellow 5Y 6/4 Bottom; Middle - Bluish gray (5B 7/1)	100%		13 Feet - Diesel smelled In cuttings, - Light Bluish gray (5B 7/1); 33 Blow Counts 0.2 VOC - Dry Top Middle - Moist w/ Diesel To Bottom
	20		Top 5in - ML - Bluish gray (5B 7/1) Gypsum Silt; Rest: CL-Lean clay, Light brown (5YR 5/6) w/ (Sand (Fine)) Zoned Gypsum 5 7/1	100%		18 Blow Counts wet Diesel, Top 3in Clay Sandy, Small gas sauny ~~downward~~

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-54	SHEET No. 2 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	25		Interbedded Clay & Sand Top 8in - CL-Lean clay w/silt - Blue Sand or Towards middle SW-SC - Med grained Sand RTN to CL w/Sand Increase Sand downward Moderate yellowish brown (10YR 5/4) Low to No Placisty	100%		27 Blow Count Diesel Smell Dry to moist
	30		SW-SC - well graded w/ clay & silt - Minor (Fine to VF) Pale yellowish brown (10YR 6/2) Bottom: SP - poorly graded Sand Moderate yellowish brown (10YR 5/4) No silt, Fine to VF grained	85%		50 Blow Counts Top 1ft - Diesel Bottom 1ft - Slight smell Top - wet Bottom moist
	35		CL-Lean clay w/Sand & Silt For the Top 10 in - w/ Gypsum X-stals & silt (Gypsum ML) outer Ring color yellowish gray (5Y 8/1) Inter Ring moderate yellowish brown (10YR 5/4) Rest core: SP - poorly graded, Med Sand, No silt - (10YR 5/4)	70%		56 Blow counts Faint Diesel Smell Sand - moist
	40		SW-SM-SC - well graded Sand - Med Size w/silt & Clay, Minor Moderate yellowish brown (10YR 5/4) 1st Foot 2nd Foot - CL-Lean clay w/ Fine Sand Low placisty, Moderate brown (5YR 4/4) Silt in Sand is localized Top 3 inch, Sand becomes more poorly graded downward (Less Fines) Sorting Improves	70%		34 Blow Counts Clay - Dry Sand - moist
	45		Top 3in - SP - Med grained Sand, Bottom of Sand Zoned Gypsum, Rest CL - Lean clay w/ Fine Sand; Sand - moderate yellowish brown, clay - light brown (5YR 5/6)	80%		33 Blow Counts clay - Dry Sand - wet w/ Diesel odor - could be water from above
	50		SP - Med to Fine grain moderate yellowish brown (10YR 5/4); Fairly well sorted No silt or Fines.	100%		36 Blow Counts Moisture - water b/w grains
	55		Top 1ft - SW - SM - Fine grain Sand w/ Minor Clay (SC) Near Bottom of 1ft grades Into CH - Fat clay, hard, Black organic Sand - moderate yellowish brown - (10YR 5/4) Clay - Light Brown (5YR 5/6	100%		15 Blow Counts Sand - wet to moist

43'
LP

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-54	SHEET No. 3 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	60		SP - Med grained sand moderate yellowish brown (10YR 5/4), saw no fines	100%		24 Blow cont Sand wet to moist (Top to Bottom)
	65		SP - Fine to VF grained sand, moderate yellowish brown (10YR 5/4)	90% ~~80%~~		14 Blow Counts wet
	70		SP - Fine to VF grained sand, moderate yellowish brown (10YR 5/4), Bottom 6 In CL-lean clay w/ Fine Sand, Intrabed Lime Sand Layer, Light Brown (5YR 6/4	100%		Heaving Sands 24 Blow Counts Sand - moist Clay Dry
	75		SP - Fine to very Fine sand moderate yellowish brown (10YR 5/4)	70%		19 Blow Counts wet
	80					
	85		Hit water pipe @ 8 ft Plan to set well at 83 ft			

DTW - 72
TD ~~84~~? 83

DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-55	SHEET No. 1 OF 3

1. PROJECT: HELSTF Groundwater Study	11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
2. LOCATION (Coordinates or Station):	12. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
3. DRILLING AGENCY:	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
4. HOLE No. (As shown on drawing title and file number): HMW-55	14. TOTAL NUMBER CORE BOXES:
5. NAME OF DRILLER: Tierra Rene Sosa	15. ELEVATION GROUND WATER:
6. DIRECTION OF HOLE: [X] Vertical [ ] Inclined _____ Degrees from Vertical	16. DATE HOLE — STARTED: — COMPLETED: 9-25-06 — 9-27-06
7. THICKNESS OF OVERBURDEN:	17. ELEVATION TOP OF HOLE:
8. DEPTH DRILLED INTO ROCK:	18. TOTAL CORE RECOVERY FOR BORING:
9. TOTAL DEPTH OF HOLE: 82' — 10. SIZE AND TYPE OF BIT:	19. SIGNATURE OF INSPECTOR: Bryt. Dan

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0					
			No Recovery			Vacuum excavation Down to 6 ft bgs to check for utilities
	5					
	10		ML Silt w/Sand v.fine grained - composed of gypsum N9 white - has iron staining - rust color mottled	70%		18 blow counts
	15		ML silt w/sand - composed of gyp v. fine gr. sand N9 white has rust staining / mottling	75%		54 blow counts moist ≈ 15.5' dry at bottom Driller noted wet at 17 ft.
	20		CL Lean clay w/ Sand fine to med. gr. abundant gyp. crystals Lt. brown 5YR 6/4 — less sand at bottom	75%		13 blow counts ~~[illegible]~~ wet

UP

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-55	SHEET No. 2 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significent) g
						UP
	25		6"- CL lean clay w/silt Low Plasticity Lt brown 5YR6/4	50%		25 blow counts
			3"- SW- well graded sand - Fine to med. poorly sorted			Dry
			CL lean clay - low to mod plasticity Lt Brown - 5YR 5/6			
	30		CL Lean clay w/silt+sand v.fine grained - low to mod plasticity Lt brown 5YR 6/4	70%		14 blow counts Dry
	35		CL Sandy lean clay Low plasticity fine grained sand in clay Lt brown 5YR 6/4 less sand - plasticity - low - mod.	50%		22 blow counts dry
	40		CH Fat Clay - mod plasticity Lt brown 5YR 5/6			
			CL Sandy lean clay - fine grained sand to clayey sand - no plasticity			
	45		CL Sandy Lean clay - fine to med grained - low plasticity	75%		29 blow counts - wet
			SW - well graded sand - fine to med.			
			CL Sandy lean clay		Lt brown 5YR 6/4	LP
	50		CL Lean clay ~~CH Fat clay~~ low-mod plasticity Lt Brown 5YR 6/4 - Soft	90%		25 blow counts Dry
			Bottom 6"- CL Sandy Lean clay No plasticity fine gr. sand			
	55		CL Lean clay low-plasticity Pale yellowish brown 10YR 6/2	100%		17 blow counts Dry
			CL lean clay w/silt			

