**North Carolina Department of Environmental Quality – Division of Water Resources**

# APPLICATION FOR PERMIT TO CONSTRUCT AND/OR USE A WELL(S) FOR INJECTION
## *In Situ* Groundwater Remediation (15A NCAC 02C .0225) / Tracer Injection (15A NCAC 02C .0229)

Do **not** use this form for the following:

- *In-situ* remediation, tracer, or aquifer test injection wells permitted by rule (ref. 15A NCAC 02C .0217)
- remediation systems that reinject treated contaminated groundwater (Non-discharge) (ref. 15A NCAC 02T .1600)

**Permit Number** (*to be completed by DWR*): WI_____

## I. APPLICATION INFORMATION

1. Project is: [x] New [ ] Modification [ ] Renewal *without* modification [ ] Renewal *with* modification
2. If this application is being submitted for Renewal and/or Modification to an existing permit, provide:

   (a.) Existing permit number WI_____ Issued Date:_____& Expiration Date: _____

   ***For all Renewals**, submit a status report including monitoring results of all injection activities to date.*
   ***For Renewal without modification only**, fill out sections I & II only, sign the certification on the last page of this form, and obtain the property owner's signature to indicate consent (if the applicant is not the owner).*

## II. WELL OWNER(S)/PERMIT APPLICANT (generally the responsible party)

1. Name(s): Trex Properties, LLC
2. Signing Official's Name*: Thomas Roberts Title: Manager

   * Signing Official must be in accordance with instructions in **Part X** on page 5.
3. Mailing address of Permittee/Applicant: 1650 Des Peres Road, Suite 306

   City: St. Louis State: MO Zip: 63131
4. Telephone number: (314) 835-1515 Email: troberts@cdcco.com
5. Status (choose one):_____Individual__X__Business/Org._____Federal_____State_____County_____Municipality

## III. PROPERTY OWNER(S) (if different than well owners)

1. Name(s):_____
2. Mailing address:_____

   City:_____ State:_____ Zip:_____
3. Telephone number:_____Email:_____

## IV. PROJECT CONTACT – (generally the environmental/engineering consultant).

1. Name: Brian Bellis, P.G. Title: Senior Hydrogeologist
2. Company: WithersRavenel, Inc.
3. Address: 1410 Commonwealth Drive, Suite 101
4. City: Wilmington State: NC Zip: 28403
5. Telephone number: 910-256-9277 Email: bbellis@withersravenel.com

## V. FACILITY INFORMATION

1. Facility name: Trex Charlotte, NC Phone No. if available: NA
2. Physical address: 3114 and 3124 Cullman Avenue
   City: Charlotte County: Mecklenburg Zip:
3. Geographic Coordinates: Latitude: 35° 14' 56.04" N Longitude: 80°48'34.76" W
   Reference Datum: NA Accuracy: NA
   Method of Collection (i.e., Google Earth, GPS, etc.): Google Earth
4. Brief description of business: Former RCRA TSD facility where solvents were recycled under the company name Detrex under a RCRA Part B Permit.

## VI. INCIDENT DESCRIPTION

1. Source and date of contamination: The facility was first permitted to recycle waste solvents (primarily PCE and TCE) in 1983 under the first RCRA Part B permit for such a facility in the state of NC. Over the years, incidental spills of such solvents resulted in contamination of unsaturated materials occurring beneath and adjacent to the on-site buildings. Over time the soil contamination gave rise to contamination of underlying groundwater. Solvent contaminated groundwater then migrated with natural groundwater flow to downgradient properties to the north and to a perennial stream known as Little Sugar Creek.
2. List all contaminants present in soils or groundwater at the site (*contaminants may be listed in groups, e.g., gasoline, diesel, jet fuel, fuel oil, chlorinated ethenes, chlorinated ethanes, metals, pesticides/herbicides, etc*):
   Chlorinated ethenes and chlorinated ethanes
3. Has LNAPL or DNAPL ever been observed at the site (even if outside the injection zone)?
   [ ] Yes If yes, list maximum measured separate phase thickness: _____ **feet**
   [X] No If no, list maximum concentration of total VOCs observed at site: 193,412 **ppb**
4. Agency managing the contamination incident:
   [ ] UST Section
   [ ] DWR Aquifer Protection Section
   [X] Hazardous Waste Section
   [ ] Superfund Section (including REC Program and DSCA sites)
   [ ] Solid Waste Section
   [ ] Other:
5. Incident manager's name: Kathleen Z. Lawson Phone No.: 919-707-8214
6. Incident number or other incident mgmt. agency tracking number: EPA ID # NCD 049 773 245

## VII. PERMITS

List all applicable permits or construction approvals issued for the **facility or incident:**

1. Previous or other UIC permits issued by DWR (e.g., NOIs) NA
2. Other Non-Discharge or NPDES permit issued by DWR: NA
3. County or DEH subsurface wastewater disposal permits: NA
4. Hazardous waste management or other environmental permits required by state or federal law:
   RCRA Part B Permit for Hazardous Waste Treatment & Storage Facilities

## VIII. INJECTION SUMMARY

1. List all proposed injectants/additives.

   ***NOTE**: Only injectants approved by the epidemiology section of the NC Division of Public Health, Department of Health and Human Services can be injected. Approved injectants can be found online at* http://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/ground-water-protection/ground-water-approved-injectants. *All other substances must be reviewed by the DHHS prior to use. Contact the UIC Program for more info (919-807-6496) if you wish to get approval for a different additive. However, please note it may take 3 months or longer.*

   Injectant: Klozur™ sodium persulfate Total Amt. to be injected (gal)/event 56,750 gallons

   Injectant: Fe EDTA Total Amt. to be injected (gal)/event 12,750 gallons

   Injectant: _____ Total Amt. to be injected (gal)/event _____

   Injectant: _____ Total Amt. to be injected (gal)/event _____

   Injectant: _____ Total Amt. to be injected (gal)/event _____

2. Number of separate injection events: 1 Duration of Event: ~15 days
3. Estimated Injection rate per well: up to five (5) gallons per minute (GPM)
4. Estimated Injection pressure: ~20-80 pounds/square inch (PSI)
5. Temperature at point of injection: ~65 °F
6. Injection will be via:

   ☐ Existing well(s); Total No.: _____; Well Type (DPT, permeant, etc.): _____

   X Proposed well(s); Total No.: 20 ; Well Type (DPT, permeant, etc.): _____

7. NC Certified Well Drilling Contractor's Name: To Be Determined (TBD)

   NC Well Contractor Certification No.: TBD

8. Date to be constructed: TBD
9. Screened interval/Injection interval of injection wells: *Varies: See Table 2 of Attachment 1*

   Depth from 6 to 73 feet below land surface (BLS)(if multiple intervals, indicate shallowest to deepest depth)

10. Well casing (leave blank if Geoprobes):

    Type: X PVC ☐ Stainless steel ☐ Other: *Varies: See Table 2 of Attachment 1*

    Casing depth: _____to_____ ft. BLS

    Type: ☐ PVC ☐ Stainless steel ☐ Other: _____

    Casing depth: _____to_____ ft. BLS

11. Grout (leave blank if Geoprobes):

    Type: X Cement ☐ Bentonite ☐ Other: *Varies: See Table 2 of Attachment 1*

    Grout depth: _____ to _____ ft. BLS

    Type: ☐ Cement ☐ Bentonite ☐ Other: _____

    Grout depth: _____ to _____ ft. BLS

**IX. ATTACHMENTS –** provide the following information in separate attachments. The attachments should be clearly identified and presented in the order below to expedite review of the permit application package.

1. INJECTION ZONE – Per 15A NCAC 02C .0225(e)(2), specify the horizontal and vertical portion of the subsurface within which the proposed injection activity will take place and beyond which no violations of groundwater quality standards shall result from the injection as determined by an approved monitoring plan. The determination shall be based on the hydraulic properties of the specified zone. Provide any supporting documentation in a separate attachment. *See Attachment 1*

2. HYDROGEOLOGIC EVALUATION – Per 15A NCAC 02C .0225(e)(3), provide a hydrogeologic evaluation of the injection zone that includes all of the following:

(A) Regional and local geology and hydrology; *See Attachment 2A*
(B) Changes in lithology underlying the facility; *See cross-sections in Attachment 1*
(C) Depth to bedrock; *See cross-sections in Attachment 1*
(D) Depth to the mean seasonal high water table; *~ 4 feet below ground*
(E) Hydraulic conductivity, transmissivity, and storativity, of the injection zone based on tests of site-specific material, including a description of the test(s) used to determine these parameters; *See Attachment 2E*
(F) Rate and direction of groundwater flow as determined by predictive calculations or computer modeling; *See Attachment 2F,* and
(G) Lithostratigraphic and hydrostratigraphic logs of any existing test and injection wells. *Not applicable*

3. INJECTANT INFORMATION – Per 15A NCAC 02C .0225(e)(5), provide information on each injectant as indicated below:

(A) MSDS, concentration at the point of injection, and percentage if present in a mixture with other injectants; *See Attachment 3*
(B) The source of fluids used to dilute, carry, or otherwise distribute the injectant throughout the injection zone. If any well within the area of review of the injection facility is to be used as the fluid source, then the following information shall be submitted: location/ID number, depth of source, formation, rock/sediment type, and a chemical analysis of the water from the source well, including analyses for all contaminants suspected or historically recognized in soil or groundwater on the site; *The City of Charlotte municipal water supply will be the source of all water used to mix the injectant.*
(C) A description of the rationale for selecting the injectants and concentrations proposed for injection, including an explanation or calculations of how the proposed injectant volumes and concentrations were determined; *See Attachment 3*
(D) A description of the reactions between the injectants and the contaminants present including specific breakdown products or intermediate compounds that may be formed by the injection; *See Attachment 3*
(E) A summary of results if modeling or testing was performed to investigate the injectant's potential or susceptibility for biological, chemical, or physical change in the subsurface; *See Attachment 3* and
(F) An evaluation concerning the development of byproducts of the injection process, including increases in the concentrations of naturally occurring substances. Such an evaluation shall include the identification of the specific byproducts of the injection process, projected concentrations of byproducts, and areas of migration as determined through modeling or other predictive calculations. *See Attachment 3*

4. INJECTION PROCEDURE – Per 15A NCAC 02C .0225(e)(6), submit a table with a detailed description of the proposed injection procedure that includes the following: *See Table 3 in Attachment 4*
(A) The proposed average and maximum daily rate and quantity of injectant;
(B) The average maximum injection pressure expressed in units of pounds per square inch (psi); and
(C) The total or estimated total volume to be injected.

5. FRACTURING PLAN (if applicable) – Per 15A NCAC 02C .0225(e)(7), submit a detailed description of the fracturing plan that includes the following: *Not Applicable*

(A) Material Safety Data Sheets of fracturing media including information on any proppants used;
(B) a map of fracturing well locations relative to the known extent of groundwater contamination plus all buildings, wells, septic systems, underground storage tanks, and underground utilities located within the Area of Review;
(C) a demonstration that buildings, wells, septic systems, underground storage tanks, and underground utilities will not be adversely affected by the fracturing process;
(D) injection rate and volume;
(E) orientation of bedding planes, joints, and fracture sets of the fracture zone;
(F) performance monitoring plan for determining the fracture well radius of influence; and
(G) if conducted, the results of geophysical testing or pilot test of fracture behavior conducted in an uncontaminated area of the site.

6. WELL CONSTRUCTION DETAILS – Per 15A NCAC 02C .0225(e)(8), submit the following information in tabular or schematic form as appropriate for each item: *Please see Table 2 of Attachment 1*

(A) number and depth of injection wells; *Please see Table 2 of Attachment 1*
(B) number and depth of borings if using multi-level or "nested" well systems;
(C) indication whether the injection wells are existing or proposed; *Please see Table 2 of Attachment 1*
(D) depth and type of casing; *Please see Table 2 of Attachment 1*
(E) depth and type of screen material; *Please see Table 2 of Attachment 1*
(F) depth and type of grout; *Please see Table 2 of Attachment 1*
(G) indication whether the injection wells are permanent or temporary "direct push" points; *Please see Table 2 of Attachment 1* and
(H) plans and specifications of the surface and subsurface construction details. *Please see Figure 1 of Attachment 1*

7. MONITORING PLAN – Per 15A NCAC 02C .0225(e)(9), submit a monitoring plan that includes the following:
*Please see Attachment 7for site specific information on each of the following.*

(A) target contaminants plus secondary or intermediate contaminants that may result from the injection;
(B) other parameters that may serve to indicate the progress of the intended reactions;
(C) a list of existing and proposed monitoring wells to be used; and
(D) a sampling schedule to monitor the proposed injection.

*Monitoring wells shall be of sufficient quantity and location to detect any movement of injection fluids, injection process byproducts, or formation fluids outside the injection zone. The monitoring schedule shall be consistent with the proposed injection schedule, pace of the anticipated reactions, and rate of transport of the injectants and contaminants.*

8. WELL DATA TABULATION – Per 15A NCAC 02C .0225(e)(10), provide a tabulation of data on all existing or abandoned wells within the area of review of the injection well(s) that penetrate the proposed injection zone, including monitoring wells and wells proposed for use as injection wells. Such data shall include a description of each well's type, depth, and record of construction or abandonment. *Please see Attachment 8*

9. MAPS AND CROSS-SECTIONS – Per 15A NCAC 02C .0225(e)(11), provide scaled, site-specific site plans or maps depicting the location, orientation, and relationship of facility components including the following:

(A) area map based on the most recent USGS 7.5' topographic map of the area, at a scale of 1:24,000 and showing the location of the proposed injection site; *Please see Figure 1 of Attachment 2*
(B) topographic contour intervals showing all facility related structures, property boundaries, streams, springs, lakes, ponds, and other surface drainage features; *Please see Figure 2 of Attachment 2*
(C) all existing or abandoned wells within the area of review of the wells listed in the well data tabulation that penetrate the proposed injection zone; *Please see Figure 3 of Attachment 2, and Table 1 of Attachment 1*
(D) potentiometric surface map(s) that show the direction of groundwater movement, existing and proposed wells; *Please see Figures 4 and 5 of Attachment 2*
(E) contaminant plume map(s) with isoconcentration lines that show the horizontal extent of the contaminant plume in soil and groundwater, and existing and proposed wells; *Please see Figures 10 through 19 of Attachment 9*
(F) cross-section(s) to the known or projected depth of contamination that show the horizontal and vertical extent of the contaminant plume in soil and groundwater, major changes in lithology, and existing and proposed wells; Please see Figures 9, 10 and 11 of Attachment 2, and

(G) any existing sources of potential or known groundwater contamination, including waste storage, treatment, or disposal systems within the area of review of the injection well or well system.*Please see Figure 3 of Attachment 2*

**X. CERTIFICATION** (to be signed as required below or by that person's authorized agent*)

NCAC 15A 02C .0211(e) requires that all permit applications shall be signed as follows:

1. for a corporation: by a responsible corporate officer
2. for a partnership or sole proprietorship: by a general partner or the proprietor, respectively
3. for a municipality or a state, federal, or other public agency: by either a principal executive officer or ranking publicly elected official
4. for all others: by the well owner.

***If an authorized agent is signing on behalf of the applicant, then supply a letter signed by the applicant that names and authorizes their agent.**

*"I hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments therein, and that, based on my inquiry of those individuals immediately responsible for obtaining said information, I believe that the information is true, accurate, and complete. I am aware that there are penalties, including the possibility of fines and imprisonment, for submitting false information. I agree to construct, operate, maintain, repair, and if applicable, abandon the injection well(s) and all related appurtenances in accordance with the approved specifications and conditions of the Permit."*

Printed Name and Title:_____

Signature:_____ Date:_____

**XI. CONSENT OF PROPERTY OWNER** (if the property is not owned by the permit applicant)

"Owner" means any person who holds the fee or other property rights in the well being constructed. A well is real property and its construction on land shall be deemed to vest ownership in the land owner, in the absence of contrary agreement in writing.

"*As owner of the property on which the injection well(s) are to be constructed and operated, I hereby consent to allow the applicant to construct each injection well as outlined in this application and agree that it shall be the responsibility of the applicant to ensure that the injection well(s) conform to the Well Construction Standards (15A NCAC 02C .0200)."*

Printed Name and Title:_____

Signature:_____ Date:_____

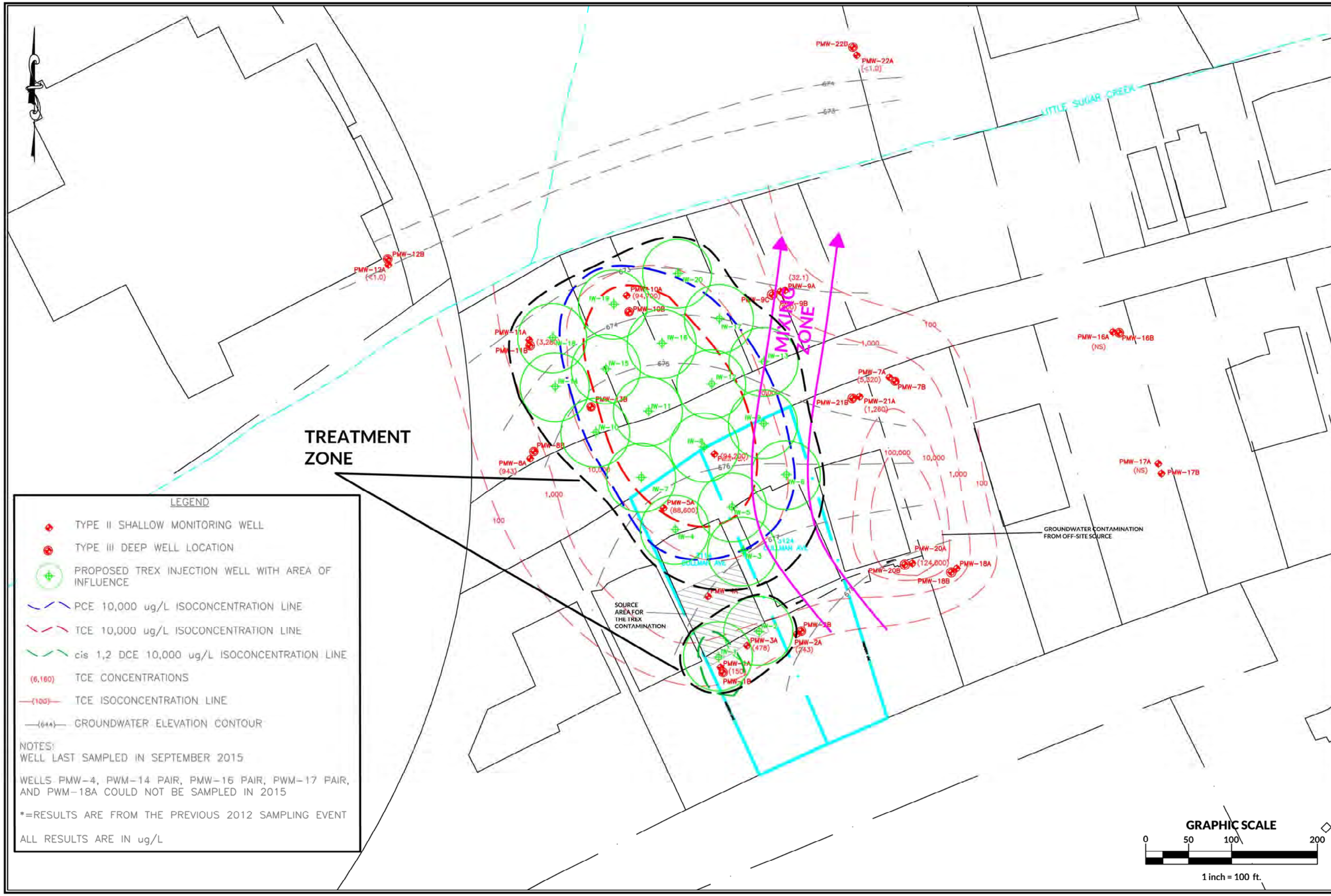
Submit **TWO** copies of the completed application package, including all attachments, to:

**Division of Water Resources – UIC Program**
**1636 Mail Service Center**
**Raleigh, NC 27699-1636**
**Telephone (919) 807-6464**

# ATTACHMENT 1

# INJECTION ZONE INFORMATION

# Trex Properties, Charlotte NC




LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- PROPOSED TREX INJECTION WELL WITH AREA OF INFLUENCE
- PCE 10,000 ug/L ISOCONCENTRATION LINE
- TCE 10,000 ug/L ISOCONCENTRATION LINE
- cis 1,2 DCE 10,000 ug/L ISOCONCENTRATION LINE
- (6,160) TCE CONCENTRATIONS
- (100) TCE ISOCONCENTRATION LINE
- (644) GROUNDWATER ELEVATION CONTOUR

NOTES:
WELL LAST SAMPLED IN SEPTEMBER 2015

WELLS PMW-4, PWM-14 PAIR, PMW-16 PAIR, PWM-17 PAIR, AND PWM-18A COULD NOT BE SAMPLED IN 2015

*=RESULTS ARE FROM THE PREVIOUS 2012 SAMPLING EVENT

ALL RESULTS ARE IN ug/L

| | | | |
|---|---|---|---|
| DRAWN BY: CF | SCALE: 1"=100' | FIGURE NO.: 3 | |
| APPROVED BY: BB | DATE: 3/17/2016 | PROJECT NO.: 03130490.06 | |