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-55	SHEET No. 3 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	60		SW - Well graded sand fine to med, gr. mostly fine - poorly sorted	100%		Sand - wet 20 blow counts
			Bottom 8" - CL to CH - Lean Clay. no silt - soft - pale yellowish brown 10 YR 6/2			- Clay - dry
	65		CL Silty Lean clay Soft Low plasticity w/minor fine sand	100%		Dry 25 blow Counts
			bottom 3" - CL Sandy Lean clay fine gr. Sand Pale yellowish brown	10 YR 6/2		
	70		CL - Sandy lean clay Med to fine sand, moderate yellowish brown 10YR 5/4, Zones of poorly graded sand (see over Top) SW Low to Moderate plasticity	100%		27 blow Counts Moist - see moist blw grains
	75		SW - well graded sand w/silt SM w/minor clay SC poorly sorted, Med to VF grained moderate yellowish brown (10YR 5/4) seen like more clay at Bottom of core	90%		36 Blow counts wet
	80		CH - Fat clay Top 5 in Hi - Mod Plasticity Minor silt, ~~next 12 inches, [illegible]~~ Mod brown 5YR 4/4, next 12 in SW-SC gypsum sand w/clay yellowish gray (5Y 7/2) well graded w/ Sand & clay - Little or no plasticity Bottom, CH w/ Sand Hi to Mod Plasticity, Moderate brown 5YR 4/4 - Gypsum Large pistol Found at Top	100%		27 Blow count
	85					

69-79

DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-56	SHEET No. 1 OF 3

1. PROJECT HELSTF Groundwater Study	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL CME-75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number) HMW-56	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER Tierra Rene Sosa	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE [X] Vertical [ ] Inclined _____ Degrees from Vertical	16. DATE HOLE — STARTED — COMPLETED 9-20-06 — 9-21-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE 83.5 — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR Barry T. Dair

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0					Vacuum excavion
	5		No Recovery			
	10		ML Silt - Gypsum N9 white	60%		Hit Refusal after ≈ 1' depth Dry
	15		Top 6" ML - Gypsilt Grades to SM Silty Sand fine to med. grained w/ gyp crystals throughout becomes clayey at bottom.			Dry
	20		Top 3" - ML Gypsum silt N9 white w/ minor sand. CL lean clay Low plasticity Gyp crystals throughout	80% 5YR 4/4 Moderate brown		15 blow counts fine to med. Dry.

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-56	SHEET No. 2 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significent) g
	25		CL Sandy Lean Clay Gypsum crystals throughout Moderate brown 5YR 4/4 Low to No plasticity soft			30 blow counts Dry
	30		SP - poorly graded Sand fine grained Qtz sand w/ minor silt. Subrounded grains well sorted moderate yellowish brown 10YR 5/4		75%	50 Blow counts Dry
	35		SP - poorly graded Sand fine grained Qtz sand w/minor silt Subrounded grains - mod. well sorted moderate yellowish brown 10YR 5/4		75%	50 Blow Counts Dry
	40		SP Poorly graded Sand w/ silt fine grained sand - minor medium Subrounded grains mod. well sorted moderate yellowish brown 10YR 5/4			37 Blow Counts moist
	45		CH Fat clay w/silt Some gyp crystals at top			
	50		SW - well graded sand ~~[illegible]~~ Top fin Med grained, poorly sorted, Rest is to coarse Cl - Sandy Lean clay, Moderate to high Placisity (holds shape). hard Stiff Light brown (5YR 5/6), Sand is friable		100%	25 Blow count Dry
	55		SP Fine to Med grain sand Poorly graded Sand. Sub Rounded grains, moderate yellowish brown (10YR 5/4) Little or No Fines		100% heavy sands	Sand heaving into hole, driller will drill to Next Interval. Driller will add to drill down

Sample heave up into spoon, wet

55' LP

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-56	SHEET No. 3 OF 3
1. PROJECT HELSTF Groundwater Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	60		1st Foot SP - Poorly graded Sand (well graded, Med to Fine grain. 2nd Ft CH - Fat clay ~~Lean clay~~ JP Medium Placisity to Hi Placisity ~~[illegible]~~ - hard ~~[illegible]~~, Breaks, Hard to form wire, take a lot work to handle Moderate yellowish brown (10yr 5/4)	100%		17 Blow counts pic shows Sand on top of clay wet Sand clay Dry
	62.5					
	65		CL - Lean clay w Fine sand Rare Gypsum x-stal, Med to Low Placisity. clayey sand on top Less sand near the bottom Moderate yellowish brown (10YR 5/4)	70%		18 Blow counts decrease in sand in amt & particle size Dry
	67.5					
	70		CL - Lean clay w/ Fine Sand Moderate to Low placisity (Solf) Light brown (5YR 6/4)	70%		15 Blow counts, mostly Dry, slightly ~~Mot~~ Damp in some areas - more near bottom no visable water
	72.5					
	75		Fat clay CH - w/ minor Fine Sand (lens) & silt hard, Hi Placisity, Rest of core CL - Lean clay w/ Sand Med to Fine grained, Low placisity (Solf),	75%		22 Blow counts Top clay Dry, Bottom clay is Moist. water b/w Sand grains
	77.5					
	80		CL - Lean clay w/ Fine Sand & silt Lg Gypsum x-stal (30 min) Moderate To Low placisity Moderate yellowish brown (10YR 5/4), silt can have a color of dark yellowish orange (10YR 6/6)	45%		27 Blow counts moist to Dry in areas depends on Sent of Sand
	82.5		• 1015 Ream w/ Lg Augers To 84 ft			
	85		TD 83.10 ft			

PTW Reg 71

DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-57	SHEET No. 1 OF 3

1. PROJECT: HELSTE GROUNDWATER STUDY	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number): HMW-57	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER: Tierra Rene Sosa	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE: [X] Vertical [ ] Inclined ____ Degrees from Vertical	16. DATE HOLE: 9-18-06 — STARTED — COMPLETED: 9-19-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE: 84' — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR: Bryan T. Day

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0					Used Vacuum excavator down to 6' to check Utilities.
	5		No Recovery			
	10		ML - Silt w/v. fine sand White (N9) poorly sorted Gypsum sand.			
	15		SW Well graded gypsum Sand SM w/silt SW-SM Yellowish gray 5Y 7/2 v. fine grained			
	20		SW-SM Well graded Sand w/silt - fine to medium gr. sand - poorly sorted - subrounded			

Lt brown 5YR 6/4

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-57	SHEET No. 2 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	25		SW - well graded sand Vfine to med. grained - Qtz. Sand subang to subrounded 10YR 8/2 Very pale orange			
	30		SP-SM - poorly graded sand with silt fine grained sand - Qtz sand Lt brown 5YR 6/4			
	35		SP-SM poorly graded sand w/silt fine grained sand Qtz sand Moderate yellowish brown 10YR 5/4			
	40		No Recovery			
	45		SC Clayey sand V.fine to fine grained sand moderate yellowish brown			- moist - driller noted water in this zone ≈43 - 60
	50		SW - well graded sand w/silt - fine to med. grained well rounded 10YR 5/4 Moderate yellowish brown	100%		25 blow counts wet
	55		SW-SM - well graded sand w/silt - fine to med gr. Clay content increasing downward	100%		20 blow counts moist

43
LP

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-57	SHEET No. 3 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	60		CL lean clay w/ Silt 95% Low plasticity - Light brown 5YR 6/4			23 blow counts dry
	65		CL - Sandy Lean clay 75% No plasticity - Sand fine to med gr. w/silt			53 blow counts
			Bottom 6" - SW - well graded Sand			
	70		SW - fine to med. grained well graded Sand - minor silt - moderate yellowish brown 10YR 5/4			>50 blow counts - refusal - Moist to dry
	75		SW - fine to med gr. Sand well graded Sand 80% Subrounded to rounded			38 blow counts - wet - Sand
			Bottom 6" - CH Fat clay - dry Moderate plasticity Little silt. 10R 5/4 Pale reddish brown			
	80		CH Fat Clay - Low to mod plasticity 75% no silt. Soft clay 10R 5/4 Pale reddish brown			17 blow counts Dry
			TD -			

DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-58	SHEET No. 1 OF 3

1. PROJECT: HELSTF Groundwater	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number): HMW-58	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER: Tierra John Findley	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE: [X] Vertical [ ] Inclined ____ Degrees from Vertical	16. DATE HOLE: 9-12-06 — STARTED: 1330 — COMPLETED: 9-14-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE: 84' — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR: Benj T. Davis

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significent) g
	2.5			No Recovery		Used Vaccum extractor 6ft down To check Utilities
	5					
	7.5			No Recovery		
	10		ML v.fine -silt w/Sand (Gypsum) White (N9), Poorly sorted ~~gravel~~ TO ~~well sorted~~ (Friable)	65%		
	12.5					
	15		SW - Well graded sand (Gypsum) SM - w/Silt yellowish gray (5Y 8/1) Poorly sorted, Med to V.F. Grained Sand. Made up mostly Gypsum			
	17.5					
	20		CL - Lean clay w/common Gypsum X-stals, w/ Fine grained Sand. Zones of Gypsum Layers Top 3inch (Moderate yellow brown 10YR 5/4, Rest of core sample is Moderate brown (5YR 4/4) Moderate Plasticity (To Low	100%		Sandy at Top 3inch ~~[illegible]~~ Increase dam and To middle. Last 3inch Less Sand.

Using Rock color chart - USGS

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-58	SHEET No. 2 OF 3
1. PROJECT HELSTF Groundwater (To=7)	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significent) g
	22.5					
	25		CL - Leanclay, Zones of Gypsum, very soft & mallable - Top ~~3 inch~~ 5D 6 Inches Low Placisity, Modera brown (5YR 4/4) - High placisity Rest of core (Hard, Stiff) CH - Fat clay (Rest of CH	90%		Very Low X-stal of Gypsum In Zones
	27.5					
	30		CL - Leanclay w/silt & Sand - 1st Ft Zones of Gypsum (decreasing) Low Placisity, Bottom 1 Ft ~~SP~~, Hi Placisity (hard, stiff) Moderate Brown (5YR 4/4) Sand partial Fine grained	100%		moist inside core Low Placity - soft, mallable Sand throughout core, but ~~it~~ Lot found in 1st Foot It does not hold it shape Like 2nd Ft does
	32.5					
	35		CL - Leanclay w/ Little Sand/silt, Zones of Gypsum, Hi placisity - Stiff hard, hold shape, See more sand at Bottom 4 in. Moderate Brown (5YR 4/4), Sand is Fine graded.	100%		Dry, Little Damp ~~Moist~~ (Driller see) (water), but it ~~[illegible]~~ 5D Dry inside core
	37.5					
	40		CH - Fat clay, Zones of Gypsum, High Placisity (hard, stiff) Moderate Brown (5YR 4/4) Breaks along Gypsum Zones	100% 5D		Moist - Driller hear water at Bottom of auger Gypsum decreasing
9/12	42.5					
	45		CL - Leanclay w/Sand & Gypsum X-stal (Thru out core) Sand is fine graded	100%		25 Blow counts Cutting are muddy Dry in middle core Gypsum decreasing.
9/13	47.5		CH - Fat clay w/ minor silt (6 Inches) at Bottom of core Light brown (5YR 5/6) Moderate Placisity (hard, but Some areas are Soft)			
	50		CL - Leanclay w/ Minor Sand Bottom 1 inch or 2, SW - SM Sand w/silt, Well grained, Med to v. fine graded, poorly Sorted, Light Brown (5YR 5/6) very Low Placisity	100%		23 Blow counts Moist in middle of core 5D ~~[illegible]~~ Sand increases downward few Gypsum X-stals
	52.5					
	55		CL - Lean clay w/ Sand Bottom 4 in is more Sand, Sandy Lean clay, Light Brown (5YR 5/6) Low to None Placisity (Top to bottom)	100%		27 Blow counts Moist in core (middle) Sand increases downward

37 LP

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-58	SHEET No. 3 OF 3
1. PROJECT HELSTF Groundwater (TO#7)	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	57.5					
	60		CL-Lean clay w/ minor sand & silt Moderate Placicity, Silt Increases downward, Light brown (5YR 6/4) Fine to very Fine grained sand.	100%		17 blow counts we believe the sand & thes clay are more like Sand Zones (Lens) very thin (Ribbions) Less Than an Inch. Dry in middle of core
	62.5					
	65		SW-SC - Well graded Sand & Silt w/clay, Med to Fine grained Poorly sorted Zones of core where Ratio clay is Higher. (Lens of clay). 1 inch or so in Middle of core (1 ft) Light Brown (5YR 5/6)	90%		50 Blow counts Moist in center of core
	67.5					
	70		SW - Well graded Sand Lens of clay at the Bottom (SC) Poorly sorted, Med to fine grained There a rust color to the Sand. There are layers of pale yellowish brown (10YR 6/2) + Dark yellowish orange (10YR 6/6) →	50%		Moist at Top of core wet at Bottom of core visible water b/w grains Sometime these color are mixing together.
	72.5					
	75		SW-SC well graded Sand w/clay (Silt too), Med to very fine grain Sand, Sandy clay, Low to none Placicity, Poorly sorted. Moderate yellowish brown (10YR 5/4) (holes it form, very soft, Frihrate in some areas.	100%		14 Blow counts water b/w sand grains
	77.5					
	80					
	82.5		Sand w/Clay	No recovery		
	85		TD 84'			