# CONCEPTUAL INJECTION STRATEGY

**TREX PROPERTIES, CHARLOTTE, NC**
3144 AND 3124 CULLMAN AVE.
CHARLOTTE, MECKLENBURG COUNTY, NC

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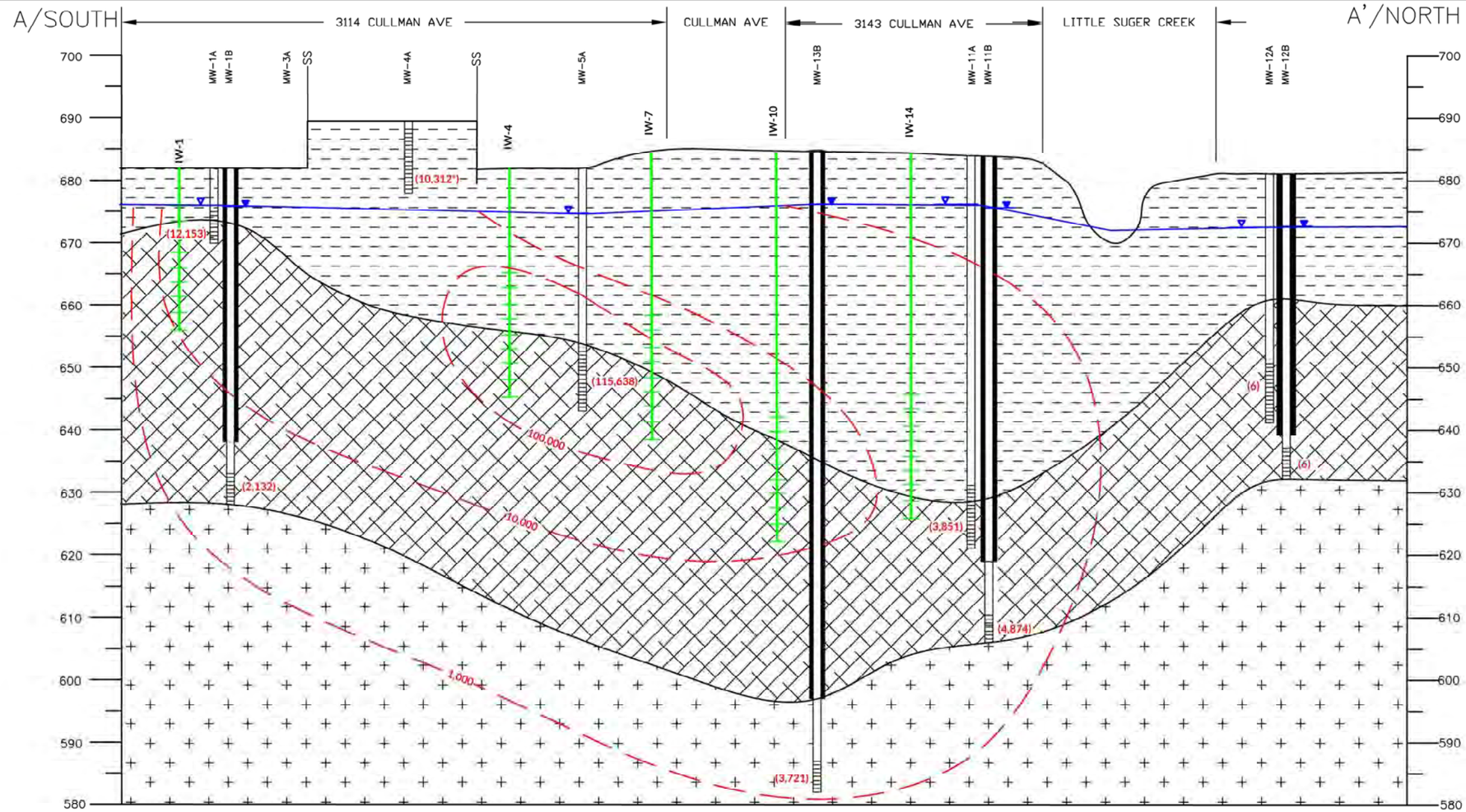
W:\13\13-0430\130430.06-Trex Plex Testing & Design\CAD\Trex Property - Baseline-20160313.dwg - May 11, 2016 - FAX, CHRISTOPHER

LEGEND

- OUTER WELL CASING INTERVAL
- WELL SCREEN INTERVAL
- INNER WELL CASING INTERVAL
- INJECTION WELL
- SHALLOW GROUNDWATER ELEVATION
- DEEPER GROUNDWATER ELEVATION
- (5,200) TOTAL VOCs IN ug/L (2015)
- TOTAL VOC IN ug/L ISOCONCENTRATION LINE
- RESIDUAL SOIL/SAPROLITE
- PARTIALLY WEATHERED BEDROCK
- COMPETENT ROCK

NOTE;
INFERRED BOUNDARIES BETWEEN GEOLOGIC UNITS ARE TRANSITIONAL.
*=RESULTS ARE FROM THE 9/25/12 SAMPLING EVENT




4X VERTICAL EXAGGERATION

GRAPHIC SCALE
0 40 80 160
1 inch = 80 ft.

| | |
|---|---|
| FIGURE NO.: | 9 |
| SCALE: | 1"=80' |
| PROJECT NO.: | 03130430.06 |
| DRAWN BY: | CF |
| DATE: | 3/22/2016 |
| APPROVED BY: | BB |

# GEOLOGICAL CROSS SECTION A-A' WITH TOTAL VOCs IN GROUNDWATER RESULTS AND PROPOSED INJECTION POINTS

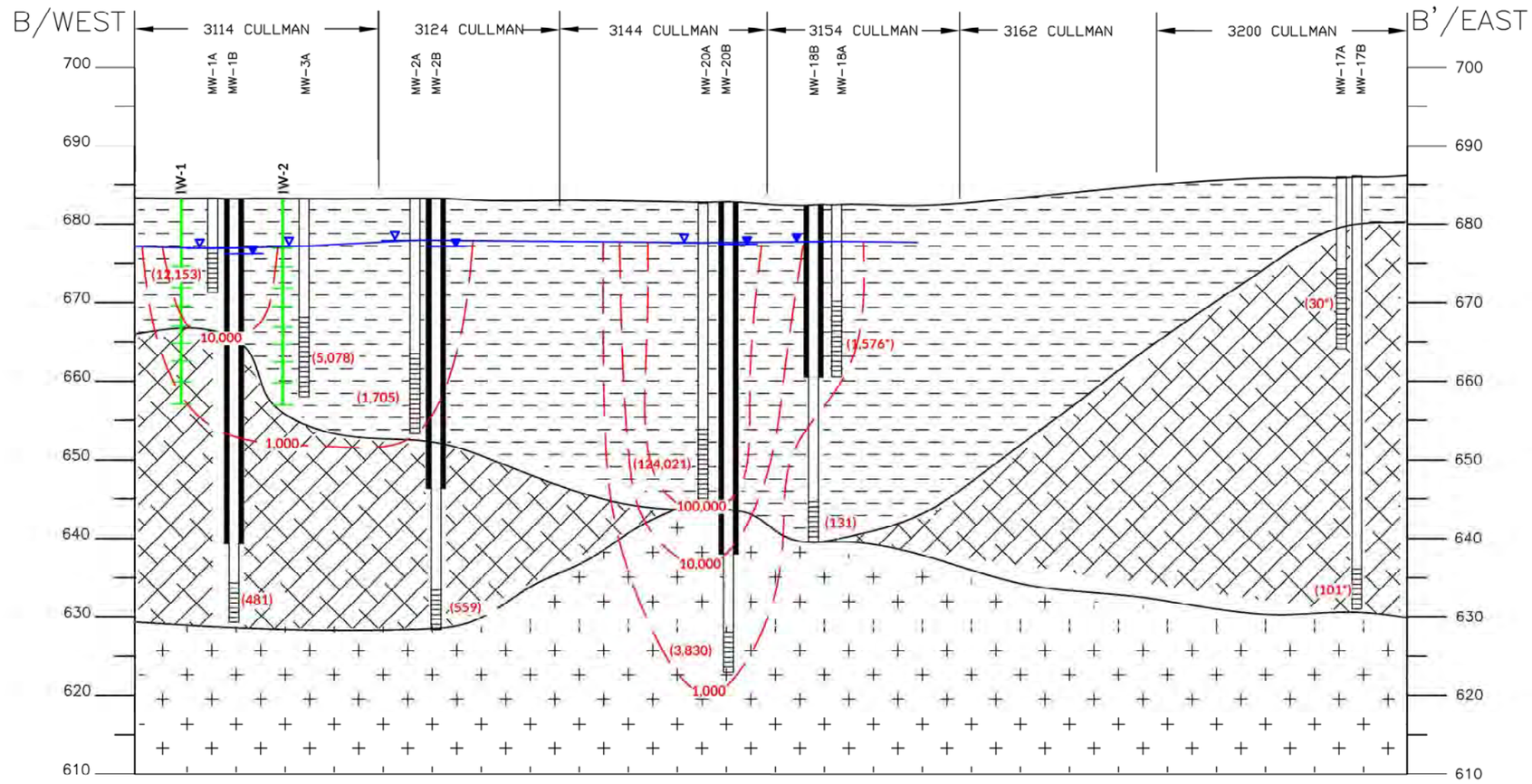
**TREX PROPERTIES, CHARLOTTE, NC**
3144 AND 3124 CULLMAN AVE.
CHARLOTTE, MECKLENBURG COUNTY, NC


WithersRavenel
Engineers | Planners | Surveyors
115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

LEGEND

- OUTER WELL CASING INTERVAL
- WELL SCREEN INTERVAL
- INNER WELL CASING INTERVAL
- INJECTION WELL
- SHALLOW GROUNDWATER ELEVATION
- DEEPER GROUNDWATER ELEVATION
- (5,200) TOTAL VOCs IN ug/L (2015)
- TOTAL VOCs IN ug/L ISOCONCENTRATION LINE
- RESIDUAL SOIL/SAPROLITE
- PARTIALLY WEATHERED BEDROCK
- COMPETENT ROCK

NOTE;
INFERRED BOUNDARIES BETWEEN GEOLOGIC UNITS ARE TRANSITIONAL.
*=RESULTS ARE FROM THE 9/25/12 SAMPLING EVENT




4X VERTICAL EXAGGERATION

GRAPHIC SCALE
0 35 70 140
1 inch = 140 ft.

FIGURE NO.: 10
PROJECT NO.: 02130430.06
DRAWN BY: CF
SCALE: 1"=70'
APPROVED BY: BB
DATE: 03/22/2016

# GEOLOGICAL CROSS SECTION B-B' WITH TOTAL VOCs IN GROUNDWATER RESULTS AND PROPOSED INJECTION POINTS

**TREX PROPERTIES, CHARLOTTE, NC**
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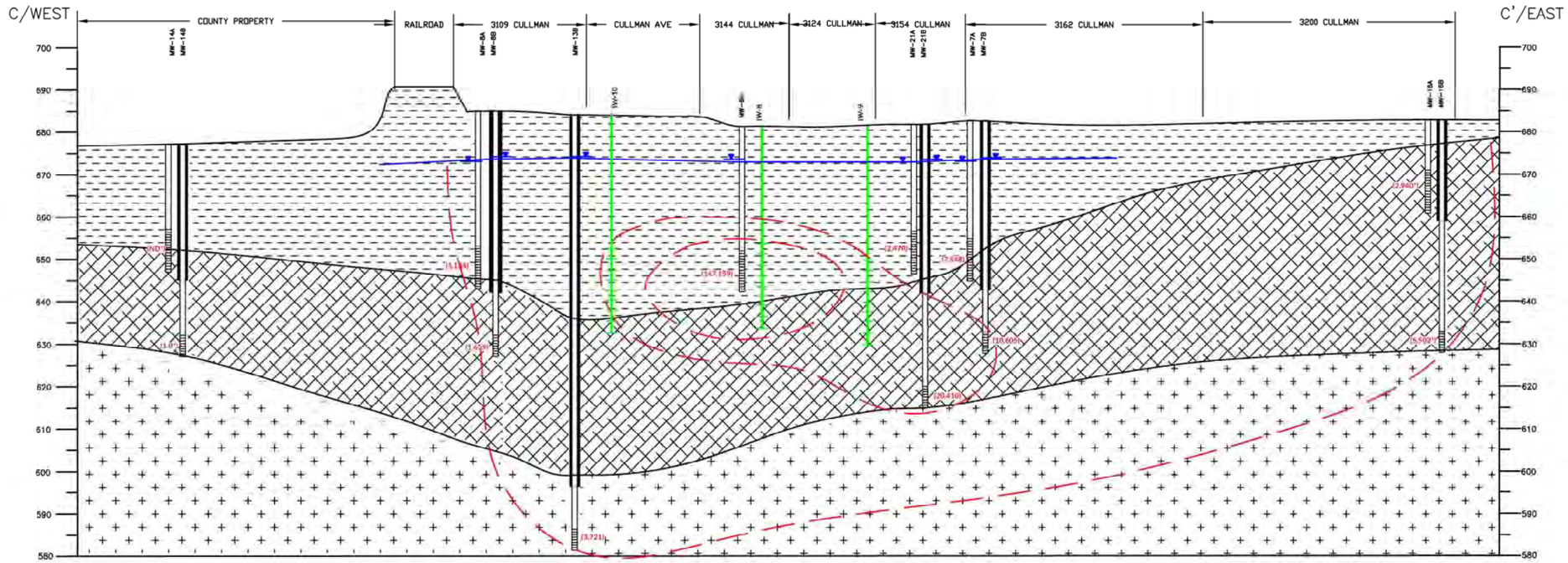
LEGEND

- OUTER WELL CASING INTERVAL
- WELL SCREEN INTERVAL
- INNER WELL CASING INTERVAL
- INJECTION WELL
- SHALLOW GROUNDWATER ELEVATION
- DEEPER GROUNDWATER ELEVATION
- (5,200) TOTAL VOCs (IN ug/L)
- TOTAL VOC ISOCONCENTRATION LINE (IN ug/L)
- RESIDUAL SOIL/SAPROLITE
- PARTIALLY WEATHERED BEDROCK
- COMPETENT ROCK

NOTE;
INFERRED BOUNDARIES BETWEEN GEOLOGIC UNITS ARE TRANSITIONAL.
*=RESULTS ARE FROM THE 9/25/12 SAMPLING EVENT.




4X VERTICAL EXAGGERATION

GRAPHIC SCALE

0 60 120 240

1 inch = 120 ft.

FIGURE NO.: 11

SCALE: 1"=120'

PROJECT NO.: 03130430.06

DRAWN BY: CF

DATE: 03/22/2016

APPROVED BY: BB

# GEOLOGICAL CROSS SECTION C-C' WITH TOTAL VOCs IN GROUNDWATER RESULTS AND PROPOSED INJECTION POINTS

**TREX PROPERTIES, CHARLOTTE, NC**
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## Table 1: Summary of Exsisting Monitoring Well Construction Information

**Trex Properties: 3114 and 3124 Cullman Avenue, Charlotte, NC**

**W&R Project No. 03130430.01**

| Well ID | Date Installed | Decimal Latitude | Decimal Longitude | Well Type | Total Depth of Well Casing (ft bgs) | Total Depth of Outer Casing (ft bgs) | Screened Interval (ft bgs) | Screened Material | Height of Top of Casing (ft ags) | Ground Surface Elevation (ft msl) | Top of Casing Elevation (ft msl) | Depth to PWR (ft bgs) | Top of PWR Elevation (ft msl) | Depth to Bedrock (ft bgs) | Top of Bedrock Elevation (ft msl) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PMW-1A | 09/14/12 | N 35.248662 | W 80.809590 | Type II | 12 | -- | 7-12 | Saprolite | 3.33 | 683.62 | 686.95 | 10 | 673.62 | -- | -- |
| PMW-1B | 09/13/12 | N 35.248650 | W 80.809583 | Type III | 54 | 44 | 49-54 | PWR | 3.75 | 683.12 | 686.87 | 10 | 673.12 | 55 | 628.12 |
| PMW-2A | 09/14/12 | N 35.248775 | W 80.809296 | Type II | 30 | -- | 20-30 | Saprolite | 3.58 | 683.76 | 687.34 | 30 | 653.76 | -- | -- |
| PMW-2B | 09/13/12 | N 35.248784 | W 80.809282 | Type III | 55 | 37 | 50-55 | PWR | 3.56 | 683.42 | 686.98 | 30 | 653.42 | 55 | 628.42 |
| PMW-3A | 09/14/12 | N 35.248720 | W 80.809485 | Type II | 25 | -- | 15-25 | Saprolite | 3.58 | 683.42 | 687.00 | 25 | 658.42 | -- | -- |
| PMW-4A | 06/14/12 | N 35.248890 | W 80.809644 | Type II | 12 | -- | 2-12 | Saprolite | 3.41 | 687.45 | 690.86 | -- | -- | -- | -- |
| PMW-5A | 06/13/12 | N 35.249154 | W 80.809816 | Type II | 39 | -- | 29-39 | PWR | -0.28 | 683.88 | 683.60 | 25 | 658.88 | -- | -- |
| PMW-6A | 06/12/12 | N 35.249330 | W 80.809620 | Type II | 38 | -- | 28-38 | PWR | -0.31 | 684.07 | 683.76 | 30 | 654.07 | -- | -- |
| PMW-7A | 06/12/12 | N 35.249592 | W 80.808951 | Type II | 38 | -- | 28-38 | PWR | -0.25 | 683.92 | 683.67 | 30 | 653.92 | -- | -- |
| PMW-7B | 06/25/12 | N 35.249583 | W 80.808930 | Type III | 55 | 40 | 50-55 | PWR | -0.30 | 684.34 | 684.04 | 30 | 654.34 | -- | -- |
| PMW-8A | 06/11/12 | N 35.249319 | W 80.810339 | Type II | 42 | -- | 32-42 | PWR | -0.34 | 685.10 | 684.76 | 35 | 650.10 | -- | -- |
| PMW-8B | 06/21/12 | N 35.249342 | W 80.810325 | Type III | 58 | 43 | 53-58 | PWR | -0.33 | 685.31 | 684.98 | 35 | 650.31 | -- | -- |
| PMW-9A | 06/08/12 | N 35.249864 | W 80.809364 | Type II | 19 | -- | 9-19 | Saprolite | -0.29 | 683.61 | 683.32 | -- | -- | -- | -- |
| PMW-9B | 06/13/12 | N 35.249860 | W 80.809382 | Type II | 34 | -- | 24-34 | Saprolite | -0.25 | 683.66 | 683.41 | 30 | 653.66 | -- | -- |
| PMW-9C | 06/21/12 | N 35.249852 | W 80.809409 | Type III | 50 | 35 | 45-50 | PWR | -0.26 | 683.83 | 683.57 | 30 | 653.83 | -- | -- |
| PMW-10A | 06/11/12 | N 35.249839 | W 80.809968 | Type II | 63 | -- | 53-63 | PWR | -0.31 | 683.25 | 682.94 | 55 | 628.25 | -- | -- |
| PMW-10B | 06/21/12 | N 35.249789 | W 80.809963 | Type III | 73 | 64 | 68-73 | PWR | -0.32 | 683.49 | 683.17 | 55 | 628.49 | 73 | 610.49 |
| PMW-11A | 06/12/12 | N 35.249696 | W 80.810347 | Type II | 63 | -- | 53-63 | PWR | -0.29 | 682.91 | 682.62 | 55 | 627.91 | -- | -- |
| PMW-11B | 06/21/12 | N 35.249676 | W 80.810344 | Type III | 78 | 63 | 73-78 | PWR | -0.30 | 683.11 | 682.81 | 55 | 628.11 | 78 | 605.11 |
| PMW-12A | 06/25/12 | N 35.249935 | W 80.810901 | Type II | 40 | -- | 30-40 | PWR | -0.32 | 681.89 | 681.57 | 20 | 661.89 | -- | -- |
| PMW-12B | 06/25/12 | N 35.249943 | W 80.810893 | Type III | 49 | 42 | 44-49 | PWR | -0.31 | 682.01 | 681.70 | 20 | 662.01 | 49 | 633.01 |
| PMW-13B | 07/12/12 | N 35.249474 | W 80.810109 | Type III | 103 | 88 | 98-103 | Bedrock | -0.28 | 685.55 | 685.27 | 50 | 635.55 | 88 | 597.55 |
| PMW-14A | 09/19/12 | N 35.249161 | W 80.811296 | Type II | 30 | -- | 20-30 | Saprolite | 2.89 | 678.25 | 681.14 | 25 | 653.25 | -- | -- |
| PMW-14B | 09/19/12 | N 35.249159 | W 80.811280 | Type III | 50 | 32 | 45-50 | PWR | 2.85 | 678.15 | 681.00 | 25 | 653.15 | -- | -- |
| PMW-16A | 09/19/12 | N 35.249751 | W 80.808092 | Type II | 22 | -- | 12-22 | PWR | -0.28 | 683.54 | 683.26 | 5 | 678.54 | -- | -- |
| PMW-16B | 09/19/12 | N 35.249751 | W 80.808074 | Type III | 55 | 24 | 50-55 | PWR | -0.30 | 683.67 | 683.37 | 5 | 678.67 | 55 | 628.67 |
| PMW-17A | 09/19/12 | N 35.249333 | W 80.807911 | Type II | 22 | -- | 12-22 | PWR | -0.31 | 686.53 | 686.22 | 5.5 | 681.03 | -- | -- |
| PMW-17B | 09/12/12 | N 35.249305 | W 80.807897 | Type II | 50 | -- | 45-50 | PWR | -0.29 | 686.40 | 686.11 | 5.5 | 680.90 | 55 | 631.40 |
| PMW-18A | 09/14/12 | N 35.248972 | W 80.808679 | Type II | 22 | -- | 12-22 | Saprolite | 3.58 | 682.69 | 686.27 | 22 | 660.69 | -- | -- |
| PMW-18B | 09/14/12 | N 35.248965 | W 80.808696 | Type III | 43 | 22 | 38-43 | PWR | 3.50 | 682.90 | 686.40 | 22 | 660.90 | 43 | 639.90 |
| PMW-20A | 12/11/14 | N 35.248998 | W 80.808867 | Type II | 39 | -- | 34-39 | Saprolite | 2.75 | 683.28 | 686.03 | 39 | -- | -- | 643.98 |
| PMW-20B | 12/09/14 | N 35.248990 | W 80.808881 | Type III | 60 | 45 | 55-60 | Rock | 3.32 | 683.32 | 686.64 | -- | -- | 39 | 644.02 |
| PMW-21A | 12/02/14 | N 35.249524 | W 80.809077 | Type II | 35 | -- | 30-35 | Saprolite | -0.41 | 683.62 | 683.21 | 35 | 648.31 | -- | -- |
| PMW-21B | 12/03/14 | N 35.249520 | W 80.809094 | Type III | 67 | 40 | 62-67 | PWR | -0.31 | 683.57 | 683.26 | 35 | 648.27 | 67 | 616.27 |
| PMW-22A | 12/08/14 | N 35.250615 | W 80.809111 | Type II | 63 | -- | 58-63 | Saprolite | 3.10 | 683.93 | 687.03 | 63 | 620.81 | -- | -- |
| PMW-22B | 12/09/14 | N 35.250636 | W 80.809114 | Type III | 86 | 70 | 81-86 | PWR | 2.64 | 684.24 | 686.88 | 63 | 621.15 | 85 | 599.15 |