64

Screen

77

DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-59	SHEET No. 1 OF 3

1. PROJECT HELSTF Groundwater Study	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL CME-75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number) HMW-59	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER Tierra John Findley	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE [X] Vertical [ ] Inclined ____ Degrees from Vertical	16. DATE HOLE 9-28-06 — STARTED — COMPLETED 10-2-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE 83' — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR [signature]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significent) g
	0					Vacuum excavation to 6 ft bgs to Check for Utilities
	5		No Recovery			
	10		ML-silty Sand yellowish gray 5Y 8/1 Fine to med	40%		over 50 Blow counts Hit Refusal Dry
	15		ML-Silty Sand yellowish gray 5Y 8/1 & Rare case grayish 10YR 7/4 Fine to med grained	100%		27 Blowcount
	20		CL-Lean clay w/sand (Fine to med) common & scattered thru out w/Gypsum X-stals. Low Plasticity yellowish gray 5Y 7/2	100%		16 Blow counts Slightly moist

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-59	SHEET No. 2 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significent) g
	25		CL - Lean clay w/Sand Low to Moderate Plasticity Dusky yellow 5 Y6/4, Rest of core	100%		20 Blow count Dry
			SC - Clayey Sand - Sand is Gypsum Similar to Tape very Fine to Med grained ~~Yellow fish~~			
	30		SP - Poorly Graded Sand Mostly Fine Sand w/some Med grains, well sorted (mostly some particle sin Pale yellowish brown (10YR 6/2)	90%		Over 50 Blow counts Hit Refusal Dry
	35		CL - Lean clay w/Sand Gypsum throughout Light brown (5YR 5/6) Some Gypsum zone in Layers	100%		45 Blow counts Dry
	40		CL - Lean clay w/Sand. Mod - Low Plasticity Zoned Gypsum near middle 6 in CH - Fat clay Moderate Brown 5YR 4/4 Moderate to Hi Plasticity Sand - Fine to Med grained.	100%		40 Blow counts Dry So far, no upper perch water zone
	45		CL - Lean clay, Low to Moderate Plasticity. Zones of Sand & Gypsum CH - Fat clay - makes up rest of core Moderate brown 5YR 4/4 Sand Rare - Med to fine grained Moderate yellowish brown (10YR 5/4)	100%		35 Blow counts Dry
	50		CL - Lean clay w/Sand Gypsum x-stat throughout Light brown 5YR 5/6 Fine to Med grained Sand	100%		30 Blow counts Dry
	55		CL - Lean clay w/Minor silt & Zones of Gypsum Sand Low Plasticity to none (Friable, hard) Light brown 5YR 5/6	90%		26 Blow counts Dry

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-59	SHEET No. 3 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	60		SP-poorly graded Sand, Fine to med grained, well-sorted Top half Dark yellowish brown (10YR4/2)	50%		44 Blow counts Dry
			SW-SC end half, well graded Sand w/ clay, poorly sorted. Fine grained, silt + clay moderate yellowish brown (10YR5/4)			
	65		CL- Lean clay w/ Sand Fine sand & minor silt moderate yellowish brown (10YR5/4) Sandier at Top and becomes more clay near Bottom	100%		30 Blow counts may be Slightly moist Feels cool
OMW wells DTW 69'	70		CL- Lean clay w/ sand & silt Top foot moderate brown 5YR4/4 Bottom foot yellowish gray 5Y7/2	100%		23 Blow counts Zones of moister wet zones are sandier areas
	75		SW-SC- Well graded Sand w/ clay (lot of clay but more Sand) Moderate brown 5YR4/4 Poorly Sorted, Fine (mostly) to med. grained	less%		visable water on Sand grains - wet enough clay to hold form a ribbon, but it breaks soon after.
83	80		TD=83			
	85					Regional ONLY

DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-60	SHEET No. 1 OF 3

1. PROJECT: HELSTF GW Study	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number): HMW-60	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER: Tierra John Findley	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE: [X] Vertical [ ] Inclined ____ Degrees from Vertical	16. DATE HOLE: 10-6-06 — STARTED: 1500 — COMPLETED: 10-10-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE: 83 ft — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR: Brian T. Dan

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		No Recovery			Vacuum excavation
	5		ML - Gypsum silt N9 White	60%		60 blow counts Dry
	10		SW - well graded sand w/ silt (SM), coarse to silt size particles - ~~coarse~~ Made up (Gypsum) mostly, yellowish gray 5Y 8/1 Poorly sorted	90%		47 Blowcounts Dry
	15		SW - SC well graded sand w/ clay Modelled - 8 Inch CH - Fat clay, Lower Plasticity Root is Large 2 oved area made up Gypsum x-stals Sand - yellowish gray 5Y 8/1 clay - Light Brown 5YR 5/6	100%		27 Blowcounts Dry
	20		CL - Lean clay w/ VF sand Scattered Gypsum x-stals Thru-out Sand Increase Towards Bottom Lost Est (1 Ft) SW - SM Well graded Sand w/ silt. VF gravel Sand, Poorly sorted - Light brown 5YR 5/6	80%		52 Blowcounts Dry

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-60	SHEET No. 2 OF 3
1. PROJECT HELSTF Groundwater Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	25		SW-SM - well graded Sand, N/silt, VF Grained poorly sorted, grayish orange 10YR 7/4	90%		50 Blow counts Dry
	30		Top 5 inch - SW-SM well graded Sand w/silt, VF Grained, poorly sorted Next 12 inch - CL - Lean clay w/ VF Sand, No plasticity breaks apart easily, Rest is SW-SM Sand again (Interbedded Sand & clay) Moderate yellowish brown 10YR 5/4	100%		52 Blow counts Dry Zoned, but Few Gypsum x-stals
	35		CL - Lean clay w/Sand (VF grain) Sand becomes less downward Zoned Gypsum x-stals Near top Become Fewer near bottom Plasticity Increased downward From no plasticity To Low. Moderate yellowish brown 10YR 5/4 on Top to gradual Light brown 5YR 5/6	100%		35 Blow counts Dry
	40		CL - Lean clay w/Sand (VF) Zoned & scattered Gypsum Few downward in core, Low plasticity. Light brown 5YR 5/6	100%		23 Blow counts Dry
	45		Top 4 in - CL - Lean clay w/Sand Rest - SW-SM, Very Fine grain sand w/ Minor silt, Poorly Sorted (well graded), clay - moderate brown 5YR 4/4 Sand - Moderate yellowish brown 10YR 5/4	60%		36 Blow Counts
	50		SP - Poorly graded Sand VF grained, well sorted No silt, Sub-Rounded. Moderate yellowish brown (10YR 5/4)	50%		64 Blow counts Dry
	55		SP - Poorly graded sand VF grained, well sorted No silt, sub Rounded Moderate yellowish brown 10YR 5/4	50%		38 Blow counts Wet

54' LP

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-60	SHEET No. 3 OF 3
1. PROJECT HELSTF Groundwater Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	60		Top 6 In - SP - Poorly graded Sand - Similar to above sample Rest - CL - Lean clay w/ sand - VF Sand decreases downward - Moderate yellowish brown (10YR 5/4)	80%		19 Blow counts Wet - Sand Moist to Dry in clay
	65		SP - Poorly graded Sand No silt, VF grained, well sorted, Moderate yellowish brown 10YR 5/4	50%		38 Blow counts Slightly moist - Bottom Dry
	70		SP - Poorly graded Sand No silt, VF grained, well sorted, Rest color to same grain - Banded Moderate yellowish brown (10YR 5/4)	50%		49 Blow counts Moist
	75		SP - Poorly graded Sand, No silt, Bottom 1 inch, 5mm width zoned Gypsum, above Gypsum Sand is VF grained, below Gypsum Med to Fine grained. Moderate yellow brown (10YR 5/4)	50%		over 50 Blow counts Hit Refusal Wet
	80					
	85		Plan to set well at 83 feet			

LP

62

68-78

DTW-70,71

83

End Thur - until 10

DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-61	SHEET No. 1 OF 3

1. PROJECT: HELSTF Ground water Study	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number): HMW-61	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER: Tierra John Findley	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE: [X] Vertical [ ] Inclined ____ Degrees from Vertical	16. DATE HOLE: 10-5-06 — STARTED — COMPLETED: 10-6-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE: 83' — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR: Brodey T. Dan

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0					Vacuum excavator 6' down
	5		ML- Gypsum silt Yellowish gray 5Y 8/1	70%		41 Blow counts Dry
	10		ML- Gypsum silt w/ Clay (2 mm) Clay - yellowish gray 5Y 7/2 Silt - N9 white	80%		41 Blow counts Dry
	15		ML- Gypsum Silt w/ minor clay Yellowish gray 5Y 8/1	80%		29 Blow counts Dry
	20		ML- Gypsum Silt w/ minor clay - moderate yellowish brown (10YR 5/4 grades into a ≈1 ft CL- Sandy lean clay, VFine Sand & silt, Scatter Thru-out Lg Gypsum X-stals - Light brown 5YR 5/6	100%		39 Blow counts Dry

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-61	SHEET No. 2 OF 3
1. PROJECT HELSTF Ground Water Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	25		CL-Lean clay w/silt, Moderate brown 5YR 4/4 Scattered Gypsum Thruout	100%		34 Blow count Dry Gypsum clay
	30		CL-Lean clay w/VF Sand Scattered Gypsum Thru-out core Light brown 5YR 5/6	100%		41 Blow Counts Less Gypsum than above core
	35		SP-poorly graded Sand, Fine to VF grained, very pale orange 10YR 8/2	50%		48 Blow counts Dry Featurless
	40		SP-poorly graded Sand, Fine to VF grained grayish orange 10YR 7/4	55%		50 Blow Counts Dry
	45		SP-Poorly graded Sand VFine grained, moderate Yellowish brown 10YR 5/4	80%		56 Blow counts Slightly Moist
	50		CL-Lean clay w/Minor Sand VF grained. Scattered Gypsum & Zones; Thru-out core Moderate yellowish brown 10YR 5/4	100%		34 Blow Counts Dry to Slightly moist in Sandier areas
	55		CL-Lean clay w/sand interbedded w/SC-Clayey Sand - VF grained moderate yellowish brown 10YR 5/4	80%		26 Blow Counts wet in Sandy Zones moist in more clayey Zones

53' LP

DRILLING LOG (Continuation Sheet)

INSTALLATION	HOLE No.	SHEET No.
	HMW-61	3 OF 3

1. PROJECT: HELSTF Groundwater Study

11. ELEVATION OF TOP HOLE:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	60		CL - Lean clay w/ Sand Low Plasticity, Light Brown 5YR 5/6, Rare Loose Gypsum X-stal.	100%		26 Blow Count Dry
	65		CL - Lean clay w/ Sand Low Plasticity, Friable - no wire, occasional Zoned Gypsum, Light Brown 5YR ~~5/4~~ 5/6	100%		37 Blow Counts Dry
	70		SW-SC - well graded Sand w/ Clay; Minor Silt Med to Fine grained, poorly Sorted, moderate yellowish Brown 10YR 5/4	10%		48 Blow Count Wet
	75		SW-SC - well graded Sand w/ Clay, med to VF grained Poorly sorted Interbedded w/ CL - Lean clay sand, Silt low to no Plasticity for Top 16 Inches Rest - CH - Fat clay, hard ~~[illegible]~~ Middle Texture, Moderate To High plasticity	100%		27 Blow Counts Wet
	80		Moderate yellowish brown 10YR 5/4 (Top 16 In) Pale yellowish brown 10YR 6/2 w/ Dark yellowish orange 10YR 6/6 & Moderate yellowish brown 10YR 6/6 for the CH			
	85		Plan To set well at 83 TD			

nearest well DTW-69

83

LP 58'

DRILLING LOG	DIVISION	INSTALLATION	HOLE No.	SHEET No.
			HMW-62	1 OF 3

1. PROJECT HELSTF Groundwater Study	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station) HELSTF	12. MANUFACTURER'S DESIGNATION OF DRILL CME 75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number) HMW-62	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER Tierra John Findley	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE [X] Vertical [ ] Inclined _____ Degrees from Vertical	16. DATE HOLE — STARTED 1440 — COMPLETED 9-7-06 9-6-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE 81.5' — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR Brent Davis