**Notes:**

1. ft bgs = Feet below ground surface
2. ft toc = Feet below top of casing
3. ft ags  Feet above ground surface
4. ft msl  Feet above mean sea level
5. PWR = Partially Weathered Rock.
6. -- = Not Applicable

## Table 2: Summary of Proposed Injection Well Construction Information

**Trex Properties: 3114 and 3124 Cullman Avenue, Charlotte, NC**

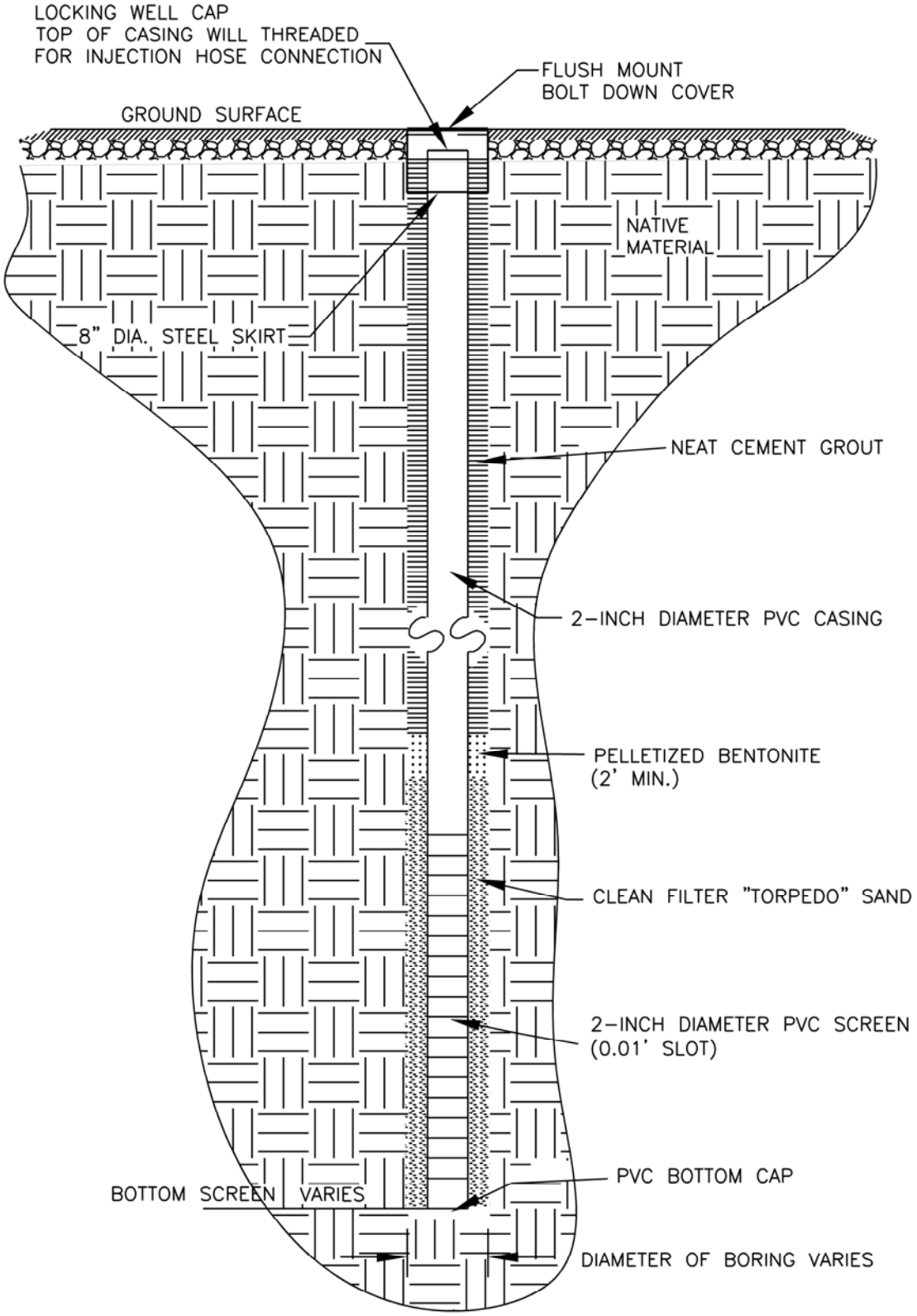
**W&R Project No. 03130430.06**

| Well ID | Status | Well Installation | Well Type | Depth to PWR (ft bgs) | Total Depth of Well Casing (ft bgs) | Screened Interval (ft bgs) | Screened Material | Portland Grout Interval (ft bgs) | Bentonite Seal Interval (ft bgs) | #2 Sand Pack Interval (ft bgs) | Surface Completion |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IW-1 | Proposed | Permanent | Single casing PVC | 10 | 26 | 6-26 | Saprolite/PWR | 0-3 | 3-5 | 5-26 | Flush Mount Bolt Down Cover |
| IW-2 | Proposed | Permanent | Single casing PVC | 25 | 26 | 6-26 | Saprolite/PWR | 0-3 | 3-5 | 5-26 | Flush Mount Bolt Down Cover |
| IW-3 | Proposed | Permanent | Single casing PVC | 25 | 31 | 11-31 | Saprolite/PWR | 0-8 | 8-10 | 10-31 | Flush Mount Bolt Down Cover |
| IW-4 | Proposed | Permanent | Single casing PVC | 25 | 39 | 19-39 | Saprolite/PWR | 0-16 | 16-18 | 18-39 | Flush Mount Bolt Down Cover |
| IW-5 | Proposed | Permanent | Single casing PVC | 25 | 39 | 19-39 | SaprolitePWR | 0-16 | 16-18 | 18-39 | Flush Mount Bolt Down Cover |
| IW-6 | Proposed | Permanent | Single casing PVC | 30 | 39 | 19-39 | SaprolitePWR | 0-16 | 16-18 | 18-39 | Flush Mount Bolt Down Cover |
| IW-7 | Proposed | Permanent | Single casing PVC | 25 | 39 | 19-39 | Saprolite/PWR | 0-16 | 16-18 | 18-39 | Flush Mount Bolt Down Cover |
| IW-8 | Proposed | Permanent | Single casing PVC | 30 | 47 | 27-47 | Saprolite/PWR | 0-24 | 24-26 | 26-47 | Flush Mount Bolt Down Cover |
| IW-9 | Proposed | Permanent | Single casing PVC | 30 | 51 | 31-51 | Saprolite/PWR | 0-29 | 29-30 | 30-51 | Flush Mount Bolt Down Cover |
| IW-10 | Proposed | Permanent | Single casing PVC | 50 | 51 | 31-51 | Saprolite/PWR | 0-29 | 29-30 | 30-51 | Flush Mount Bolt Down Cover |
| IW-11 | Proposed | Permanent | Single casing PVC | 50 | 51 | 31-51 | Saprolite/PWR | 0-29 | 29-30 | 30-51 | Flush Mount Bolt Down Cover |
| IW-12 | Proposed | Permanent | Single casing PVC | 40 | 64 | 44-64 | PWR | 0-39 | 39-43 | 43-64 | Flush Mount Bolt Down Cover |
| IW-13 | Proposed | Permanent | Single casing PVC | 35 | 64 | 44-64 | PWR | 0-39 | 39-43 | 43-64 | Flush Mount Bolt Down Cover |
| IW-14 | Proposed | Permanent | Single casing PVC | 55 | 73 | 53-73 | PWR | 0-50 | 50-52 | 52-73 | Flush Mount Bolt Down Cover |
| IW-15 | Proposed | Permanent | Single casing PVC | 55 | 73 | 53-73 | PWR | 0-50 | 50-52 | 52-73 | Flush Mount Bolt Down Cover |
| IW-16 | Proposed | Permanent | Single casing PVC | 55 | 73 | 53-73 | PWR | 0-50 | 50-52 | 52-73 | Flush Mount Bolt Down Cover |
| IW-17 | Proposed | Permanent | Single casing PVC | 55 | 73 | 53-73 | PWR | 0-50 | 50-52 | 52-73 | Flush Mount Bolt Down Cover |
| IW-18 | Proposed | Permanent | Single casing PVC | 55 | 73 | 53-73 | PWR | 0-50 | 50-52 | 52-73 | Flush Mount Bolt Down Cover |
| IW-19 | Proposed | Permanent | Single casing PVC | 55 | 73 | 53-73 | PWR | 0-50 | 50-52 | 52-73 | Flush Mount Bolt Down Cover |
| IW-20 | Proposed | Permanent | Single casing PVC | 55 | 73 | 53-73 | PWR | 0-50 | 50-52 | 52-73 | Flush Mount Bolt Down Cover |

**Notes:**

1. ft bgs = Feet below ground surface
2. PWR = Partially Weathered Rock.

INJECTION WELL CONSTRUCTION
(TYPICAL)




NOTE: INJECTION WELL INTERVALS VARY DEPENDING ANALYTICAL RESULTS FOR THE EXISTING GROUNDWATER MONITORING WELLS. PLEASE REFER TO TABLE 2 FOR SPECIFIC WELL CONSTRUCTION DETAILS.

WithersRavenel
Engineers | Planners | Surveyors
115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

**TREX PROPERTIES, CHARLOTTE, NC**
3144 AND 3124 CULLMAN AVE.
CHARLOTTE, MECKLENBURG COUNTY, NC

**NESTED INJECTION WELL CONSTRUCTION**

| DRAWN BY: | SCALE: | FIGURE NO.: |
|---|---|---|
| CF | NTS | 1 |
| APPROVED BY: | DATE: | PROJECT NO.: |
| BB | 3/21/2016 | 03130430 |

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# ATTACHMENT 2

# HYDROGEOLOGIC EVALUATION

# Trex Properties, Charlotte NC

## 1.1 TOPOGRAPHY, SURFACE WATER AND DRAINAGE

The subject properties are located on relatively flat land, which according to the Derita, North Carolina USGS 7.5 minute Topographic Map of the area (**Figure 1**) occurs at an elevation approximately 690 feet above the North American Vertical Datum of 1988. As shown in **Figure 2**, the land surface topography rises sharply at the southern property boundary where the railroad lines are located, and slopes gently downward to the north towards Little Sugar Creek.

Little Sugar Creek and associated tributaries are the primary surface water features in the immediate vicinity of the site. The northern boundaries of the subject properties are located approximately 150 feet to the south of Little Sugar Creek, which flows to the west towards downtown Charlotte.

## 1.2 GEOLOGY and HYDROGEOLOGY

The site is located within a geologic terrain known as the Charlotte Belt, which is part of the Piedmont Physiographic Province. The topography of the Piedmont is commonly characterized by low rounded hills and long northeast to southwest trending ridges with incised creek channels. The Charlotte Belt consists primarily of moderately metamorphosed coarse grained igneous rocks including granite, diorite and gabbro. The soil profile in the Piedmont is formed by the in-place chemical and physical weathering of the underlying rock. The most highly weathered materials occur near the land surface and typically contain appreciable amounts of clay generated through chemical alteration of feldspar minerals that are part of the parent rock.

With increasing depth in the soil profile the degree of weathering and amount of clay minerals decreases and the appearance and texture of the soil begin to resemble those of the underlying parent rock. This material which has the appearance of rock but which is unconsolidated is known as saprolite. With increasing depth the saprolite becomes more consolidated until the point where it can no longer be penetrated by mechanical drilling machinery such as direct push equipment or hollow stem augers. Geologic material below this point is referred to as partially weathered rock (PWR), which is often the most permeable part of the soil profile. The PWR becomes more consolidated with depth and gradually transitions into fully consolidated bedrock.

Rainfall that does not a) run off, b) get absorbed by plants, or c) evaporate, infiltrates the soil profile until it reaches the water table. Below the water table, all porous saprolite or PWR and fractures within underlying bedrock are saturated with groundwater. These

saturated subsurface materials comprise the unconfined aquifer that underlies the site. The Geologic Map of North Carolina (1985) and descriptions of rock samples obtained from deeper well borings at the site by previous investigators suggest that the parent rock in the area is a meta-diorite, which is a coarse grained igneous rock that has been moderately metamorphosed. Rock of this type would be expected to weather into a typical Piedmont soil profile that coarsens with depth and that does not contain confining layers. Therefore horizontal layers that restrict the vertical movement of groundwater should not be present within the aquifer that underlies the site.

The presence of fractures in the upper portion of bedrock in Piedmont settings in North Carolina is not uncommon and is to be expected. However, experience has shown that attempting to fully characterize the nature and extent of fractures under a site such as this would be a cost prohibitive exercise of questionable value. Experience at this and other Piedmont sites has shown that the direction of groundwater flow through partially weathered rock and competent bedrock is controlled by hydraulic gradients, and that groundwater will move from areas of higher hydraulic head (groundwater at higher elevation) to areas of lower hydraulic head. This is true for flow through either porous or fractured media.

**Table 1** contains information on the construction of the permanent monitoring wells installed in the vicinity of the site, including which portion of the aquifer the well screen is set within (saprolite, PWR or bedrock). **Table 2** contains depth to groundwater measurements and groundwater elevations at well locations that were accessible on September 22 and 23, 2015. The groundwater elevation data for the shallow wells screened within saprolite are plotted and contoured in **Figure 4** to depict the direction of groundwater flow in the shallower portion of the aquifer.

The groundwater elevation data for wells screened within the PWR portion of the aquifer are plotted and contoured in **Figure 5** to illustrate the direction of groundwater flow in the deeper portion of the aquifer. The positions of the groundwater elevation contours on both **Figures 4** and **5** are very similar and both imply northerly directions of groundwater flow towards Little Sugar Creek, which makes intuitive sense and is consistent with previous determinations.

The groundwater elevations shown in **Table 2** and on **Figures 4** and **5** indicate that the highest groundwater elevation in the saprolite/partially weathered rock portion of the aquifer was measured at PMW-20A, and that highest groundwater elevation in the bedrock was measured at PMW-20B. Therefore, we expect that groundwater flows away from this area towards the north and northwest as illustrated in **Figures 4** and **5**. Additionally, we would not expect

groundwater occurring at lower elevations to flow towards the PMW-20 well pair as the hydraulic head relationship would not allow such flow.

Little Sugar Creek is a perennial surface water feature that has been present at its current location for a very long time. The creek occupies the topographically lowest area between higher topographic elevations to the north and south. Water within the creek comes from surface water runoff from the north, south and east, and flows to the west towards the city of Charlotte. The creek is considered to be a perennial stream because it exhibits water flow throughout the year, even during dryer times of the year. Water present within the stream during dryer times comes from groundwater discharge from both north and south sides of the creek. The creek is the area where groundwater flowing southward from the north meets groundwater flowing northward from the south, as illustrated in the groundwater elevation contour maps discussed above.

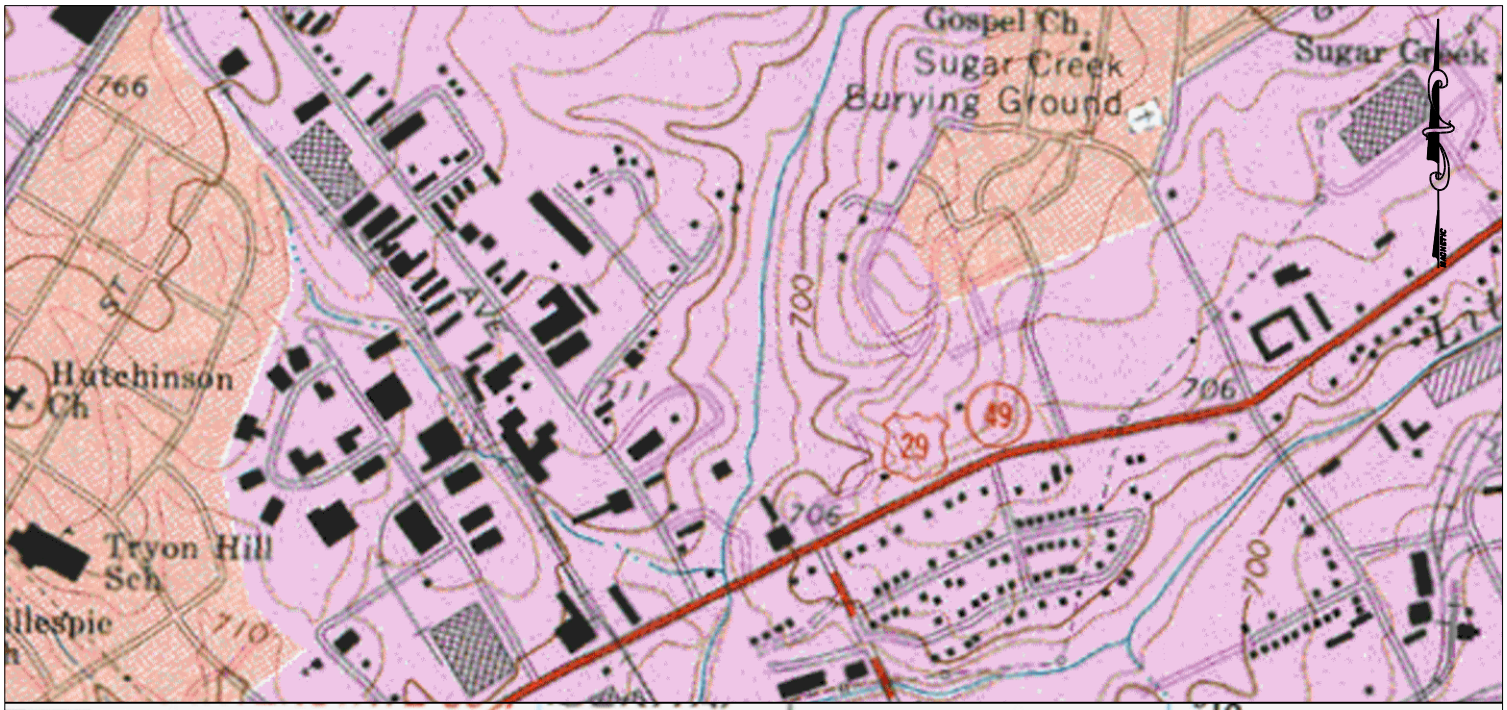
As shown in **Table 2**, the hydraulic head or groundwater elevation in the deeper portion of the aquifer at well pairs located proximal to Little Sugar Creek is higher than that in the shallow portion of the aquifer, which indicates the presence of an upward component of groundwater flow. This is the case at PMW-7A & B, PMW-8A & B, PMW-9A, B & C, PMW-10A & B, PMW-12A & B, PMW-21A & B, and PMW-22A & B. The groundwater elevation measured in PMW-11A was higher than that in deeper well PMW-11B when the water levels were measured on September 22, 2015. However, when these wells were measured during the September 25, 2012 groundwater sampling event documented in Amec's April 5, 2015 Draft Interim Report Addendum, the water level in deeper well PMW-11B was 0.27 feet higher than that in PMW-11A, indicating the presence of an upward component of groundwater flow.