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significent) g
	0			No Recovery		Used Vacuum excavator 6' down to check for utilities.
	2.5					
	5					
	7.5					
	10		SM Silty Sand, fine grained silty Sand gypsum, Rc: 5Y 8/1 or M: N 8/ Friable Yellowish gray white	70%		10.0-11.5 Ft spoon 50 blow counts for 6 inches hit refusal.
	11.5					
	15		SP Poorly graded Sand Slight Damp, Medium grained well Rounded Sand, color - Yellowish gray (5Y 8/1) Friable			
	17.5					
	20		CL Lean clay Clay w/ Gypsum Sand, Fine grained - Gypsum crystal near bottom - Very coarse grained. color: Light olive gray 5Y 6/			
	21.5					

Rock Chart = Rc
Munsell = M

DRILLING LOG (Continuation Sheet)

INSTALLATION	HOLE No.	SHEET No.
HELSTF	HMW-62	2 OF 3

1. PROJECT: HELSTF TO-7 Groundwater Study

11. ELEVATION OF TOP HOLE:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significent) g
	22.5					
	25		CL Lean clay Gypsum crystal 10mm at least 20% thru out core	80%		80% Recovery -2 zones of Gypsum
	26.5		Moderate brown 5YR3/4 Damp at Top and becomes dryer near bottom.			
	27.5					Gypsum crystal ave decreasing
	30		CL Lean clay clay w/ Rare Gypsum crystals Layer Moderate brown (5YR 3/4)	80%		
	31.5		Gypsum crystal seen 5% thru out core, Largest crystal 50 mm (20mm)			
	32.5		Gypsum Filling gaps w/in clay upper 4in Damp			
	35		CL Lean clay Clay w/ Very rare Gypsum crystals. Moderate brown 5YR 4/4. crystal are becoming less than 5% composition w/in core. Some silt can be seen in middle of core	80%		Gypsum crystal decreasing size of Gypsum crystal are getting smaller 3mm
	36.5					
	37.5					
	40		Top a med. grained sand (Lens) 2in			
	41.5		CL - Lean clay, Moderate Brown 5YR 4/4, Med Plasticity	20%		-No Gypsum 2 gallon per table water 20% Recovery
	42.5					
	45		Top 6in CL, 6 Inches Silt, well graded sand w/silt: 1inch Gypsum crystals 10mm Long, Then Rtn to CL. 3in. core is Moderate brown 5YR4/4, Sand is moist. Med. grained, Poorly sorted.	100%		
	46.5					
	47.5					47 to 50 Drill said it Dropped fast, appears to have water - poorly sand
	50		CL-Lean clay, no Gypsum Moderate yellowish brown 10YR5/4, feels hard, feels stiff Low plasticity	100%		soft - Clay is comming up Very Soft, appears to have water, Saturated. 50 - 51.5 feet Perch zone - Lots of water
	51.5					
	52.5					
	55		CL-Lean clay 1inch, 4in of Silt well graded sand w/silt, 1ft CL-Lean clay, Sand layer is moist, Med grained, Poorly sorted core is moderate yellowish brown 10YR5/4, Bottom clay is Dry, Rare Large Gypsum (15mm).	90%		
	56.5					

UP
LP
?

using Rock color chart by USGA

DRILLING LOG (Continuation Sheet)	INSTALLATION HELSTF	HOLE No. HMW-62	SHEET No. 3 OF 3
1. PROJECT HELSTF TO-7 Groundwater Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	~~57.5~~					
	60		CL- Lean clay w/sand for 7in, CL- Lean clay (no sand) Moderate yellowish brown 10YR 5/4,	90%		middle of core dry
	61.5					
	62.5					
	65		4in on Top SW - Well graded Sand w/Clay, Rest of core is CL- Lean clay; Sand is v.fine w/silt & clay; Poorly sorted Moderate yellowish brown (10YR 5/4) Clay is hard, stiff, ~~[illegible]~~ plasticity Hi	90%		
	66.5					
	67.5					
	70		CL- Lean clay (14in) SW - Well graded Sand w/silt Mostly Med grained, Poorly Sorted Moderate yellowish brown (10YR 5/4),	(Bottom 3in) 80%		Clay, middle of core dry
	71.5					
	72.5					
	75		CL- Lean clay w/sand (3in) SW - Well graded sand (5in) w/Little silt (<5%) Med. grained, poorly Sorted Moderate yellowish brown (10YR 5/4) Rare granules (5mm)	50%		Seems moist
	76.5					
	77.5					
	80		SW - Well graded sand w/ Silt & Gravel; Med grained Sand w/silt & Gravel (15mm) Gravel Rare (1-3 pieces found) Moderate yellowish brown (10YR 4/2), Well Rounded grains Poorly Sorted	80%		wet.
	81.5					
	82.5					
	85					

Due to heaving sands, could not get deeper than 79' for lead auger. Will set well w/out sump. Screen w/ bottom cap at base.

68.5

Screen 10 ft

78.5

DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-63	SHEET No. 1 OF 3

1. PROJECT: HELSTF Ground water Study	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number): HMW-63	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER: Tierra — John Findley	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE: [X] Vertical [ ] Inclined ____ Degrees from Vertical	16. DATE HOLE — STARTED: 9-8-06 1030 — COMPLETED: 9-11-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE: 84' — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR: Barry T. Dan

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0					
	2.5			No Recovery		Used Vaccum excavator 6' down to check for utilities
	5					
	7.5		ML - Silt w/ Sand, Sand is Very fine grained made up of mostly Gypsum Yellowish gray (5Y 8/1)			
	10		ML - Silt w/ Sand Sand is Very fine grained made up of mostly Gypsum Yellowish gray (5Y 8/1)	50%		
	11.5					
	12.5					
	15		SW-SC - Well graded Sand w/ Clay, Light Olive gray (5Y 6/1), Poorly sorted, Med graded Sand, V. Find graded.	100%		
	16.5					
	17.5					
	20		SW - Well graded Sand SM - w/ Silt, Poorly sorted Med graded Sand, Moderate Yellowish Brown (10YR 5/4)			Moist (No visable water) Seems to get Silter as it goes down
	21.5					