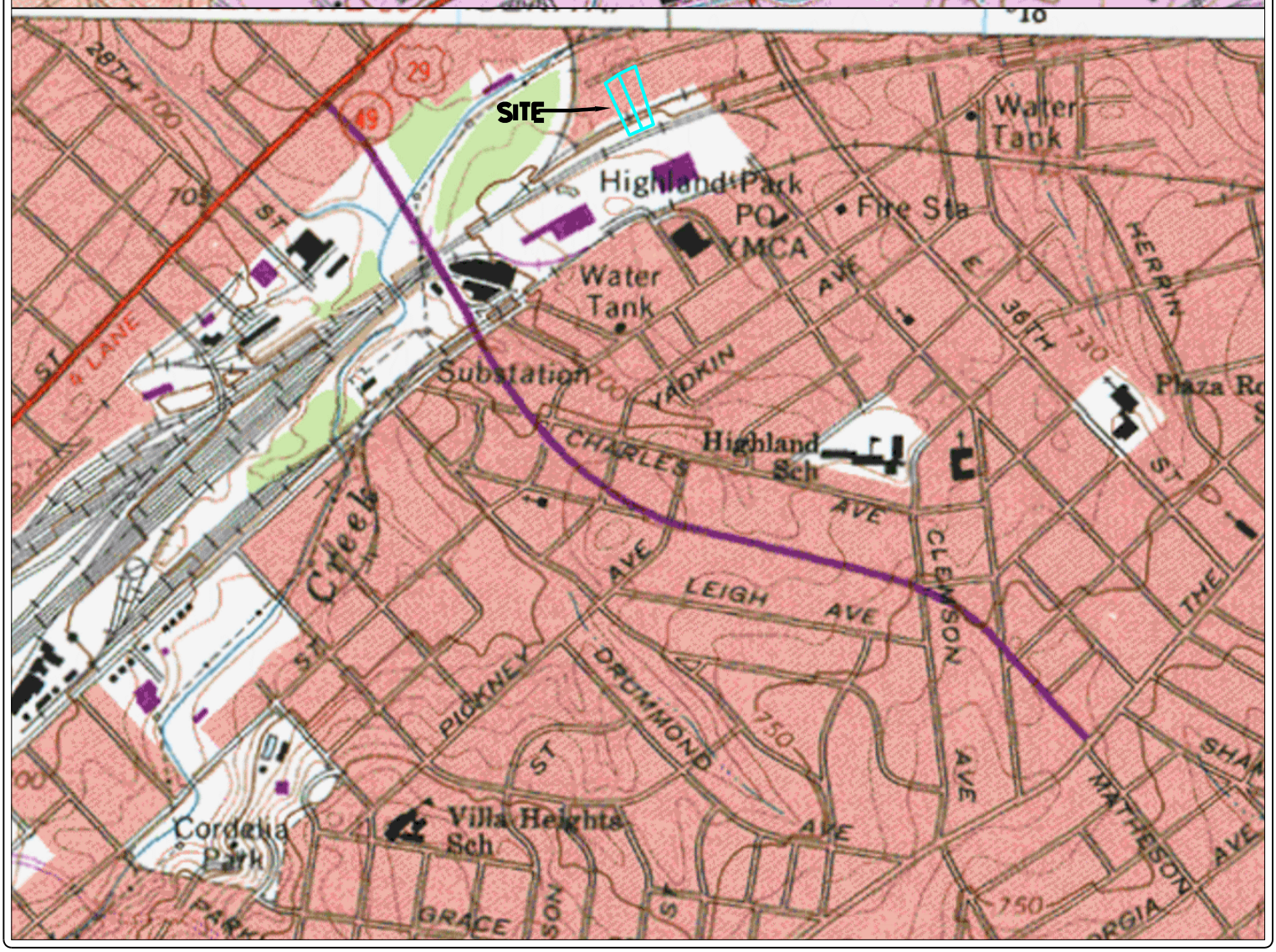
Conversely, the hydraulic head in the shallow portion of the aquifer is higher than that in the deeper portion at locations that are distant from the creek, particularly PMW-1A & B, PMW-2A & B, and PMW-20A & B. This is typical of recharge areas where there is a downward component of groundwater flow.

Additionally, the absence of contaminants associated with the site in two sets of groundwater samples from off-site wells PMW-22A & B, which are located on the north side of the creek, indicates that Little Sugar Creek is acting as a barrier that prevents groundwater from south of the creek from moving further to the north. The concept that groundwater in the vicinity of the site is discharging into Little Sugar Creek is supported by previous analyses of surface water from the creek provided in Amec's 2012 Phase II Interim Report, which show detectable concentrations of contaminants in all samples collected at various locations along the creek.

All of the lines of evidence described above imply that Little Sugar Creek acts not only as a groundwater discharge area, but as a hydraulic barrier that prevents the movement of groundwater from the south side of the creek to its north side, and vice versa.

The geologic cross-sections provided in **Figures 6 through 9** provide four different views of the subsurface, and variations in the approximate thickness of the saprolite and PWR across the area of investigation. The cross-sections also show the variations in the depth to competent bedrock across the site. In general, the depth to bedrock increases with proximity to Little Sugar Creek.

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*GENERAL LOCATION MAP*

*TREX PROPERTIES, CHARLOTTE, NC*
*CHARLOTTE, NORTH CAROLINA*

*USGS CHARLOTTE EAST, NC*
*7.5 min. Quadrangle*

| DRAWN BY: | SCALE: | FIGURE NO. |
|---|---|---|
| CF | 1"=1000' | 1 |
| APPROVED BY: | DATE: | JOB NO: |
| BB | 10/08/15 | 03130430 |

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| No. | Description | Date | By |
| | | | |
| | | | |

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3114 AND 3124 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

MONITORING WELL LOCATION AND TOPOGRAPHIC MAP

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 1/13/15 |

| Job No. | 03130430 |
|---|---|
| Sheet No. | 2 |

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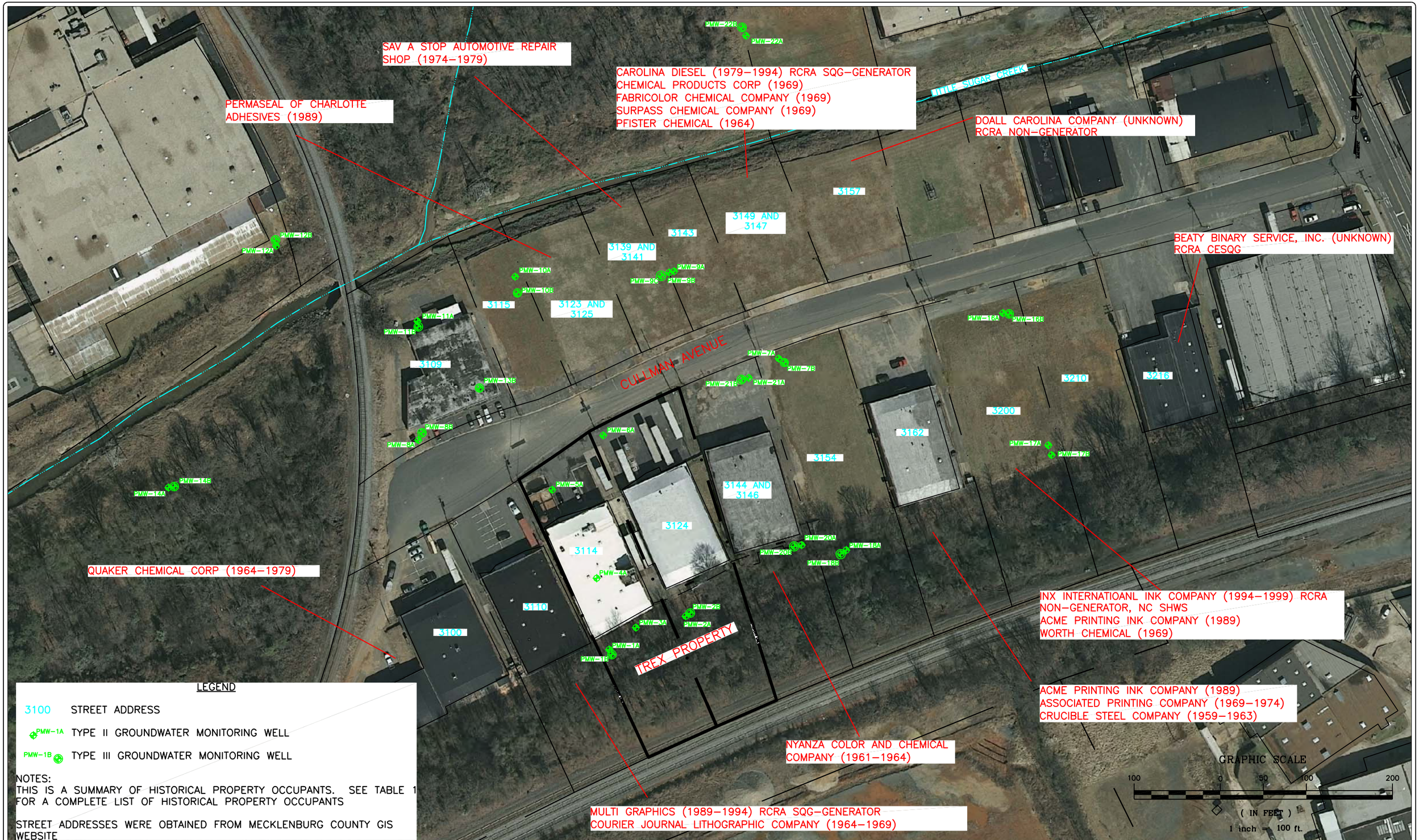


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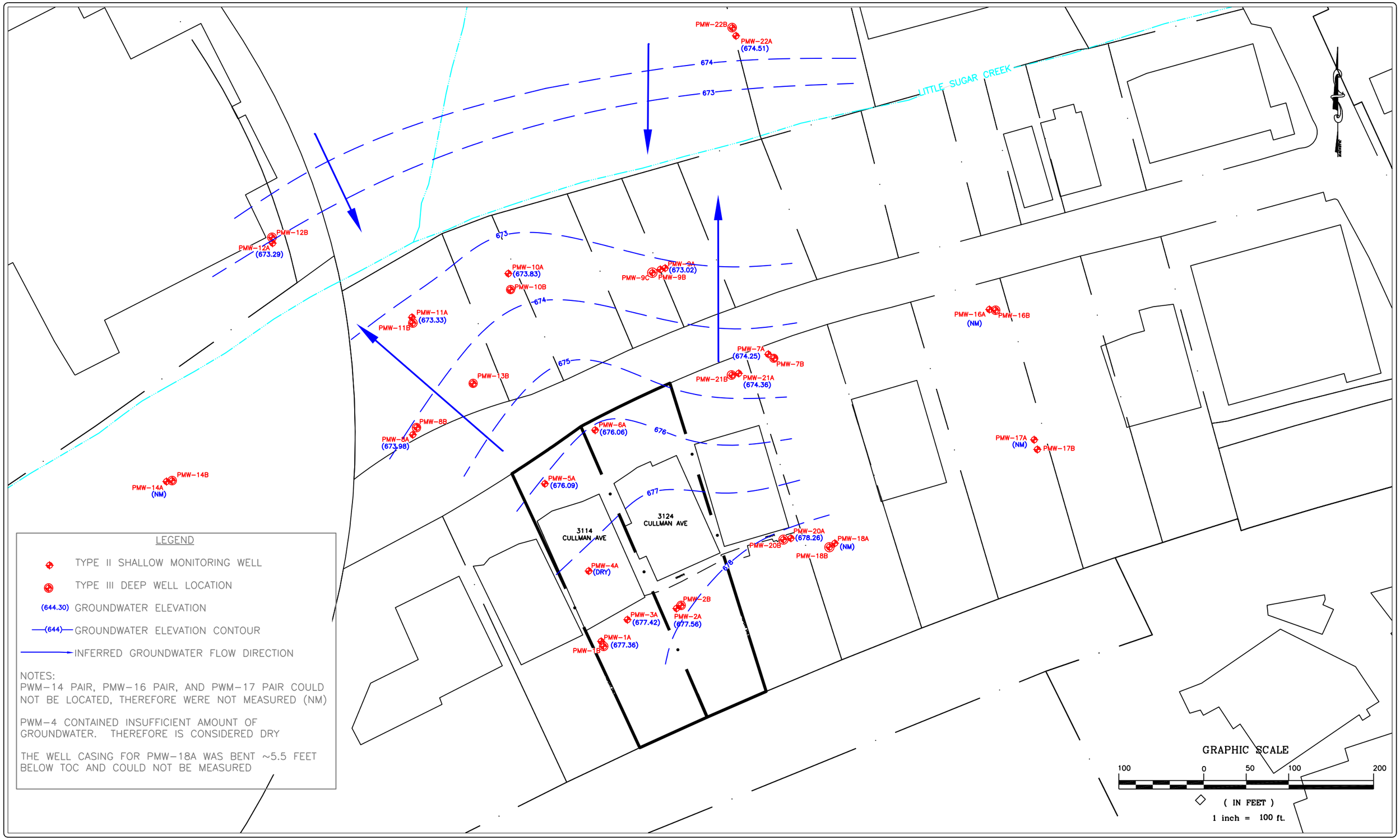
|---|---|---|---|
| No. | Description | Date | By |
| | | | |

*TREX PROPERTIES CHARLOTTE, NC*
*3114 AND 3124 CULLMAN AVE*
*CHARLOTTE, NORTH CAROLINA*

*VICINITY MAP SHOWING FORMER PROPERTY USE ON CULLMAN AVENUE*

Drawn By CF
Checked By BB
Scale 1"=100'
Date 1/13/15
Job No. 03130430
Sheet No. 3

W:\13\13-0430\130430.04-TREX HISTORICAL REVIEW\CAD\TREX PROPERTY - BASEMAP.DWG 11/22/2015 8:44 AM FAY, CHRISTOPHER 1:1




LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- (644.30) GROUNDWATER ELEVATION
- —(644)— GROUNDWATER ELEVATION CONTOUR
- INFERRED GROUNDWATER FLOW DIRECTION

NOTES:
PWM-14 PAIR, PMW-16 PAIR, AND PWM-17 PAIR COULD NOT BE LOCATED, THEREFORE WERE NOT MEASURED (NM)

PWM-4 CONTAINED INSUFFICIENT AMOUNT OF GROUNDWATER. THEREFORE IS CONSIDERED DRY

THE WELL CASING FOR PMW-18A WAS BENT ~5.5 FEET BELOW TOC AND COULD NOT BE MEASURED

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| No. | Description | Date | By |
| | | | |
| | | | |

TREX PROPERTIES CHARLOTTE, NC
3114 AND 3124 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

SHALLOW GROUNDWATER ELEVATION CONTOUR MAP

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

| Job No. | 03130430 |
|---|---|
| Sheet No. | 4 |

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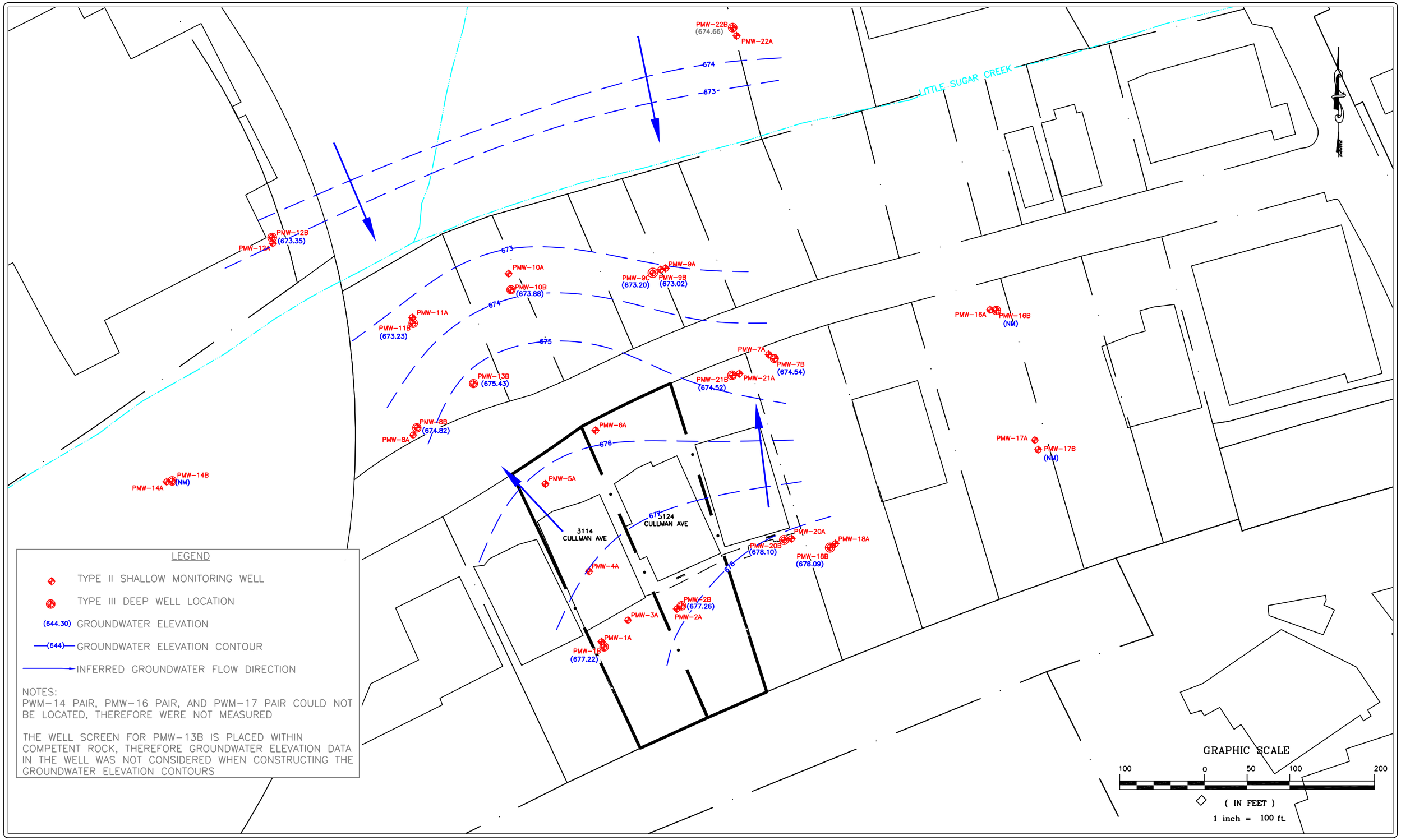


LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- (644.30) GROUNDWATER ELEVATION
- —(644)— GROUNDWATER ELEVATION CONTOUR
- INFERRED GROUNDWATER FLOW DIRECTION

NOTES:
PWM-14 PAIR, PMW-16 PAIR, AND PWM-17 PAIR COULD NOT BE LOCATED, THEREFORE WERE NOT MEASURED

THE WELL SCREEN FOR PMW-13B IS PLACED WITHIN COMPETENT ROCK, THEREFORE GROUNDWATER ELEVATION DATA IN THE WELL WAS NOT CONSIDERED WHEN CONSTRUCTING THE GROUNDWATER ELEVATION CONTOURS

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|---|---|---|---|
| No. | Description | Date | By |
| | | | |
| | | | |

TREX PROPERTIES CHARLOTTE, NC
3114 AND 3124 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

DEEP GROUNDWATER ELEVATION CONTOUR MAP

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

| Job No. | 03130430 |
|---|---|
| Sheet No. | 5 |

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LEGEND

OUTER WELL CASING INTERVAL

WELL SCREEN INTERVAL

INNER WELL CASING INTERVAL

(2.8) PCE CONCENTRATION

[2.8] TCE CONCENTRATION

{2.8} Cis 1,2 DCE CONCENTRATION

/2.8/ 1,4 DIOXANE CONCENTRATION

\2.8\ 1,1 DCE CONCENTRATION

SHALLOW GROUNDWATER TABLE

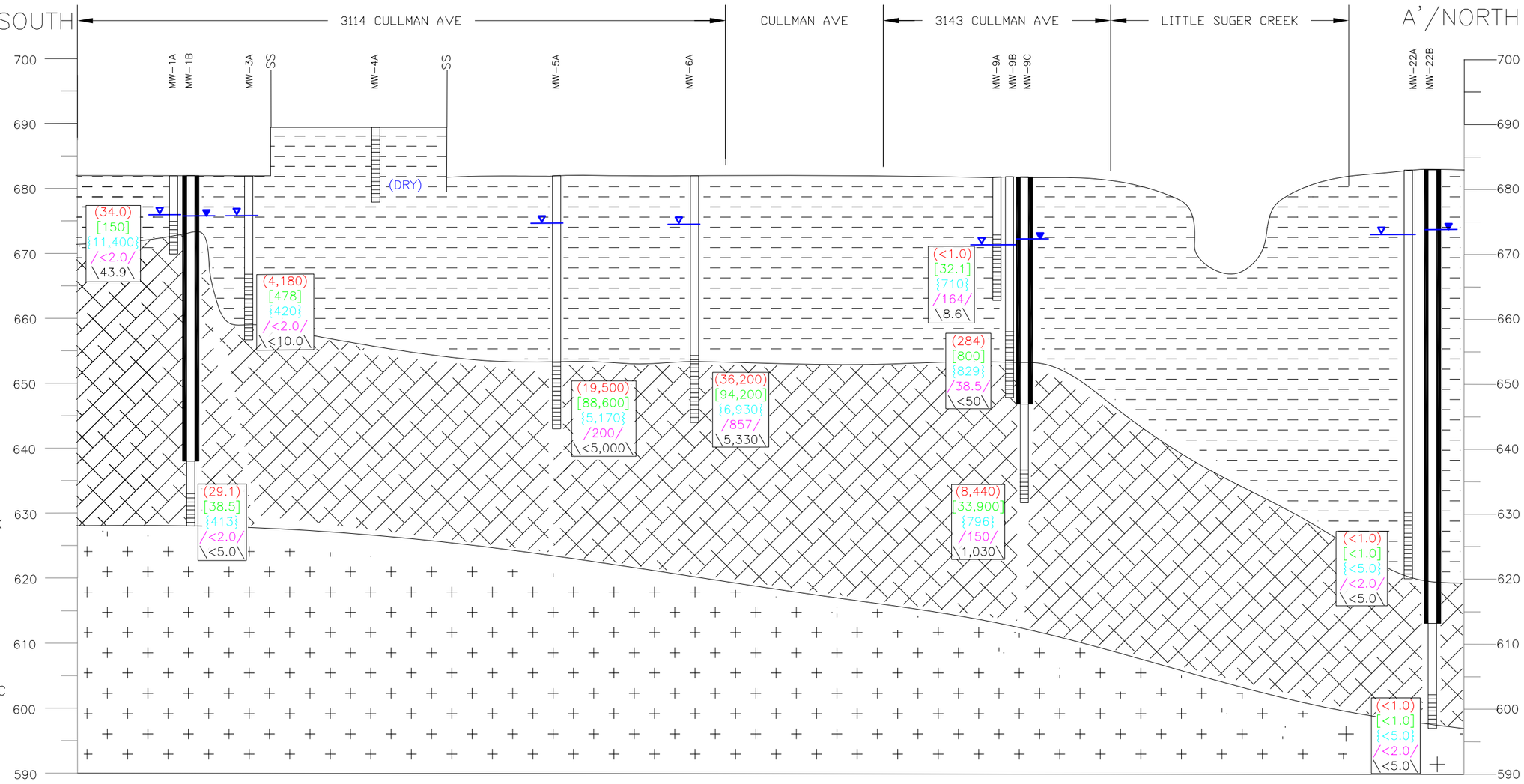
DEEPER GROUNDWATER TABLE

RESIDUAL SOIL/SAPROLITE

PARTIALLY WEATHERED BEDROCK

COMPETENT ROCK

NOTE;
INFERRED BOUNDARIES BETWEEN GEOLOGIC UNITS ARE TRANSITIONAL.