Using Rock ~~chart~~ color chart By USGS

DRILLING LOG (Continuation Sheet)	INSTALLATION HELSTF	HOLE No. HMW-63	SHEET No. 2 OF 3
1. PROJECT HELSTF Groundwater Study (To = 7)	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	25		CL- Lean clay, Zones of Gypsum x-stals (10mm) Moderate brown (5YR 4/4) is very hard, stiff, Low Plasticity	100%		No visible water Possible archtard/confining Layer
	27.5					
	30		CL- Lean clay w/Sand Zones of Gypsum (fewer) (5mm) Moderate brown (5YR 4/4) is hard, stiff, holds shape well Low plasticity; Sand particles are fine to med grained	100%		Gypsum decreasing Moist (no visible water) at Top of core
	32					
	32.5					
	35		CL- Lean clay w/sand Zones of Gypsum (10mm size x-stal) Moderate brown (5YR 4/4), clay is hard, stiff, Low Plasticity. CH- Fat Clay near (8 inch at bottom)	100%		Gypsum is decreasing fewer zones CH- Less sand & silt, smooth
	37					
	37.5					
	40		CH- Fat clay Zones of Gypsum (5mm), moderate brown (5YR 4/4), clay is moderately Plastic, Top is easily handled (1 inch) 1.5 ft takes much more work to handle clay	100%		Gypsum (zones) is getting Less. (decreasing)
	42					
	42.5					
	45		CL- Lean clay, minor silt Top 4 in has Zones of Gypsum Moderate brown (5YR 4/4), Low plasticity - Easy work, on Bottom (3 inch), can't form a wire	100%		wet - Visable water
	47					
	47.5					
	50		SW-SC - well graded sand (Top 2 inch) w/clay, Zones of Gypsum (20mm) Rest is: CL- lean clay; easy to work, minor zones of silt & sand Moderately plastic, but is stiff, Mod. hard Moderate brown (5YR 4/4) color more ->	100%		Gypsum, few by Large. bottom 2 inch, is softer Pale yellowish brown (10YR 6/2)
	52.5					53 ft visible water coming up from Drillhole & MUD
	55		CL- lean clay w/sand & silt, Top 3 in has Large Gypsum x-stal. Sand Increases downward, Fin grained Sand, Poorly sorted, Moderate Yellowish brown (10YR 5/4) Low plasticity; soft, Moldable forms wire easly	90%		moist inside core

LP

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-63	SHEET No. 3 OF 3
1. PROJECT HELSTF Groundwater Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	57.5					
	60		CL- Lean clay w/Sand a minor silt. Moderatly Placistic, Slightly hard, holding form together, Malleable Moderate yellowish brown (10YR 5/4)	100%		40 Blowcount Center of core is dry
	62.5					
	65		SP - Poorly graded Sand; Med - fine grained Sand fairly well sorted, Pale yellowish brown (10YR 6/2	25%		Refusal 50 Blowcounts Slightly moist ≈ 6"
	67.5					
	70		SP - Poorly graded Sand Med to fine grained, well sorted See wettness on the grains (moist) Pale yellowish brown (10YR 6/2)	50%		70 blow counts ≈ 8"; moist
	72.5					
	75		SW - Well graded (SM) w/Silt Poorly sorted, Med to very fine sand Dark yellowish brown (10YR 4/2)	70%		Wet - visible water
	77.5					
	80		Assume that JD Sand is below 80 feet. Drilled w/ hand auger to 84 ft			No Recovery.
	82.5					
	85		DTW 71 ft measured 9-13-06			

68

Screen 10 ft

78

Low Placisty - Easy Malleable
HI Placisty - Hard, Stiff, Not Malleable

DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-64	SHEET No. 1 OF 3

1. PROJECT HELSTF Ground water Study	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL CME-75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number) HMW-64	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER Tierra John Findley	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE [X] Vertical [ ] Inclined _____ Degrees from Vertical	16. DATE HOLE — STARTED — COMPLETED 10-11-06 — 10-11-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE 83' — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR Bruce T. Dan

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			No Recovery			Vacuum excavation 6' down to check for utilities
	5					
	10		ML-Silt, Gypsum rock flour, yellowish gray 5Y8/1 & white N9	100%		48 Blow Counts Dry
	15		Top 1ft - ML-Silt, Gypsum Rock flour, yellowish gray 5Y8/1 & white N9, Rest: SW-SM - well graded Sand w/ Silt fine grained Sand, poorly Sorted. yellowish gray (5Y 7/2)	90%		38 Blow Counts Dry at Top becomes Moist near the bottom
	20		Top 3in - ML-Silt Gypsum (same as at 10ft) Rest: CL-Lean clay w/ Scattered Gypsum Y-Stal Thru-out	100%		16 Blow counts Dry

Clay w/ Coarse grain Gypsum Y-stals
Moderate yellowish brown 10YR5/4
clay is soft, Plasticity is Low

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-64	SHEET No. 2 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	25		SW-SC - well graded sand w/ clay, med to fine grained for top 7 inch, moderate yellowish brown 10YR 5/4, Rest - SW-SM well graded sand w/ silt, zoned Gypsum X-stals yellowish gray 5Y 7/2, poorly sorted, med grain sand.	60%		49 Blow counts Moist
	30		Top 5 in Middle clay CL - Lean clay w/ Gypsum silt Rest: CL - Lean clay w/ sand zoned Gypsum, middle clay has yellowish gray 5Y 7/2 & Light brown 5YR 6/4 Clay w/ sand is Light brown 5YR 5/6	100%		33 Blow counts Dry Plasticity Low
	35		Top 5 in - CL. Lean clay w/ sand & minor silt (Gypsum) Rest: SW-SM - well graded sand w/ silt, med to fine grained, moderate yellowish brown (10YR 5/4 Clay moderate brown 5YR 3/4 zoned X-stal in clay	60%		50 Blow counts Moist
	40		Top 1 ft - SW-SM well graded med - fine grain sand moderate yellowish brown (10YR 1 5/4), Rest CL - Lean clay w/ silt & zoned Gypsum X-stal Light brown 5YR 6/4, minor sand	80%		36 Blow counts Driller said hit water wet (sand) Low to none plasticity Clay - Moist
	45		Top 1 ft SW-SM (Similar to one above) - Slightly coarser grained, 2nd foot: CL - Lean clay w/ sand & minor silt, zoned Gypsum moderate yellowish brown (10YR 5/4) Clay is hard	100%		28 Blow counts Sand wet Clay - Dry Low to none plasticity
	50		Top 3 in SW-SM-SC, well (med grained) graded sand w/ silt & minor clay, Rest CL - Lean clay w/ sand, zones of SW - sand Interbeds of clay and sand Thru-out core moderate yellowish brown 10YR 5/4	80%		25 Blow counts Sand - wet Clay - slightly moist
	55		Top 2 inches - SW-SM-SC well graded sand w/ silt & clay Remainder CL - Lean clay - Low plasticity Bottom 2 inches - SW-SM-SC	90%		36 Blow counts clay dry Sand - moist to wet

41' LP

Pale yellowish brown 10YR 6/2

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-64	SHEET No. 3 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	60		Top 6in - SW - SC well graded Sand w/ Clay minor Silt, med grain Sand, grades Into CH ~~Lean Clay~~ Fat clay w/ Modelling Near Bottom (Clay mixing w/ silt near 3in of Bottom - CL - Lean clay w/ silt layering, Bedding Planes, - yellowish gray 5Y 7/2	100%		21 Blow Counts Sand - wet Clay - Dry Fat clay - Light Brown 5YR 6/4 L Placisty - High
	65		Interbedded of Sand ~~& clay~~ Top - SW - SM ~~minor~~ silt mid - CL - Lean clay w/ Sand & minor Zoning & Silt (yellowish gray 5Y 7/2) Bottom - SW - SM, well graded Sand med grained w/ silt, moderate yellowish brown 10YR 5/4	100%		19 Blow Counts Sand Top Moist ? - water may be coming from the Top (perch zones) Sand Bottom - Dry Clay - Dry - Low Placisity
	70		Interbedded Sand & clay Top 3in CL - Lean clay w/ silt (silty clay), yellowish gray 5Y 7/2, grads Into SW - SC, well graded Sand w/ Clay (9 inch) Return to Clay - CL - Lean clay w/ silt (Same as Top) Sand - Med. grained, Poorly Sorted.	80%		25 Blow Counts Wet - Sand Clay - Moist
	75		Top 12 in SW - SM w/ minor clay, Rest - CL - Lean clay w/ sand & silt, Bottom 6in is CH - Fat clay; Sand - Moderate yellowish brown 10YR 5/4, Clay - Light brown 5YR 5/6	100%		27 Blow Counts Sand decreases downward Sand Top - wet Clay - Dry
	80					
	85					
			Plan to Place Well at 83 feet			

(68-78)
83

DRILLING LOG	DIVISION	INSTALLATION	HOLE No. HMW-65	SHEET No. 1 OF 3

1. PROJECT: HELSTF Groundwater Study	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL: CME - 75
3. DRILLING AGENCY	13. TOTAL No. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE No. (As shown on drawing title and file number): HMW-65	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER: Tierra John Findley	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE: [X] Vertical [ ] Inclined ____ Degrees from Vertical	16. DATE HOLE: 10-3-06 — STARTED: 0843 — COMPLETED: 10-4-06
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE: 81' — 10. SIZE AND TYPE OF BIT	19. SIGNATURE OF INSPECTOR: [signature]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0					Vacuum excavation to 6 ft bgs for utilities
	5		No Recovery			
	10		ML-Silt w/Sand Gypsum Silt, at bottom VF-F Sand Yellowish gray 5Y 8/1	100%		45 Blow Counts
	15		Top Sin - ML - Silt w/Sand VF-F Sand. Rest - Gypsum Sand - SW-SC w/Little clay, coarse grain Gypsum X-stal To medium grained Sand. Well graded w/clay Bottom 3in - SW - Coarse grain Gypsum Sand - No clay	100%		20 Blow counts Moist Moderate yellowish brown 10YR 5/4
	20		Top Sin ML - Silt w/Sand (VF-F) - Yellowish gray 5Y 8/1 Rest - CL - Lean clay w/Sand (Zoned X-stal Gypsum, Soft - Low Plasticity Moderate yellowish brown (10YR 5/4)			26 Blow counts

DRILLING LOG (Continuation Sheet)

INSTALLATION	HOLE No.	SHEET No.
	HMW-65	2 OF 3

1. PROJECT: HELSTF GW Study

11. ELEVATION OF TOP HOLE:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	25		Top 2in - ML - silt w/sand Yellowish gray 5Y 8/1 Bth - CL - Lean clay - Soft Low Plasticity Rest - Zoned Gypsum x-stals Thur-out CH - fat clay - hard, Moderate Plasticity, Moderate brown 5YR 4/4	100%		42 Blow counts Dry
	30		Top 3in CL - Lean clay, Low to Med. Plasticity Rest - CH - fat clay. Hard, Med To High Plasticity. Zoned Gypsum Thru-out core, Increase downward. at bottom 6in - Moderate Brown 5YR 4/4	100%		36 Blow counts Dry
	35		Top 6½ in CL - Lean clay w/Sand Gypsum x-stal Throughout Rest - SP - Poorly graded Sand ~~Moderately Sorted Sand~~ moderately Sorted Sand, Med to Fine grained, Zoned clay lens Thur-out, Light brown 5YR 5/6	100%		49 Blow counts Slightly moist
	40		Top 2in CL - Lean clay w/Sand Rest - SP - Poorly graded Sand Moderately Sorted - Med to VF Sand - No silt, well Rounded Clay - Moderate brown 5YR 4/4 Sand - Moderate yellowish 10YR 5/4	50%		over 50 Blow counts Hit Refusal wet - visable water in Sand
	45		SW - Well graded Sand w/silt SM & clay SW, Poorly Sorted Med to VF Sand, silt & clay. Vertical burrows or Root casts was Formed, Filled in w/clay	80%		59 blow counts Wet - very
	50		Top 4in - CL - Lean clay w/Sand, low to med. plasticity Middle - CH - Fat clay - hard Stiff, Med to High Plasticity Bottom 1in - CL - Lean clay w/Sand - 1in Sandy lens Seen Below CL. moderate yellowish brown 10YR 5/4	95%		35 Blow counts Dry
	55		CL - Lean clay w/Sand, Soft Low Plasticity, Clayey Sand Sandier in middle of core, but still hold Shape, Moderate Yellowish brown 10YR 5/4	100%		17 Blow counts Moist to wet - Depends on amt of sand

41 LP

DRILLING LOG (Continuation Sheet)	INSTALLATION	HOLE No. HMW-65	SHEET No. 3 OF 3
1. PROJECT HELSTF GW Study	11. ELEVATION OF TOP HOLE		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (description) d	% CORE RECOVERY e	BOX OR SAMPLE NUMBER f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	60		SP- Sand, Fine to very Fine Moderate Sorted. Poorly graded No silt, Sub Rounded grains See mica, Moderate yellowish brown 10YR5/4, See more clay at very Bottom	100%		27 Blow Counts Wet
	65		CL- Lean clay w/Sand (Fine) Light brown 5YR6/4 Moderate Plasticity, ridged,	100%		23 Blow Count Dry, some area slight moisture.
	70		Top 12in SW-SC - Sand w/ minor clay Well graded, Moderate yellowish brown 10YR5/4, Moderately Sorted Fine to very Fine Sand Rest: CL- Lean clay w/sand Light Brown 5YR6/4 & Pale yellowish brown 10YR6/2	80%		34 Blow Counts Sand - wet clay - Dry & moderate plasticity
	75		SW - Well graded Sand w/ Minor clay - SC, Little silt (SM) Bottom 2in - CL - Lean clay w/ Sand, Very Fine - Fine Sand, Sub Rounded. Clay - Low to No Plasticity Moderate yellowish brown 10YR5/4	70%		32 Blow counts Wet Driller see heaving Sands
	80		Set well at 81'			
	85					

LP

64

67?
well @ HMW-17
DTW = 71