4X VERTICAL EXAGGERATION

GRAPHIC SCALE

70 0 35 70 140

( IN FEET )

1 inch = 70 ft.

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|---|---|---|---|
| No. | Description | Date | By |
| | | | |

DETREX FACILITY
3114 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

GEOLOGICAL CROSS SECTION A-A' WITH ANALYTICAL RESULTS

| Drawn By | Scale |
|---|---|
| CF | 1"=70' |
| Checked By | Date |
| BB | 10/13/15 |

Job No. 03130430
Sheet No. 6

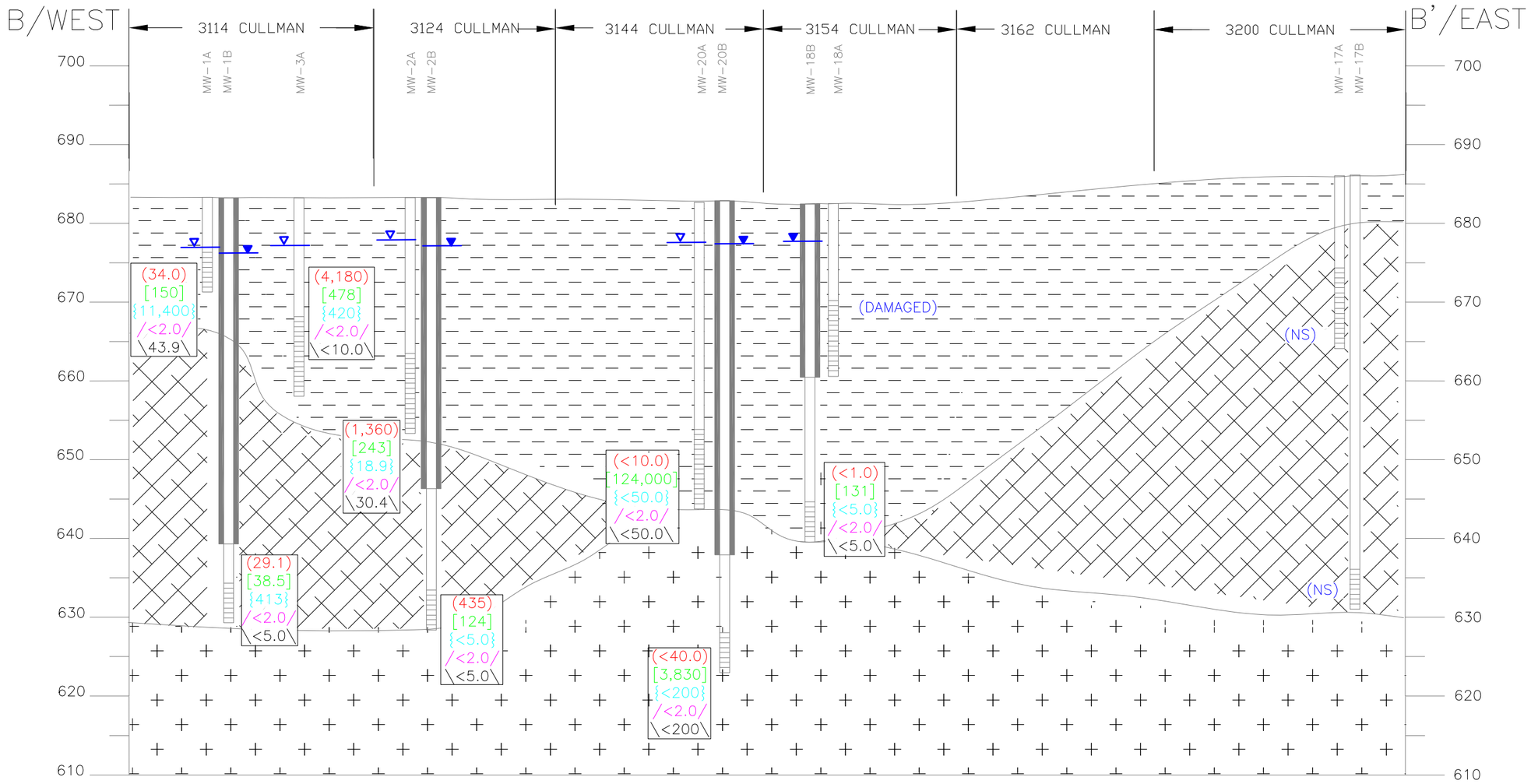
W:\13\13-0430\130430.01-TREX CHARLOTTE OFF SITE WELLS\CAD\TREX PROPERTY - CROSS SECTIONS-GW ASSESSMENT-20151009.DWG 11/2/2015 4:01 PM FAY, CHRISTOPHER 1:1

LEGEND

- OUTER WELL CASING INTERVAL
- WELL SCREEN INTERVAL
- INNER WELL CASING INTERVAL
- (2.8) PCE CONCENTRATION
- [2.8] TCE CONCENTRATION
- {2.8} Cis 1,2 DCE CONCENTRATION
- /2.8/ 1,4 DIOXANE CONCENTRATION
- \2.8\ 1,1 DCE CONCENTRATION
- SHALLOW GROUNDWATER TABLE
- DEEPER GROUNDWATER TABLE
- RESIDUAL SOIL/SAPROLITE
- PARTIALLY WEATHERED BEDROCK
- COMPETENT ROCK

NOTE;
INFERRED BOUNDARIES BETWEEN GEOLOGIC UNITS ARE TRANSITIONAL.

NS=NOT SAMPLED




4X VERTICAL EXAGGERATION

GRAPHIC SCALE

60 0 30 60 120

( IN FEET )

1 inch = 60 ft.

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|---|---|---|---|
| No. | Description | Date | By |
| | | | |

DETREX FACILITY
3114 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

GEOLOGICAL CROSS SECTION B-B' WITH ANALYTICAL RESULTS

Drawn By CF
Checked By BB
Scale 1"=60'
Date 10/13/15

Job No. 03130430
Sheet No. 7

W:\13\13-0430\130430.01-TREX CHARLOTTE OFF SITE WELLS\CAD\TREX PROPERTY - CROSS SECTIONS-GW ASSESSMENT-20151009.DWG 11/2/2015 4:03 PM FAY, CHRISTOPHER 1:1

LEGEND

OUTER WELL CASING INTERVAL

WELL SCREEN INTERVAL

INNER WELL CASING INTERVAL

(2.8) PCE CONCENTRATION

[2.8] TCE CONCENTRATION

{2.8} Cis 1,2 DCE CONCENTRATION

/2.8/ 1,4 DIOXANE CONCENTRATION

\2.8\ 1,1 DCE CONCENTRATION

SHALLOW GROUNDWATER TABLE

DEEPER GROUNDWATER TABLE

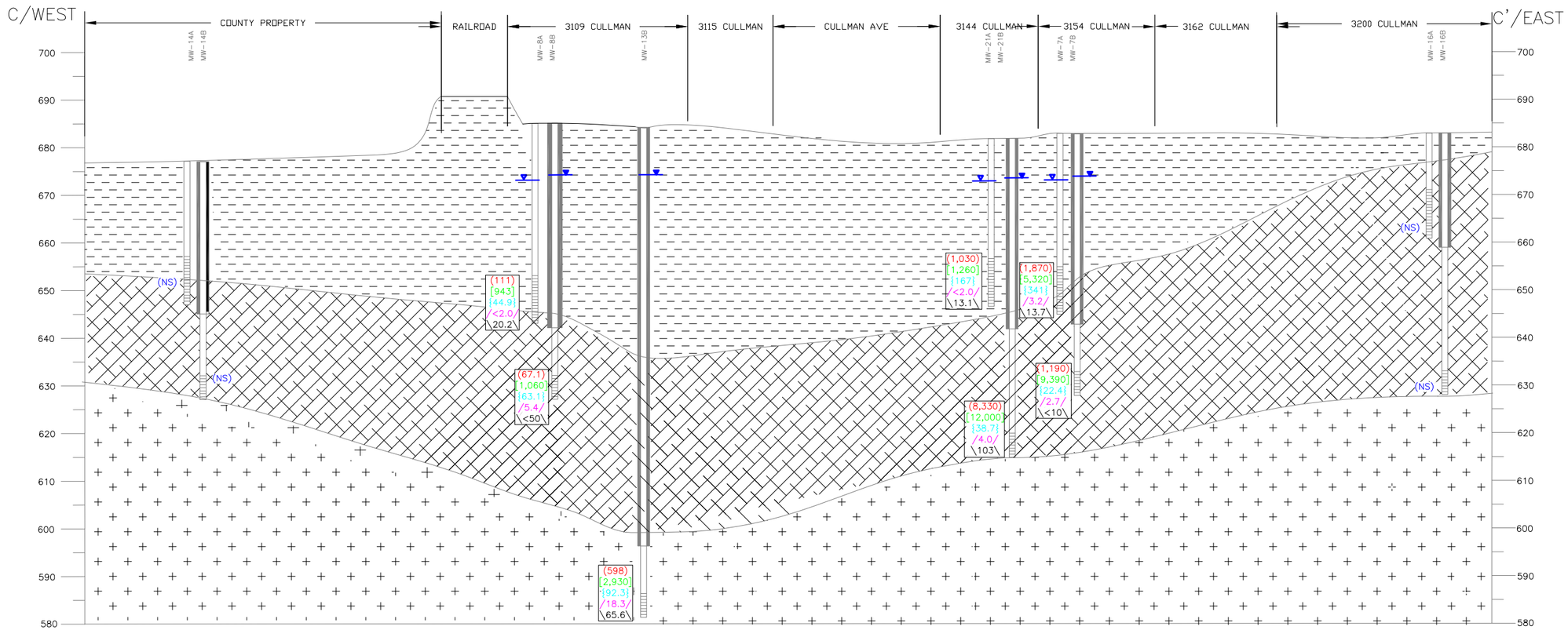
RESIDUAL SOIL/SAPROLITE

PARTIALLY WEATHERED BEDROCK

COMPETENT ROCK

NOTE;
INFERRED BOUNDARIES BETWEEN GEOLOGIC UNITS ARE TRANLATIONAL.

NS =NOT SAMPLED




4X VERTICAL EXAGGERATION

GRAPHIC SCALE

100 0 50 100 100

( IN FEET )

1 inch = 100 ft.

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| Revisions | | | |
|---|---|---|---|
| No. | Description | Date | By |
| | | | |

DETREX FACILITY
3114 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

GEOLOGICAL CROSS SECTION C–C' WITH ANALYTICAL RESULTS

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/13/15 |

Job No. 03130430
Sheet No. 8

W:\13\13-0430\130430.01-TREX CHARLOTTE OFF SITE WELLS\CAD\TREX PROPERTY - CROSS SECTIONS-GW ASSESSMENT-20151009.DWG 11/3/2015 9:39 AM FAY, CHRISTOPHER 1:1

LEGEND

OUTER WELL CASING INTERVAL

WELL SCREEN INTERVAL

INNER WELL CASING INTERVAL

(2.8) PCE CONCENTRATION

[2.8] TCE CONCENTRATION

{2.8} Cis 1,2 DCE CONCENTRATION

/2.8/ 1,4 DIOXANE CONCENTRATION

\2.8\ 1,1 DCE CONCENTRATION

SHALLOW GROUNDWATER TABLE

DEEPER GROUNDWATER TABLE

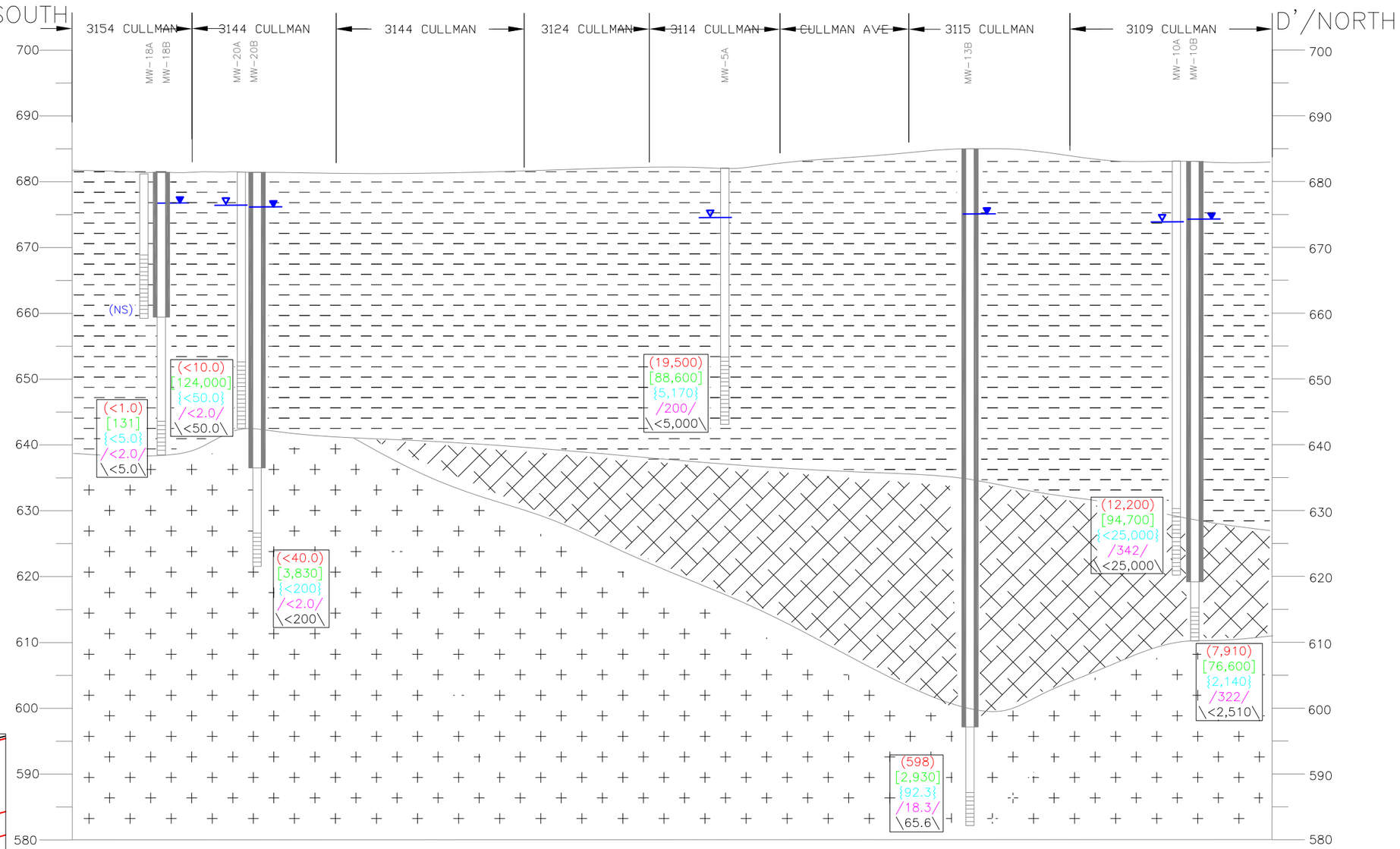
RESIDUAL SOIL/SAPROLITE

PARTIALLY WEATHERED BEDROCK

COMPETENT ROCK

NOTE;
INFERRED BOUNDARIES BETWEEN GEOLOGIC UNITS ARE TRANLATIONAL.

NS=NOT SAMPLED




4X VERTICAL EXAGGERATION

GRAPHIC SCALE

70 0 35 70 140

( IN FEET )

1 inch = 70 ft.

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|---|---|---|---|
| No. | Description | Date | By |
| | | | |

DETREX FACILITY
3114 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

GEOLOGICAL CROSS SECTION D-D' WITH ANALYTICAL RESULTS

Drawn By CF
Checked By BB
Scale 1"=70'
Date 10/13/15

Job No. 03130430
Sheet No. 9

W:\13\13-0430\130430.01-TREX CHARLOTTE OFF SITE WELLS\CAD\TREX PROPERTY - CROSS SECTIONS-GW ASSESSMENT-20151009.DWG 11/2/2015 4:06 PM FAY, CHRISTOPHER 1:1

## Table 1: Summary of Monitoring Well Construction Information

**Trex Properties: 3114 and 3124 Cullman Avenue, Charlotte, NC**

**W&R Project No. 03130430.01**

| Well ID | Date Installed | Decimal Latitude | Decimal Longitude | Well Type | Total Depth of Well Casing (ft bgs) | Total Depth of Outer Casing (ft bgs) | Screened Interval (ft bgs) | Screened Material | Height of Top of Casing (ft ags) | Ground Surface Elevation (ft msl) | Top of Casing Elevation (ft msl) | Depth to PWR (ft bgs) | Top of PWR Elevation (ft msl) | Depth to Bedrock (ft bgs) | Top of Bedrock Elevation (ft msl) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PMW-1A | 09/14/12 | N 35.248662 | W 80.809590 | Type II | 12 | -- | 7-12 | Saprolite | 3.33 | 683.62 | 686.95 | 10 | 673.62 | -- | -- |
| PMW-1B | 09/13/12 | N 35.248650 | W 80.809583 | Type III | 54 | 44 | 49-54 | PWR | 3.75 | 683.12 | 686.87 | 10 | 673.12 | 55 | 628.12 |
| PMW-2A | 09/14/12 | N 35.248775 | W 80.809296 | Type II | 30 | -- | 20-30 | Saprolite | 3.58 | 683.76 | 687.34 | 30 | 653.76 | -- | -- |
| PMW-2B | 09/13/12 | N 35.248784 | W 80.809282 | Type III | 55 | 37 | 50-55 | PWR | 3.56 | 683.42 | 686.98 | 30 | 653.42 | 55 | 628.42 |
| PMW-3A | 09/14/12 | N 35.248720 | W 80.809485 | Type II | 25 | -- | 15-25 | Saprolite | 3.58 | 683.42 | 687.00 | 25 | 658.42 | -- | -- |
| PMW-4A | 06/14/12 | N 35.248890 | W 80.809644 | Type II | 12 | -- | 2-12 | Saprolite | 3.41 | 687.45 | 690.86 | -- | -- | -- | -- |
| PMW-5A | 06/13/12 | N 35.249154 | W 80.809816 | Type II | 39 | -- | 29-39 | PWR | -0.28 | 683.88 | 683.60 | 25 | 658.88 | -- | -- |
| PMW-6A | 06/12/12 | N 35.249330 | W 80.809620 | Type II | 38 | -- | 28-38 | PWR | -0.31 | 684.07 | 683.76 | 30 | 654.07 | -- | -- |
| PMW-7A | 06/12/12 | N 35.249592 | W 80.808951 | Type II | 38 | -- | 28-38 | PWR | -0.25 | 683.92 | 683.67 | 30 | 653.92 | -- | -- |
| PMW-7B | 06/25/12 | N 35.249583 | W 80.808930 | Type III | 55 | 40 | 50-55 | PWR | -0.30 | 684.34 | 684.04 | 30 | 654.34 | -- | -- |
| PMW-8A | 06/11/12 | N 35.249319 | W 80.810339 | Type II | 42 | -- | 32-42 | PWR | -0.34 | 685.10 | 684.76 | 35 | 650.10 | -- | -- |
| PMW-8B | 06/21/12 | N 35.249342 | W 80.810325 | Type III | 58 | 43 | 53-58 | PWR | -0.33 | 685.31 | 684.98 | 35 | 650.31 | -- | -- |
| PMW-9A | 06/08/12 | N 35.249864 | W 80.809364 | Type II | 19 | -- | 9-19 | Saprolite | -0.29 | 683.61 | 683.32 | -- | -- | -- | -- |
| PMW-9B | 06/13/12 | N 35.249860 | W 80.809382 | Type II | 34 | -- | 24-34 | Saprolite | -0.25 | 683.66 | 683.41 | 30 | 653.66 | -- | -- |
| PMW-9C | 06/21/12 | N 35.249852 | W 80.809409 | Type III | 50 | 35 | 45-50 | PWR | -0.26 | 683.83 | 683.57 | 30 | 653.83 | -- | -- |
| PMW-10A | 06/11/12 | N 35.249839 | W 80.809968 | Type II | 63 | -- | 53-63 | PWR | -0.31 | 683.25 | 682.94 | 55 | 628.25 | -- | -- |
| PMW-10B | 06/21/12 | N 35.249789 | W 80.809963 | Type III | 73 | 64 | 68-73 | PWR | -0.32 | 683.49 | 683.17 | 55 | 628.49 | 73 | 610.49 |
| PMW-11A | 06/12/12 | N 35.249696 | W 80.810347 | Type II | 63 | -- | 53-63 | PWR | -0.29 | 682.91 | 682.62 | 55 | 627.91 | -- | -- |
| PMW-11B | 06/21/12 | N 35.249676 | W 80.810344 | Type III | 78 | 63 | 73-78 | PWR | -0.30 | 683.11 | 682.81 | 55 | 628.11 | 78 | 605.11 |
| PMW-12A | 06/25/12 | N 35.249935 | W 80.810901 | Type II | 40 | -- | 30-40 | PWR | -0.32 | 681.89 | 681.57 | 20 | 661.89 | -- | -- |
| PMW-12B | 06/25/12 | N 35.249943 | W 80.810893 | Type III | 49 | 42 | 44-49 | PWR | -0.31 | 682.01 | 681.70 | 20 | 662.01 | 49 | 633.01 |
| PMW-13B | 07/12/12 | N 35.249474 | W 80.810109 | Type III | 103 | 88 | 98-103 | Bedrock | -0.28 | 685.55 | 685.27 | 50 | 635.55 | 88 | 597.55 |
| PMW-14A | 09/19/12 | N 35.249161 | W 80.811296 | Type II | 30 | -- | 20-30 | Saprolite | 2.89 | 678.25 | 681.14 | 25 | 653.25 | -- | -- |
| PMW-14B | 09/19/12 | N 35.249159 | W 80.811280 | Type III | 50 | 32 | 45-50 | PWR | 2.85 | 678.15 | 681.00 | 25 | 653.15 | -- | -- |
| PMW-16A | 09/19/12 | N 35.249751 | W 80.808092 | Type II | 22 | -- | 12-22 | PWR | -0.28 | 683.54 | 683.26 | 5 | 678.54 | -- | -- |
| PMW-16B | 09/19/12 | N 35.249751 | W 80.808074 | Type III | 55 | 24 | 50-55 | PWR | -0.30 | 683.67 | 683.37 | 5 | 678.67 | 55 | 628.67 |
| PMW-17A | 09/19/12 | N 35.249333 | W 80.807911 | Type II | 22 | -- | 12-22 | PWR | -0.31 | 686.53 | 686.22 | 5.5 | 681.03 | -- | -- |
| PMW-17B | 09/12/12 | N 35.249305 | W 80.807897 | Type II | 50 | -- | 45-50 | PWR | -0.29 | 686.40 | 686.11 | 5.5 | 680.90 | 55 | 631.40 |
| PMW-18A | 09/14/12 | N 35.248972 | W 80.808679 | Type II | 22 | -- | 12-22 | Saprolite | 3.58 | 682.69 | 686.27 | 22 | 660.69 | -- | -- |
| PMW-18B | 09/14/12 | N 35.248965 | W 80.808696 | Type III | 43 | 22 | 38-43 | PWR | 3.50 | 682.90 | 686.40 | 22 | 660.90 | 43 | 639.90 |
| PMW-20A | 12/11/14 | N 35.248998 | W 80.808867 | Type II | 39 | -- | 34-39 | Saprolite | 2.75 | 683.28 | 686.03 | 39 | -- | -- | 643.98 |
| PMW-20B | 12/09/14 | N 35.248990 | W 80.808881 | Type III | 60 | 45 | 55-60 | Rock | 3.32 | 683.32 | 686.64 | -- | -- | 39 | 644.02 |
| PMW-21A | 12/02/14 | N 35.249524 | W 80.809077 | Type II | 35 | -- | 30-35 | Saprolite | -0.41 | 683.62 | 683.21 | 35 | 648.31 | -- | -- |
| PMW-21B | 12/03/14 | N 35.249520 | W 80.809094 | Type III | 67 | 40 | 62-67 | PWR | -0.31 | 683.57 | 683.26 | 35 | 648.27 | 67 | 616.27 |
| PMW-22A | 12/08/14 | N 35.250615 | W 80.809111 | Type II | 63 | -- | 58-63 | Saprolite | 3.10 | 683.93 | 687.03 | 63 | 620.81 | -- | -- |
| PMW-22B | 12/09/14 | N 35.250636 | W 80.809114 | Type III | 86 | 70 | 81-86 | PWR | 2.64 | 684.24 | 686.88 | 63 | 621.15 | 85 | 599.15 |

**Notes:**

1. ft bgs = Feet below ground surface
2. ft toc = Feet below top of casing
3. ft ags  Feet above ground surface
4. ft msl  Feet above mean sea level
5. PWR = Partially Weathered Rock.
6. -- = Not Applicable

# Table 2: Groundwater Elevation Data

## Trex Properties: 3114 and 3124 Cullman Avenue, Charlotte, NC

## W&R Project No. 03130430.01

| Well ID | Date Measured | Top of Casing Elevations (ft msl) | Depth to Groundwater (ft toc) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|
| PMW-1A | 9/23/2015 | 686.95 | 9.59 | 677.36 |
| PMW-1B | 9/23/2015 | 686.87 | 9.65 | 677.22 |
| PMW-2A | 9/23/2015 | 687.34 | 9.78 | 677.56 |
| PMW-2B | 9/23/2015 | 686.98 | 9.72 | 677.26 |
| PMW-3A | 9/23/2015 | 687.00 | 9.58 | 677.42 |
| PMW-4A | 9/23/2015 | 690.86 | DRY | DRY |
| PMW-5A | 9/23/2015 | 683.60 | 7.51 | 676.09 |
| PMW-6A | 9/23/2015 | 683.76 | 7.70 | 676.06 |
| PMW-7A | 9/23/2015 | 683.67 | 9.42 | 674.25 |
| PMW-7B | 9/23/2015 | 684.04 | 9.50 | 674.54 |
| PMW-8A | 9/22/2015 | 684.76 | 10.78 | 673.98 |
| PMW-8B | 9/22/2015 | 684.98 | 10.16 | 674.82 |
| PMW-9A | 9/22/2015 | 683.32 | 10.30 | 673.02 |
| PMW-9B | 9/22/2015 | 683.41 | 10.33 | 673.08 |
| PMW-9C | 9/22/2015 | 683.57 | 10.37 | 673.20 |
| PMW-10A | 9/22/2015 | 682.94 | 9.11 | 673.83 |
| PMW-10B | 9/22/2015 | 683.17 | 9.29 | 673.88 |
| PMW-11A | 9/22/2015 | 682.62 | 9.29 | 673.33 |
| PMW-11B | 9/22/2015 | 682.81 | 9.58 | 673.23 |
| PMW-12A | 9/22/2015 | 681.57 | 8.28 | 673.29 |
| PMW-12B | 9/22/2015 | 681.70 | 8.35 | 673.35 |
| PMW-13B | 9/22/2015 | 685.27 | 9.84 | 675.43 |
| PMW-14A | NM | 681.14 | NM | NM |
| PMW-14B | NM | 681.00 | NM | NM |
| PMW-16A | NM | 683.26 | NM | NM |
| PMW-16B | NM | 683.37 | NM | NM |
| PMW-17A | NM | 686.22 | NM | NM |
| PMW-17B | NM | 686.11 | NM | NM |
| PMW-18A | 9/23/2015 | 686.27 | DAMAGED | |
| PMW-18B | 9/23/2015 | 686.40 | 8.31 | 678.09 |
| PMW-20A | 9/23/2015 | 686.03 | 7.77 | 678.26 |
| PMW-20B | 9/23/2015 | 686.64 | 8.54 | 678.10 |
| PMW-21A | 9/23/2015 | 683.21 | 8.85 | 674.36 |
| PMW-21B | 9/23/2015 | 683.26 | 8.74 | 674.52 |
| PMW-22A | 9/22/2015 | 687.03 | 12.52 | 674.51 |
| PMW-22B | 9/22/2015 | 686.88 | 12.22 | 674.66 |

**Notes:**

1. ft toc = Feet below top of casing
2. ft msl = Feet above mean sea level
3. NM = Not measured. Off-site wells which were inaccessible at time of visit.

Slug Test Manual Readings and

Data Logger Records

Updated Draft Phase III RFI Report for

3114 & 3124 Cullman Avenue, Charlotte NC

EPA ID # NCD 049 773 245

**Trex Properties, Charlotte NC: Data Logger Record for MW-1A Slug In Test**
**W&R Project No. 03130430.01**

| | |
|---|---|
| Report Date: | January 27, 2015 |
| Report User Name: | Administrator |
| Report Computer Name: | WR1105 |

Log File Properties

| | |
|---|---|
| File Name | MW-1A In XD Data |
| Create Date | February 16, 2015 |

Device Properties

| | |
|---|---|
| Device | Level TROLL® 700 |
| Site | Trex Property |
| Device Name | |
| Serial Number | 127883 |
| Firmware Version | 2.07 |

Log Configuration

| | |
|---|---|
| Log Name | MW-1A In |
| Created By | Administrator |
| Computer Name | WR1105 |
| Application | WinSitu.exe |
| Application Version | 5.6.1.8 |
| Create Date | January 27, 2015 |
| Notes Size(bytes) | 4096 |
| Type | True Logarithmic |
| Overwrite when full | Disabled |
| Scheduled Start Time | Manual Start |
| Scheduled Stop | No Stop Time |
| Max Interval | Days: 0 Hours: 00 Mins: 02 Secs: 00 |

Level Reference Settings At Log Creation

| | |
|---|---|
| Level Measurement Mode | Level Depth To Water |
| Specific Gravity | 0.9990 |
| Level Reference Mode: | Set new reference |
| Level Reference Value: | 6.7 (ft) |
| Level Reference Head Pressure | 0.808137 (PSI) |
| Head Pressure | 0.808162 (PSI) |
| Temperature | 13.8021 (C) |
| Depth of Probe | 5 feet Below SWL |

Log Notes:

| Date and Time | Note |
|---|---|
| 1/27/2015 15:17 | Manual Start Command |
| 1/27/2015 15:22 | Manual Stop Command |

Log Data:

| | |
|---|---|
| Record Count | 89 |

**Trex Properties, Charlotte NC: Data Logger Record for MW-1A Slug In Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Water Level Checks (ft BTOC) |
|---|---|---|---|---|---|
| 3:17:50 PM | 0.000 | 0.000 | 1.291 | 5.585 | |
| 3:17:51 PM | 0.471 | 0.008 | 1.274 | 5.625 | |
| 3:17:51 PM | 0.691 | 0.012 | 1.278 | 5.614 | |
| 3:17:51 PM | 0.911 | 0.015 | 1.265 | 5.644 | |
| 3:17:51 PM | 1.130 | 0.019 | 1.261 | 5.653 | |
| 3:17:51 PM | 1.352 | 0.023 | 1.259 | 5.660 | |
| 3:17:52 PM | 1.575 | 0.026 | 1.248 | 5.684 | |
| 3:17:52 PM | 1.797 | 0.030 | 1.268 | 5.639 | |
| 3:17:52 PM | 2.020 | 0.034 | 1.306 | 5.551 | |
| 3:17:53 PM | 2.503 | 0.042 | 1.182 | 5.836 | |
| 3:17:53 PM | 2.722 | 0.045 | 1.260 | 5.656 | |
| 3:17:53 PM | 2.943 | 0.049 | 1.168 | 5.868 | |
| 3:17:53 PM | 3.162 | 0.053 | 1.225 | 5.738 | |
| 3:17:54 PM | 3.383 | 0.056 | 1.272 | 5.628 | |
| 3:17:54 PM | 3.606 | 0.060 | 1.161 | 5.884 | |
| 3:17:54 PM | 3.828 | 0.064 | 1.174 | 5.855 | |
| 3:17:54 PM | 4.049 | 0.067 | 1.227 | 5.733 | |
| 3:17:54 PM | 4.271 | 0.071 | 1.201 | 5.792 | |
| 3:17:55 PM | 4.762 | 0.079 | 1.210 | 5.773 | |
| 3:17:55 PM | 4.983 | 0.083 | 1.215 | 5.760 | |
| 3:17:55 PM | 5.202 | 0.087 | 1.090 | 6.049 | |
| 3:17:56 PM | 5.422 | 0.090 | 1.204 | 5.787 | |
| 3:17:56 PM | 5.642 | 0.094 | 1.184 | 5.833 | |
| 3:17:56 PM | 5.866 | 0.098 | 1.140 | 5.934 | |
| 3:17:56 PM | 6.090 | 0.102 | 1.157 | 5.894 | |
| 3:17:57 PM | 6.601 | 0.110 | 1.152 | 5.907 | |
| 3:17:57 PM | 6.823 | 0.114 | 1.152 | 5.907 | |
| 3:17:57 PM | 7.140 | 0.119 | 1.141 | 5.931 | |
| 3:17:58 PM | 7.780 | 0.130 | 1.135 | 5.944 | |
| 3:17:58 PM | 8.001 | 0.133 | 1.132 | 5.953 | |
| 3:17:59 PM | 8.460 | 0.141 | 1.124 | 5.972 | |
| 3:17:59 PM | 9.006 | 0.150 | 1.116 | 5.989 | |
| 3:18:00 PM | 9.480 | 0.158 | 1.108 | 6.007 | |
| 3:18:00 PM | 10.159 | 0.169 | 1.099 | 6.029 | |
| 3:18:01 PM | 10.680 | 0.178 | 1.091 | 6.047 | |
| 3:18:02 PM | 11.374 | 0.190 | 1.083 | 6.066 | |
| 3:18:02 PM | 11.940 | 0.199 | 1.075 | 6.083 | |
| 3:18:03 PM | 12.660 | 0.211 | 1.067 | 6.103 | |
| 3:18:04 PM | 13.815 | 0.230 | 1.054 | 6.133 | |
| 3:18:04 PM | 14.220 | 0.237 | 1.048 | 6.146 | |
| 3:18:05 PM | 15.060 | 0.251 | 1.039 | 6.167 | |
| 3:18:06 PM | 15.960 | 0.266 | 1.029 | 6.190 | |
| 3:18:07 PM | 16.920 | 0.282 | 1.019 | 6.213 | |
| 3:18:08 PM | 17.880 | 0.298 | 1.009 | 6.237 | |
| 3:18:09 PM | 18.960 | 0.316 | 0.999 | 6.258 | |
| 3:18:10 PM | 20.100 | 0.335 | 0.990 | 6.281 | |
| 3:18:11 PM | 21.300 | 0.355 | 0.981 | 6.302 | |
| 3:18:13 PM | 22.560 | 0.376 | 0.974 | 6.318 | |
| 3:18:14 PM | 23.880 | 0.398 | 0.964 | 6.341 | |
| 3:18:15 PM | 25.320 | 0.422 | 0.955 | 6.361 | |
| 3:18:17 PM | 26.919 | 0.449 | 0.945 | 6.384 | |
| 3:18:19 PM | 28.380 | 0.473 | 0.938 | 6.400 | |
| 3:18:20 PM | 30.185 | 0.503 | 0.930 | 6.418 | |
| 3:18:22 PM | 31.860 | 0.531 | 0.923 | 6.436 | |
| 3:18:24 PM | 33.720 | 0.562 | 0.914 | 6.455 | |
| 3:18:26 PM | 35.932 | 0.599 | 0.906 | 6.473 | |
| 3:18:28 PM | 37.860 | 0.631 | 0.900 | 6.488 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-1A Slug In Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Water Level Checks (ft BTOC) |
|---|---|---|---|---|---|
| 3:18:30 PM | 40.080 | 0.668 | 0.895 | 6.500 | |
| 3:18:33 PM | 42.480 | 0.708 | 0.889 | 6.514 | |
| 3:18:35 PM | 45.000 | 0.750 | 0.882 | 6.529 | |
| 3:18:38 PM | 47.686 | 0.795 | 0.877 | 6.540 | |
| 3:18:41 PM | 50.460 | 0.841 | 0.875 | 6.545 | |
| 3:18:44 PM | 53.460 | 0.891 | 0.871 | 6.554 | |
| 3:18:47 PM | 56.698 | 0.945 | 0.866 | 6.567 | |
| 3:18:50 PM | 60.000 | 1.000 | 0.863 | 6.574 | 6.55 |
| 3:18:54 PM | 63.600 | 1.060 | 0.860 | 6.580 | |
| 3:18:57 PM | 67.200 | 1.120 | 0.857 | 6.586 | |
| 3:19:02 PM | 71.400 | 1.190 | 0.856 | 6.589 | |
| 3:19:06 PM | 75.600 | 1.260 | 0.853 | 6.595 | |
| 3:19:10 PM | 79.800 | 1.330 | 0.851 | 6.600 | |
| 3:19:15 PM | 84.600 | 1.410 | 0.850 | 6.604 | |
| 3:19:20 PM | 90.005 | 1.500 | 0.849 | 6.606 | 6.61 |
| 3:19:25 PM | 94.800 | 1.580 | 0.847 | 6.610 | |
| 3:19:31 PM | 100.800 | 1.680 | 0.847 | 6.609 | |
| 3:19:37 PM | 106.800 | 1.780 | 0.846 | 6.614 | |
| 3:19:43 PM | 112.800 | 1.880 | 0.845 | 6.616 | |
| 3:19:50 PM | 119.400 | 1.990 | 0.844 | 6.617 | 6.63 |
| 3:19:57 PM | 126.600 | 2.110 | 0.843 | 6.620 | |
| 3:20:05 PM | 134.400 | 2.240 | 0.842 | 6.621 | |
| 3:20:12 PM | 142.200 | 2.370 | 0.842 | 6.622 | |
| 3:20:21 PM | 150.600 | 2.510 | 0.841 | 6.625 | 6.64 |
| 3:20:30 PM | 159.600 | 2.660 | 0.841 | 6.625 | |
| 3:20:39 PM | 169.225 | 2.820 | 0.840 | 6.627 | |
| 3:20:49 PM | 178.800 | 2.980 | 0.840 | 6.627 | |
| 3:21:00 PM | 189.600 | 3.160 | 0.838 | 6.631 | |
| 3:21:11 PM | 201.155 | 3.353 | 0.837 | 6.632 | |
| 3:21:23 PM | 213.172 | 3.553 | 0.838 | 6.632 | 6.65 |
| 3:21:36 PM | 225.600 | 3.760 | 0.836 | 6.635 | |
| 3:21:49 PM | 239.055 | 3.984 | 0.837 | 6.633 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-1A Slug Out Test**
**W&R Project No. 03130430.01**

| | |
|---|---|
| Report Date: | January 27, 2015 |
| Report User Name: | Administrator |
| Report Computer Name: | WR1105 |

Log File Properties

| | |
|---|---|
| File Name | MW-1A Out XD Data |
| Create Date | February 16, 2015 |

Device Properties

| | |
|---|---|
| Device | Level TROLL® 700 |
| Site | Trex Property |
| Device Name | |
| Serial Number | 127883 |
| Firmware Version | 2.07 |

Log Configuration

| | |
|---|---|
| Log Name | MW-1BOut |
| Created By | Administrator |
| Computer Name | WR1105 |
| Application | WinSitu.exe |
| Application Version | 5.6.1.8 |
| Create Date | January 27, 2015 |
| Notes Size(bytes) | 4096 |
| Type | True Logarithmic |
| Overwrite when full | Disabled |
| Scheduled Start Time | Manual Start |
| Scheduled Stop | No Stop Time |
| Max Interval | Days: 0 Hours: 00 Mins: 02 Secs: 00 |

Level Reference Settings At Log Creation

| | |
|---|---|
| Level Measurement Mode | Level Depth To Water |
| Specific Gravity | 0.999 |
| Level Reference Mode: | Set new reference |
| Level Reference Value: | 6.7 (ft) |
| Level Reference Head Pressure | 0.829029 (PSI) |
| Head Pressure | 0.829289 (PSI) |
| Temperature | 13.7348 (C) |
| Depth of Probe | 5 feet below SWL |

Log Notes:

| Date and Time | Note |
|---|---|
| 1/27/2015 15:09 | Manual Start Command |
| 1/27/2015 15:14 | Manual Stop Command |

Log Data:

| | |
|---|---|
| Record Count | 92 |

**Trex Properties, Charlotte NC: Data Logger Record for MW-1A Slug Out Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Water Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 3:09:56 PM | 0.000 | 0.000 | 0.412 | 7.664 | |
| 3:09:57 PM | 0.470 | 0.008 | 0.422 | 7.640 | |
| 3:09:57 PM | 0.689 | 0.011 | 0.426 | 7.631 | |
| 3:09:57 PM | 0.909 | 0.015 | 0.430 | 7.621 | |
| 3:09:57 PM | 1.129 | 0.019 | 0.435 | 7.611 | |
| 3:09:58 PM | 1.349 | 0.022 | 0.439 | 7.600 | |
| 3:09:58 PM | 1.573 | 0.026 | 0.444 | 7.589 | |
| 3:09:58 PM | 1.796 | 0.030 | 0.447 | 7.582 | |
| 3:09:58 PM | 2.019 | 0.034 | 0.452 | 7.570 | |
| 3:09:59 PM | 2.501 | 0.042 | 0.463 | 7.545 | |
| 3:09:59 PM | 2.721 | 0.045 | 0.467 | 7.536 | |
| 3:09:59 PM | 2.941 | 0.049 | 0.471 | 7.527 | |
| 3:09:59 PM | 3.161 | 0.053 | 0.474 | 7.519 | |
| 3:10:00 PM | 3.383 | 0.056 | 0.479 | 7.509 | |
| 3:10:00 PM | 3.606 | 0.060 | 0.483 | 7.500 | |
| 3:10:00 PM | 3.828 | 0.064 | 0.487 | 7.490 | |
| 3:10:00 PM | 4.049 | 0.067 | 0.491 | 7.481 | |
| 3:10:00 PM | 4.271 | 0.071 | 0.495 | 7.472 | |
| 3:10:01 PM | 4.763 | 0.079 | 0.504 | 7.449 | |
| 3:10:01 PM | 4.983 | 0.083 | 0.508 | 7.441 | |
| 3:10:01 PM | 5.203 | 0.087 | 0.511 | 7.434 | |
| 3:10:02 PM | 5.422 | 0.090 | 0.514 | 7.428 | |
| 3:10:02 PM | 5.643 | 0.094 | 0.518 | 7.419 | |
| 3:10:02 PM | 5.867 | 0.098 | 0.522 | 7.410 | |
| 3:10:02 PM | 6.091 | 0.102 | 0.525 | 7.402 | |
| 3:10:03 PM | 6.602 | 0.110 | 0.535 | 7.379 | |
| 3:10:03 PM | 6.824 | 0.114 | 0.538 | 7.372 | |
| 3:10:03 PM | 7.140 | 0.119 | 0.541 | 7.364 | |
| 3:10:04 PM | 7.780 | 0.130 | 0.552 | 7.339 | |
| 3:10:04 PM | 8.001 | 0.133 | 0.556 | 7.330 | |
| 3:10:05 PM | 8.460 | 0.141 | 0.561 | 7.319 | |
| 3:10:05 PM | 9.007 | 0.150 | 0.570 | 7.299 | |
| 3:10:06 PM | 9.480 | 0.158 | 0.574 | 7.288 | |
| 3:10:06 PM | 10.160 | 0.169 | 0.584 | 7.266 | |
| 3:10:07 PM | 10.680 | 0.178 | 0.591 | 7.250 | |
| 3:10:08 PM | 11.374 | 0.190 | 0.599 | 7.230 | |
| 3:10:08 PM | 11.940 | 0.199 | 0.605 | 7.217 | |
| 3:10:09 PM | 12.660 | 0.211 | 0.615 | 7.194 | |
| 3:10:10 PM | 13.816 | 0.230 | 0.627 | 7.166 | |
| 3:10:10 PM | 14.220 | 0.237 | 0.631 | 7.157 | |
| 3:10:11 PM | 15.060 | 0.251 | 0.637 | 7.144 | |
| 3:10:12 PM | 15.960 | 0.266 | 0.647 | 7.120 | |
| 3:10:13 PM | 16.920 | 0.282 | 0.656 | 7.100 | |
| 3:10:14 PM | 17.880 | 0.298 | 0.663 | 7.083 | |
| 3:10:15 PM | 18.960 | 0.316 | 0.672 | 7.063 | |
| 3:10:16 PM | 20.100 | 0.335 | 0.680 | 7.045 | |
| 3:10:17 PM | 21.300 | 0.355 | 0.688 | 7.026 | |
| 3:10:19 PM | 22.560 | 0.376 | 0.695 | 7.009 | |
| 3:10:20 PM | 23.880 | 0.398 | 0.703 | 6.991 | |
| 3:10:21 PM | 25.320 | 0.422 | 0.711 | 6.972 | |
| 3:10:23 PM | 26.820 | 0.447 | 0.718 | 6.956 | |
| 3:10:25 PM | 28.380 | 0.473 | 0.725 | 6.940 | |
| 3:10:26 PM | 30.060 | 0.501 | 0.732 | 6.925 | |
| 3:10:28 PM | 31.860 | 0.531 | 0.737 | 6.912 | |
| 3:10:30 PM | 33.720 | 0.562 | 0.744 | 6.896 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-1A Slug Out Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Water Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 3:10:32 PM | 35.760 | 0.596 | 0.750 | 6.882 | |
| 3:10:34 PM | 37.860 | 0.631 | 0.756 | 6.870 | |
| 3:10:36 PM | 40.080 | 0.668 | 0.759 | 6.861 | |
| 3:10:39 PM | 42.480 | 0.708 | 0.765 | 6.848 | |
| 3:10:41 PM | 45.000 | 0.750 | 0.769 | 6.839 | |
| 3:10:44 PM | 47.640 | 0.794 | 0.772 | 6.831 | |
| 3:10:47 PM | 50.460 | 0.841 | 0.776 | 6.823 | |
| 3:10:50 PM | 53.460 | 0.891 | 0.780 | 6.814 | |
| 3:10:53 PM | 56.640 | 0.944 | 0.782 | 6.809 | |
| 3:10:56 PM | 60.000 | 1.000 | 0.785 | 6.803 | |
| 3:11:00 PM | 63.600 | 1.060 | 0.787 | 6.798 | |
| 3:11:03 PM | 67.273 | 1.121 | 0.788 | 6.795 | |
| 3:11:08 PM | 71.400 | 1.190 | 0.791 | 6.788 | |
| 3:11:12 PM | 75.600 | 1.260 | 0.792 | 6.785 | |
| 3:11:16 PM | 79.832 | 1.331 | 0.793 | 6.782 | |
| 3:11:21 PM | 84.600 | 1.410 | 0.796 | 6.777 | |
| 3:11:26 PM | 90.000 | 1.500 | 0.797 | 6.774 | |
| 3:11:31 PM | 94.873 | 1.581 | 0.796 | 6.775 | |
| 3:11:37 PM | 100.882 | 1.681 | 0.799 | 6.770 | |
| 3:11:43 PM | 106.890 | 1.782 | 0.799 | 6.768 | |
| 3:11:49 PM | 112.898 | 1.882 | 0.800 | 6.767 | |
| 3:11:56 PM | 119.400 | 1.990 | 0.800 | 6.766 | |
| 3:12:03 PM | 126.600 | 2.110 | 0.802 | 6.762 | |
| 3:12:11 PM | 134.400 | 2.240 | 0.803 | 6.760 | |
| 3:12:18 PM | 142.200 | 2.370 | 0.805 | 6.755 | |
| 3:12:27 PM | 150.600 | 2.510 | 0.803 | 6.760 | |
| 3:12:36 PM | 159.600 | 2.660 | 0.804 | 6.757 | |
| 3:12:45 PM | 169.276 | 2.821 | 0.805 | 6.755 | |
| 3:12:55 PM | 179.008 | 2.983 | 0.805 | 6.755 | |
| 3:13:06 PM | 189.599 | 3.160 | 0.806 | 6.752 | 6.72 |
| 3:13:17 PM | 201.000 | 3.350 | 0.807 | 6.751 | |
| 3:13:29 PM | 213.000 | 3.550 | 0.808 | 6.749 | |
| 3:13:42 PM | 225.599 | 3.760 | 0.807 | 6.750 | |
| 3:13:55 PM | 238.800 | 3.980 | 0.808 | 6.748 | |
| 3:14:09 PM | 253.200 | 4.220 | 0.808 | 6.749 | |
| 3:14:25 PM | 268.446 | 4.474 | 0.809 | 6.745 | |
| 3:14:40 PM | 283.800 | 4.730 | 0.809 | 6.747 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-1B Slug In Test**
**W&R Project No. 03130430.01**

| | |
|---|---|
| Report Date: | 42031 |
| Report User Name: | Administrator |
| Report Computer Name: | WR1105 |

Log File Properties

| | |
|---|---|
| File Name | MW-1B In XD Data |
| Create Date | 42051 |

Device Properties

| | |
|---|---|
| Device | Level TROLL® 700 |
| Site | Trex Property |
| Device Name | |
| Serial Number | 127883 |
| Firmware Version | 2.07 |

Log Configuration

| | |
|---|---|
| Log Name | MW-1B in |
| Created By | Administrator |
| Computer Name | WR1105 |
| Application | WinSitu.exe |
| Application Version | 5.6.1.8 |
| Create Date | 42031 |
| Notes Size(bytes) | 4096 |
| Type | True Logarithmic |
| Overwrite when full | Disabled |
| Scheduled Start Time | Manual Start |
| Scheduled Stop | No Stop Time |
| Max Interval | Days: 0 Hours: 00 Mins: 02 Secs: 00 |

Level Reference Settings At Log Creation

| | |
|---|---|
| Level Measurement Mode | Level Depth To Water |
| Specific Gravity | 0.999 |
| Level Reference Mode: | Set new reference |
| Level Reference Value: | 6.79 (ft) |
| Level Reference Head Pressure | 0.439521 (PSI) |
| Head Pressure | 0.438691 (PSI) |
| Temperature | 13.2554 (C) |
| Depth of Probe | 5 feet below SWL |

Log Notes:

| Date and Time | Note |
|---|---|
| 1/27/2015 15:37 | Manual Start Command |
| 1/27/2015 15:44 | Manual Stop Command |

Log Data:

| | |
|---|---|
| Record Count | 97 |

**Trex Properties, Charlotte NC: Data Logger Record for MW-1B Slug In Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Water Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 3:37:51 PM | 0.000 | 0.000 | 1.133 | 5.190 | |
| 3:37:51 PM | 0.489 | 0.008 | 1.183 | 5.073 | |
| 3:37:52 PM | 0.709 | 0.012 | 1.108 | 5.246 | |
| 3:37:52 PM | 0.929 | 0.015 | 1.097 | 5.273 | |
| 3:37:52 PM | 1.148 | 0.019 | 1.148 | 5.155 | |
| 3:37:52 PM | 1.368 | 0.023 | 1.140 | 5.172 | |
| 3:37:52 PM | 1.592 | 0.027 | 1.137 | 5.180 | |
| 3:37:53 PM | 1.814 | 0.030 | 1.140 | 5.172 | |
| 3:37:53 PM | 2.037 | 0.034 | 1.116 | 5.228 | |
| 3:37:53 PM | 2.259 | 0.038 | 1.122 | 5.214 | |
| 3:37:54 PM | 2.721 | 0.045 | 1.093 | 5.281 | |
| 3:37:54 PM | 2.941 | 0.049 | 1.111 | 5.241 | |
| 3:37:54 PM | 3.161 | 0.053 | 1.171 | 5.101 | |
| 3:37:54 PM | 3.380 | 0.056 | 1.124 | 5.209 | |
| 3:37:54 PM | 3.600 | 0.060 | 1.144 | 5.163 | |
| 3:37:55 PM | 3.823 | 0.064 | 1.150 | 5.149 | |
| 3:37:55 PM | 4.046 | 0.067 | 1.117 | 5.225 | |
| 3:37:55 PM | 4.268 | 0.071 | 1.119 | 5.220 | |
| 3:37:56 PM | 4.764 | 0.079 | 1.113 | 5.234 | |
| 3:37:56 PM | 4.984 | 0.083 | 1.137 | 5.179 | |
| 3:37:56 PM | 5.205 | 0.087 | 1.054 | 5.372 | |
| 3:37:56 PM | 5.425 | 0.090 | 1.089 | 5.289 | |
| 3:37:57 PM | 5.646 | 0.094 | 1.108 | 5.247 | |
| 3:37:57 PM | 5.869 | 0.098 | 1.100 | 5.265 | |
| 3:37:57 PM | 6.093 | 0.102 | 1.108 | 5.247 | |
| 3:37:57 PM | 6.604 | 0.110 | 1.099 | 5.267 | |
| 3:37:58 PM | 6.825 | 0.114 | 1.098 | 5.271 | |
| 3:37:58 PM | 7.140 | 0.119 | 1.095 | 5.277 | |
| 3:37:59 PM | 7.790 | 0.130 | 1.091 | 5.286 | |
| 3:37:59 PM | 8.011 | 0.134 | 1.089 | 5.289 | |
| 3:37:59 PM | 8.461 | 0.141 | 1.085 | 5.299 | |
| 3:38:00 PM | 9.007 | 0.150 | 1.082 | 5.306 | |
| 3:38:00 PM | 9.480 | 0.158 | 1.078 | 5.317 | |
| 3:38:01 PM | 10.170 | 0.170 | 1.074 | 5.325 | |
| 3:38:02 PM | 10.680 | 0.178 | 1.070 | 5.335 | |
| 3:38:02 PM | 11.383 | 0.190 | 1.066 | 5.343 | |
| 3:38:03 PM | 11.940 | 0.199 | 1.061 | 5.354 | |
| 3:38:04 PM | 12.660 | 0.211 | 1.057 | 5.363 | |
| 3:38:04 PM | 13.440 | 0.224 | 1.050 | 5.380 | |
| 3:38:05 PM | 14.220 | 0.237 | 1.047 | 5.388 | |
| 3:38:06 PM | 15.060 | 0.251 | 1.040 | 5.404 | |
| 3:38:07 PM | 15.960 | 0.266 | 1.034 | 5.418 | |
| 3:38:08 PM | 16.920 | 0.282 | 1.027 | 5.433 | |
| 3:38:09 PM | 17.880 | 0.298 | 1.022 | 5.445 | |
| 3:38:10 PM | 18.960 | 0.316 | 1.015 | 5.462 | |
| 3:38:11 PM | 20.100 | 0.335 | 1.008 | 5.477 | |
| 3:38:12 PM | 21.300 | 0.355 | 1.000 | 5.497 | |
| 3:38:13 PM | 22.560 | 0.376 | 0.992 | 5.514 | |
| 3:38:15 PM | 23.880 | 0.398 | 0.984 | 5.533 | |
| 3:38:16 PM | 25.320 | 0.422 | 0.976 | 5.551 | |
| 3:38:18 PM | 26.828 | 0.447 | 0.967 | 5.573 | |
| 3:38:19 PM | 28.380 | 0.473 | 0.957 | 5.595 | |
| 3:38:21 PM | 30.095 | 0.502 | 0.946 | 5.620 | |
| 3:38:23 PM | 31.860 | 0.531 | 0.937 | 5.641 | |
| 3:38:25 PM | 33.720 | 0.562 | 0.926 | 5.666 | |
| 3:38:27 PM | 35.841 | 0.597 | 0.917 | 5.687 | |
| 3:38:29 PM | 37.860 | 0.631 | 0.905 | 5.714 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-1B Slug In Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Water Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 3:38:31 PM | 40.080 | 0.668 | 0.894 | 5.740 | |
| 3:38:33 PM | 42.480 | 0.708 | 0.882 | 5.769 | |
| 3:38:36 PM | 45.125 | 0.752 | 0.869 | 5.798 | |
| 3:38:39 PM | 47.640 | 0.794 | 0.857 | 5.827 | |
| 3:38:41 PM | 50.461 | 0.841 | 0.844 | 5.855 | |
| 3:38:44 PM | 53.461 | 0.891 | 0.830 | 5.889 | |
| 3:38:48 PM | 56.640 | 0.944 | 0.815 | 5.923 | |
| 3:38:51 PM | 60.137 | 1.002 | 0.801 | 5.956 | |
| 3:38:54 PM | 63.600 | 1.060 | 0.786 | 5.989 | |
| 3:38:58 PM | 67.200 | 1.120 | 0.772 | 6.023 | |
| 3:39:02 PM | 71.400 | 1.190 | 0.756 | 6.059 | |
| 3:39:06 PM | 75.600 | 1.260 | 0.740 | 6.096 | |
| 3:39:11 PM | 79.800 | 1.330 | 0.725 | 6.131 | |
| 3:39:15 PM | 84.600 | 1.410 | 0.710 | 6.167 | |
| 3:39:21 PM | 90.176 | 1.503 | 0.692 | 6.208 | |
| 3:39:26 PM | 94.800 | 1.580 | 0.678 | 6.239 | |
| 3:39:32 PM | 100.800 | 1.680 | 0.662 | 6.275 | |
| 3:39:38 PM | 106.800 | 1.780 | 0.645 | 6.316 | |
| 3:39:44 PM | 112.800 | 1.880 | 0.631 | 6.349 | |
| 3:39:50 PM | 119.400 | 1.990 | 0.617 | 6.380 | |
| 3:39:57 PM | 126.600 | 2.110 | 0.600 | 6.418 | |
| 3:40:05 PM | 134.400 | 2.240 | 0.586 | 6.452 | |
| 3:40:13 PM | 142.200 | 2.370 | 0.572 | 6.484 | |
| 3:40:21 PM | 150.600 | 2.510 | 0.558 | 6.518 | |
| 3:40:30 PM | 159.600 | 2.660 | 0.544 | 6.548 | |
| 3:40:40 PM | 169.200 | 2.820 | 0.533 | 6.574 | |
| 3:40:50 PM | 178.800 | 2.980 | 0.521 | 6.602 | 6.37 |
| 3:41:00 PM | 189.600 | 3.160 | 0.510 | 6.627 | |
| 3:41:12 PM | 201.065 | 3.351 | 0.500 | 6.651 | |
| 3:41:24 PM | 213.082 | 3.551 | 0.491 | 6.672 | |
| 3:41:36 PM | 225.600 | 3.760 | 0.481 | 6.695 | |
| 3:41:50 PM | 238.800 | 3.980 | 0.474 | 6.711 | 6.47 |
| 3:42:04 PM | 253.260 | 4.221 | 0.466 | 6.728 | |
| 3:42:19 PM | 268.200 | 4.470 | 0.459 | 6.745 | |
| 3:42:35 PM | 283.800 | 4.730 | 0.454 | 6.756 | |
| 3:42:51 PM | 300.600 | 5.010 | 0.450 | 6.766 | 6.69 |
| 3:43:09 PM | 318.600 | 5.310 | 0.445 | 6.778 | |
| 3:43:28 PM | 337.200 | 5.620 | 0.442 | 6.784 | |
| 3:43:48 PM | 357.600 | 5.960 | 0.439 | 6.790 | 6.75 |
| 3:44:09 PM | 378.600 | 6.310 | 0.438 | 6.792 | 6.77 |

**Trex Properties, Charlotte NC: Data Logger Record for MW-1B Slug Out Test**
**W&R Project No. 03130430.01**

| | |
|---|---|
| Report Date: | 42031 |
| Report User Name: | Administrator |
| Report Computer Name: | WR1105 |

Log File Properties

| | |
|---|---|
| File Name | MW-1B Out XD Data |
| Create Date | 42051 |

Device Properties

| | |
|---|---|
| Device | Level TROLL® 700 |
| Site | Trex Property |
| Device Name | |
| Serial Number | 127883 |
| Firmware Version | 2.07 |

Log Configuration

| | |
|---|---|
| Log Name | MW-1B out |
| Created By | Administrator |
| Computer Name | WR1105 |
| Application | WinSitu.exe |
| Application Version | 5.6.1.8 |
| Create Date | 42031 |
| Notes Size(bytes) | 4096 |
| Type | True Logarithmic |
| Overwrite when full | Disabled |
| Scheduled Start Time | Manual Start |
| Scheduled Stop | No Stop Time |
| Max Interval | Days: 0 Hours: 00 Mins: 02 Secs: 00 |

Level Reference Settings At Log Creation

| | |
|---|---|
| Level Measurement Mode | Level Depth To Water |
| Specific Gravity | 0.999 |
| Level Reference Mode: | Set new reference |
| Level Reference Value: | 6.79 (ft) |
| Level Reference Head Pressure | 0.429034 (PSI) |
| Head Pressure | 0.428285 (PSI) |
| Temperature | 13.03 (C) |
| Depth of Probe | 5 feet below SWL |

Log Notes:

| Date and Time | Note |
|---|---|
| 1/27/2015 15:46 | Manual Start Command |
| 1/27/2015 15:54 | Manual Stop Command |

Log Data:

| | |
|---|---|
| Record Count | 99 |

**Trex Properties, Charlotte NC: Data Logger Record for MW-1B Slug Out Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Wate Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 3:46:50 PM | 0.000 | 0.000 | -0.278 | 8.422 | |
| 3:46:51 PM | 0.488 | 0.008 | -0.274 | 8.414 | |
| 3:46:51 PM | 0.708 | 0.012 | -0.273 | 8.411 | |
| 3:46:51 PM | 0.928 | 0.015 | -0.273 | 8.410 | |
| 3:46:52 PM | 1.148 | 0.019 | -0.271 | 8.405 | |
| 3:46:52 PM | 1.369 | 0.023 | -0.269 | 8.401 | |
| 3:46:52 PM | 1.593 | 0.027 | -0.266 | 8.396 | |
| 3:46:52 PM | 1.815 | 0.030 | -0.265 | 8.393 | |
| 3:46:52 PM | 2.039 | 0.034 | -0.264 | 8.389 | |
| 3:46:53 PM | 2.261 | 0.038 | -0.262 | 8.386 | |
| 3:46:53 PM | 2.723 | 0.045 | -0.258 | 8.375 | |
| 3:46:53 PM | 2.943 | 0.049 | -0.256 | 8.372 | |
| 3:46:54 PM | 3.164 | 0.053 | -0.255 | 8.369 | |
| 3:46:54 PM | 3.384 | 0.056 | -0.253 | 8.366 | |
| 3:46:54 PM | 3.605 | 0.060 | -0.252 | 8.363 | |
| 3:46:54 PM | 3.829 | 0.064 | -0.251 | 8.359 | |
| 3:46:54 PM | 4.051 | 0.068 | -0.249 | 8.356 | |
| 3:46:55 PM | 4.274 | 0.071 | -0.247 | 8.351 | |
| 3:46:55 PM | 4.496 | 0.075 | -0.245 | 8.346 | |
| 3:46:55 PM | 4.988 | 0.083 | -0.241 | 8.336 | |
| 3:46:56 PM | 5.209 | 0.087 | -0.239 | 8.332 | |
| 3:46:56 PM | 5.430 | 0.091 | -0.238 | 8.330 | |
| 3:46:56 PM | 5.649 | 0.094 | -0.236 | 8.326 | |
| 3:46:56 PM | 5.871 | 0.098 | -0.234 | 8.322 | |
| 3:46:57 PM | 6.097 | 0.102 | -0.233 | 8.318 | |
| 3:46:57 PM | 6.608 | 0.110 | -0.227 | 8.305 | |
| 3:46:57 PM | 6.830 | 0.114 | -0.227 | 8.304 | |
| 3:46:58 PM | 7.140 | 0.119 | -0.225 | 8.300 | |
| 3:46:58 PM | 7.790 | 0.130 | -0.219 | 8.287 | |
| 3:46:58 PM | 8.011 | 0.134 | -0.217 | 8.281 | |
| 3:46:59 PM | 8.460 | 0.141 | -0.215 | 8.277 | |
| 3:46:59 PM | 9.007 | 0.150 | -0.211 | 8.267 | |
| 3:47:00 PM | 9.480 | 0.158 | -0.208 | 8.260 | |
| 3:47:01 PM | 10.170 | 0.170 | -0.203 | 8.248 | |
| 3:47:01 PM | 10.680 | 0.178 | -0.199 | 8.240 | |
| 3:47:02 PM | 11.384 | 0.190 | -0.193 | 8.226 | |
| 3:47:02 PM | 11.940 | 0.199 | -0.190 | 8.220 | |
| 3:47:03 PM | 12.660 | 0.211 | -0.183 | 8.204 | |
| 3:47:04 PM | 13.440 | 0.224 | -0.176 | 8.188 | |
| 3:47:05 PM | 14.220 | 0.237 | -0.175 | 8.184 | |
| 3:47:05 PM | 15.060 | 0.251 | -0.168 | 8.169 | |
| 3:47:06 PM | 15.960 | 0.266 | -0.162 | 8.154 | |
| 3:47:07 PM | 16.920 | 0.282 | -0.155 | 8.139 | |
| 3:47:08 PM | 17.880 | 0.298 | -0.149 | 8.125 | |
| 3:47:09 PM | 18.960 | 0.316 | -0.142 | 8.109 | |
| 3:47:11 PM | 20.101 | 0.335 | -0.134 | 8.090 | |
| 3:47:12 PM | 21.301 | 0.355 | -0.127 | 8.074 | |
| 3:47:13 PM | 22.560 | 0.376 | -0.119 | 8.056 | |
| 3:47:14 PM | 23.880 | 0.398 | -0.111 | 8.038 | |
| 3:47:16 PM | 25.320 | 0.422 | -0.102 | 8.016 | |
| 3:47:17 PM | 26.820 | 0.447 | -0.094 | 7.998 | |
| 3:47:19 PM | 28.380 | 0.473 | -0.084 | 7.974 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-1B Slug Out Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Wate Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 3:47:20 PM | 30.060 | 0.501 | -0.075 | 7.953 | |
| 3:47:22 PM | 31.860 | 0.531 | -0.064 | 7.929 | |
| 3:47:24 PM | 33.720 | 0.562 | -0.054 | 7.906 | |
| 3:47:26 PM | 35.763 | 0.596 | -0.043 | 7.880 | |
| 3:47:28 PM | 37.860 | 0.631 | -0.031 | 7.852 | |
| 3:47:30 PM | 40.080 | 0.668 | -0.020 | 7.826 | |
| 3:47:33 PM | 42.480 | 0.708 | -0.008 | 7.800 | |
| 3:47:35 PM | 45.000 | 0.750 | 0.004 | 7.771 | |
| 3:47:38 PM | 47.779 | 0.796 | 0.017 | 7.740 | |
| 3:47:41 PM | 50.532 | 0.842 | 0.031 | 7.710 | |
| 3:47:44 PM | 53.535 | 0.892 | 0.044 | 7.680 | |
| 3:47:47 PM | 56.802 | 0.947 | 0.058 | 7.646 | |
| 3:47:50 PM | 60.000 | 1.000 | 0.072 | 7.615 | 7.74 |
| 3:47:54 PM | 63.600 | 1.060 | 0.085 | 7.583 | |
| 3:47:58 PM | 67.200 | 1.120 | 0.100 | 7.549 | |
| 3:48:02 PM | 71.560 | 1.193 | 0.117 | 7.511 | |
| 3:48:06 PM | 75.600 | 1.260 | 0.131 | 7.478 | |
| 3:48:10 PM | 79.800 | 1.330 | 0.146 | 7.444 | |
| 3:48:15 PM | 84.600 | 1.410 | 0.161 | 7.408 | |
| 3:48:20 PM | 90.000 | 1.500 | 0.178 | 7.370 | 7.48 |
| 3:48:25 PM | 94.800 | 1.580 | 0.191 | 7.339 | |
| 3:48:31 PM | 100.800 | 1.680 | 0.208 | 7.300 | |
| 3:48:37 PM | 106.800 | 1.780 | 0.223 | 7.265 | |
| 3:48:43 PM | 112.800 | 1.880 | 0.237 | 7.233 | |
| 3:48:50 PM | 119.400 | 1.990 | 0.251 | 7.201 | 7.28 |
| 3:48:57 PM | 126.600 | 2.110 | 0.265 | 7.168 | |
| 3:49:05 PM | 134.400 | 2.240 | 0.281 | 7.133 | 7.13 |
| 3:49:13 PM | 142.200 | 2.370 | 0.293 | 7.104 | |
| 3:49:21 PM | 150.600 | 2.510 | 0.306 | 7.075 | |
| 3:49:30 PM | 159.600 | 2.660 | 0.318 | 7.046 | |
| 3:49:40 PM | 169.215 | 2.820 | 0.330 | 7.018 | |
| 3:49:49 PM | 178.800 | 2.980 | 0.341 | 6.993 | 7.04 |
| 3:50:00 PM | 189.600 | 3.160 | 0.351 | 6.970 | |
| 3:50:11 PM | 201.000 | 3.350 | 0.361 | 6.948 | 6.97 |
| 3:50:23 PM | 213.013 | 3.550 | 0.368 | 6.930 | |
| 3:50:36 PM | 225.600 | 3.760 | 0.377 | 6.910 | |
| 3:50:49 PM | 238.800 | 3.980 | 0.384 | 6.893 | 6.92 |
| 3:51:04 PM | 253.209 | 4.220 | 0.392 | 6.876 | |
| 3:51:19 PM | 268.200 | 4.470 | 0.396 | 6.866 | |
| 3:51:34 PM | 283.800 | 4.730 | 0.402 | 6.853 | |
| 3:51:51 PM | 300.600 | 5.010 | 0.406 | 6.844 | 6.86 |
| 3:52:09 PM | 318.600 | 5.310 | 0.410 | 6.835 | |
| 3:52:28 PM | 337.200 | 5.620 | 0.412 | 6.829 | |
| 3:52:48 PM | 357.600 | 5.960 | 0.415 | 6.823 | 6.84 |
| 3:53:09 PM | 378.600 | 6.310 | 0.418 | 6.816 | |
| 3:53:31 PM | 400.800 | 6.680 | 0.419 | 6.814 | |
| 3:53:55 PM | 424.888 | 7.081 | 0.421 | 6.809 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10A Slug In Test**
**W&R Project No. 03130430.01**

| | |
|---|---|
| Report Date: | 42031 |
| Report User Name: | Administrator |
| Report Computer Name: | WR1105 |

Log File Properties

| | |
|---|---|
| File Name | MW-10A In XD Data |
| Create Date | 42051 |

Device Properties

| | |
|---|---|
| Device | Level TROLL® 700 |
| Site | Trex Property |
| Device Name | |
| Serial Number | 127883 |
| Firmware Version | 2.07 |

Log Configuration

| | |
|---|---|
| Log Name | MW-10A In |
| Created By | Administrator |
| Computer Name | WR1105 |
| Application | WinSitu.exe |
| Application Version | 5.6.1.8 |
| Create Date | 42031 |
| Notes Size(bytes) | 4096 |
| Type | True Logarithmic |
| Overwrite when full | Disabled |
| Scheduled Start Time | Manual Start |
| Scheduled Stop | No Stop Time |
| Max Interval | Days: 0 Hours: 00 Mins: 02 Secs: 00 |

Level Reference Settings At Log Creation

| | |
|---|---|
| Level Measurement Mode | Level Depth To Water |
| Specific Gravity | 0.999 |
| Level Reference Mode: | Set new reference |
| Level Reference Value: | 7.61 (ft) |
| Level Reference Head Pressure | -0.0446911 (PSI) |
| Head Pressure | -0.0448985 (PSI) |
| Temperature | 16.5231 (C) |
| Depth of Probe | 5 feet below SWL |

Log Notes:

| Date and Time | Note |
|---|---|
| 1/27/2015 12:49 | Device Taken Offline |
| 1/27/2015 12:49 | User Note: "Pressure Zero - Offset: 2.13284(pounds per square inch)" |
| 1/27/2015 12:49 | Device Put Online |
| 1/27/2015 12:51 | Manual Start Command |
| 1/27/2015 12:58 | Manual Stop Command |

Log Data:

| | |
|---|---|
| Record Count | 98 |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10A Slug In Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Wate Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 12:51:48 PM | 0.000 | 0.000 | 0.413 | 6.553 | |
| 12:51:48 PM | 0.250 | 0.004 | 0.497 | 6.358 | |
| 12:51:48 PM | 0.500 | 0.008 | 0.487 | 6.382 | |
| 12:51:48 PM | 0.750 | 0.013 | 0.484 | 6.390 | |
| 12:51:49 PM | 1.000 | 0.017 | 0.484 | 6.388 | |
| 12:51:49 PM | 1.250 | 0.021 | 0.468 | 6.426 | |
| 12:51:49 PM | 1.500 | 0.025 | 0.293 | 6.831 | |
| 12:51:49 PM | 1.750 | 0.029 | 0.610 | 6.099 | |
| 12:51:50 PM | 2.000 | 0.033 | 0.419 | 6.539 | |
| 12:51:50 PM | 2.250 | 0.038 | 0.463 | 6.437 | |
| 12:51:50 PM | 2.500 | 0.042 | 0.597 | 6.128 | |
| 12:51:50 PM | 2.750 | 0.046 | 0.379 | 6.632 | |
| 12:51:51 PM | 3.000 | 0.050 | 0.434 | 6.504 | |
| 12:51:51 PM | 3.250 | 0.054 | 0.399 | 6.585 | |
| 12:51:51 PM | 3.500 | 0.058 | 0.426 | 6.523 | |
| 12:51:51 PM | 3.750 | 0.063 | 0.372 | 6.648 | |
| 12:51:52 PM | 4.000 | 0.067 | 0.415 | 6.550 | |
| 12:51:52 PM | 4.250 | 0.071 | 0.436 | 6.500 | |
| 12:51:52 PM | 4.500 | 0.075 | 0.507 | 6.337 | |
| 12:51:52 PM | 4.750 | 0.079 | 0.453 | 6.462 | |
| 12:51:53 PM | 5.043 | 0.084 | 0.431 | 6.513 | |
| 12:51:53 PM | 5.264 | 0.088 | 0.506 | 6.339 | |
| 12:51:53 PM | 5.500 | 0.092 | 0.354 | 6.689 | |
| 12:51:53 PM | 5.753 | 0.096 | 0.396 | 6.592 | |
| 12:51:54 PM | 6.000 | 0.100 | 0.255 | 6.919 | |
| 12:51:54 PM | 6.360 | 0.106 | 0.414 | 6.552 | |
| 12:51:54 PM | 6.720 | 0.112 | 0.450 | 6.468 | |
| 12:51:55 PM | 7.140 | 0.119 | 0.280 | 6.860 | |
| 12:51:55 PM | 7.560 | 0.126 | 0.397 | 6.590 | |
| 12:51:56 PM | 7.980 | 0.133 | 0.381 | 6.627 | |
| 12:51:56 PM | 8.461 | 0.141 | 0.431 | 6.512 | |
| 12:51:57 PM | 9.000 | 0.150 | 0.424 | 6.528 | |
| 12:51:57 PM | 9.518 | 0.159 | 0.365 | 6.663 | |
| 12:51:58 PM | 10.080 | 0.168 | 0.326 | 6.754 | |
| 12:51:58 PM | 10.680 | 0.178 | 0.331 | 6.743 | |
| 12:51:59 PM | 11.280 | 0.188 | 0.352 | 6.693 | |
| 12:52:00 PM | 11.940 | 0.199 | 0.348 | 6.704 | |
| 12:52:01 PM | 12.963 | 0.216 | 0.337 | 6.728 | |
| 12:52:01 PM | 13.440 | 0.224 | 0.330 | 6.744 | |
| 12:52:02 PM | 14.220 | 0.237 | 0.324 | 6.759 | |
| 12:52:03 PM | 15.342 | 0.256 | 0.317 | 6.776 | |
| 12:52:04 PM | 15.960 | 0.266 | 0.310 | 6.790 | |
| 12:52:05 PM | 16.920 | 0.282 | 0.303 | 6.808 | |
| 12:52:06 PM | 17.880 | 0.298 | 0.297 | 6.821 | |
| 12:52:07 PM | 18.960 | 0.316 | 0.288 | 6.842 | |
| 12:52:08 PM | 20.100 | 0.335 | 0.279 | 6.862 | |
| 12:52:09 PM | 21.300 | 0.355 | 0.270 | 6.884 | |
| 12:52:10 PM | 22.598 | 0.377 | 0.262 | 6.902 | |
| 12:52:12 PM | 23.880 | 0.398 | 0.253 | 6.923 | |
| 12:52:13 PM | 25.320 | 0.422 | 0.244 | 6.943 | |
| 12:52:14 PM | 26.820 | 0.447 | 0.235 | 6.965 | |
| 12:52:16 PM | 28.380 | 0.473 | 0.227 | 6.983 | |
| 12:52:18 PM | 30.060 | 0.501 | 0.217 | 7.006 | 6.980 |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10A Slug In Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Wate Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 12:52:19 PM | 31.860 | 0.531 | 0.208 | 7.026 | |
| 12:52:21 PM | 33.720 | 0.562 | 0.199 | 7.048 | |
| 12:52:23 PM | 35.760 | 0.596 | 0.191 | 7.066 | |
| 12:52:25 PM | 37.860 | 0.631 | 0.182 | 7.087 | |
| 12:52:28 PM | 40.080 | 0.668 | 0.172 | 7.109 | |
| 12:52:30 PM | 42.480 | 0.708 | 0.164 | 7.128 | |
| 12:52:33 PM | 45.000 | 0.750 | 0.156 | 7.146 | |
| 12:52:35 PM | 47.640 | 0.794 | 0.148 | 7.166 | |
| 12:52:38 PM | 50.460 | 0.841 | 0.139 | 7.185 | |
| 12:52:41 PM | 53.460 | 0.891 | 0.130 | 7.207 | |
| 12:52:44 PM | 56.640 | 0.944 | 0.123 | 7.222 | |
| 12:52:48 PM | 60.000 | 1.000 | 0.116 | 7.239 | 7.270 |
| 12:52:51 PM | 63.600 | 1.060 | 0.109 | 7.256 | |
| 12:52:55 PM | 67.200 | 1.120 | 0.102 | 7.271 | |
| 12:52:59 PM | 71.400 | 1.190 | 0.095 | 7.287 | |
| 12:53:03 PM | 75.620 | 1.260 | 0.090 | 7.299 | |
| 12:53:07 PM | 79.800 | 1.330 | 0.084 | 7.313 | |
| 12:53:12 PM | 84.632 | 1.411 | 0.079 | 7.324 | |
| 12:53:18 PM | 90.000 | 1.500 | 0.073 | 7.338 | 7.400 |
| 12:53:22 PM | 94.800 | 1.580 | 0.069 | 7.348 | |
| 12:53:28 PM | 100.800 | 1.680 | 0.064 | 7.360 | |
| 12:53:34 PM | 106.800 | 1.780 | 0.058 | 7.372 | |
| 12:53:40 PM | 112.800 | 1.880 | 0.054 | 7.381 | |
| 12:53:47 PM | 119.400 | 1.990 | 0.051 | 7.388 | 7.470 |
| 12:53:54 PM | 126.690 | 2.112 | 0.049 | 7.393 | |
| 12:54:02 PM | 134.400 | 2.240 | 0.045 | 7.403 | |
| 12:54:10 PM | 142.244 | 2.371 | 0.042 | 7.409 | |
| 12:54:18 PM | 150.722 | 2.512 | 0.039 | 7.416 | 7.510 |
| 12:54:27 PM | 159.735 | 2.662 | 0.037 | 7.421 | |
| 12:54:37 PM | 169.271 | 2.821 | 0.034 | 7.428 | |
| 12:54:46 PM | 178.800 | 2.980 | 0.032 | 7.432 | |
| 12:54:57 PM | 189.602 | 3.160 | 0.034 | 7.428 | |
| 12:55:09 PM | 201.000 | 3.350 | 0.031 | 7.436 | |
| 12:55:21 PM | 213.000 | 3.550 | 0.028 | 7.442 | |
| 12:55:33 PM | 225.600 | 3.760 | 0.029 | 7.439 | |
| 12:55:46 PM | 238.800 | 3.980 | 0.030 | 7.438 | 7.560 |
| 12:56:01 PM | 253.385 | 4.223 | 0.030 | 7.437 | |
| 12:56:16 PM | 268.216 | 4.470 | 0.028 | 7.442 | |
| 12:56:31 PM | 283.800 | 4.730 | 0.025 | 7.449 | |
| 12:56:48 PM | 300.600 | 5.010 | 0.024 | 7.451 | 7.580 |
| 12:57:06 PM | 318.600 | 5.310 | 0.024 | 7.451 | |
| 12:57:25 PM | 337.238 | 5.621 | 0.021 | 7.458 | |
| 12:57:45 PM | 357.600 | 5.960 | 0.016 | 7.469 | 7.590 |
| 12:58:06 PM | 378.600 | 6.310 | 0.017 | 7.468 | |
| 12:58:28 PM | 400.800 | 6.680 | 0.017 | 7.467 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10A Slug Out Test**
**W&R Project No. 03130430.01**

| | |
|---|---|
| Report Date: | 42031 |
| Report User Name: | Administrator |
| Report Computer Name: | WR1105 |

Log File Properties

| | |
|---|---|
| File Name | MW-10A Out XD Data |
| Create Date | 42051 |

Device Properties

| | |
|---|---|
| Device | Level TROLL® 700 |
| Site | Trex Property |
| Device Name | |
| Serial Number | 127883 |
| Firmware Version | 2.07 |

Log Configuration

| | |
|---|---|
| Log Name | MW-10A Out |
| Created By | Administrator |
| Computer Name | WR1105 |
| Application | WinSitu.exe |
| Application Version | 5.6.1.8 |
| Create Date | 42031 |
| Notes Size(bytes) | 4096 |
| Type | True Logarithmic |
| Overwrite when full | Disabled |
| Scheduled Start Time | Manual Start |
| Scheduled Stop | No Stop Time |
| Max Interval | Days: 0 Hours: 00 Mins: 02 Secs: 00 |

Level Reference Settings At Log Creation

| | |
|---|---|
| Level Measurement Mode | Level Depth To Water |
| Specific Gravity | 0.999 |
| Level Reference Mode: | Set new reference |
| Level Reference Value: | 7.61 (ft) |
| Level Reference Head Pressure | 0.0128818 (PSI) |
| Head Pressure | 0.0132985 (PSI) |
| Temperature | 16.6693 (C) |
| Depth of Probe | 5 feet below SWL |

Log Notes:

| Date and Time | Note |
|---|---|
| 1/27/2015 13:01 | Manual Start Command |
| 1/27/2015 13:05 | Manual Stop Command |

Log Data:

| | |
|---|---|
| Record Count | 88 |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10A Slug Out Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Wate Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 1:01:46 PM | 0.000 | 0.000 | -0.495 | 8.782 | |
| 1:01:47 PM | 0.251 | 0.004 | -0.491 | 8.774 | |
| 1:01:47 PM | 0.501 | 0.008 | -0.487 | 8.765 | |
| 1:01:47 PM | 0.751 | 0.013 | -0.483 | 8.756 | |
| 1:01:47 PM | 1.001 | 0.017 | -0.479 | 8.745 | |
| 1:01:48 PM | 1.251 | 0.021 | -0.475 | 8.737 | |
| 1:01:48 PM | 1.501 | 0.025 | -0.472 | 8.729 | |
| 1:01:48 PM | 1.751 | 0.029 | -0.468 | 8.721 | |
| 1:01:48 PM | 2.001 | 0.033 | -0.464 | 8.710 | |
| 1:01:49 PM | 2.251 | 0.038 | -0.460 | 8.701 | |
| 1:01:49 PM | 2.501 | 0.042 | -0.456 | 8.692 | |
| 1:01:49 PM | 2.751 | 0.046 | -0.444 | 8.666 | |
| 1:01:49 PM | 3.001 | 0.050 | -0.447 | 8.671 | |
| 1:01:50 PM | 3.251 | 0.054 | -0.443 | 8.662 | |
| 1:01:50 PM | 3.501 | 0.058 | -0.442 | 8.660 | |
| 1:01:50 PM | 3.751 | 0.063 | -0.439 | 8.655 | |
| 1:01:50 PM | 4.001 | 0.067 | -0.435 | 8.645 | |
| 1:01:51 PM | 4.251 | 0.071 | -0.432 | 8.638 | |
| 1:01:51 PM | 4.501 | 0.075 | -0.429 | 8.630 | |
| 1:01:51 PM | 4.751 | 0.079 | -0.423 | 8.617 | |
| 1:01:51 PM | 5.051 | 0.084 | -0.421 | 8.611 | |
| 1:01:52 PM | 5.276 | 0.088 | -0.413 | 8.592 | |
| 1:01:52 PM | 5.755 | 0.096 | -0.411 | 8.589 | |
| 1:01:52 PM | 5.977 | 0.100 | -0.409 | 8.583 | |
| 1:01:53 PM | 6.200 | 0.103 | -0.405 | 8.575 | |
| 1:01:53 PM | 6.422 | 0.107 | -0.399 | 8.560 | |
| 1:01:53 PM | 6.892 | 0.115 | -0.397 | 8.557 | |
| 1:01:53 PM | 7.140 | 0.119 | -0.395 | 8.551 | |
| 1:01:54 PM | 7.560 | 0.126 | -0.390 | 8.540 | |
| 1:01:54 PM | 7.980 | 0.133 | -0.383 | 8.525 | |
| 1:01:55 PM | 8.461 | 0.141 | -0.378 | 8.512 | |
| 1:01:55 PM | 9.000 | 0.150 | -0.373 | 8.501 | |
| 1:01:56 PM | 9.480 | 0.158 | -0.367 | 8.486 | |
| 1:01:56 PM | 10.080 | 0.168 | -0.360 | 8.472 | |
| 1:01:57 PM | 10.681 | 0.178 | -0.353 | 8.454 | |
| 1:01:58 PM | 11.280 | 0.188 | -0.348 | 8.444 | |
| 1:01:58 PM | 11.940 | 0.199 | -0.340 | 8.426 | |
| 1:01:59 PM | 12.962 | 0.216 | -0.330 | 8.402 | |
| 1:02:00 PM | 13.440 | 0.224 | -0.326 | 8.393 | |
| 1:02:01 PM | 14.220 | 0.237 | -0.317 | 8.372 | |
| 1:02:02 PM | 15.333 | 0.256 | -0.307 | 8.348 | |
| 1:02:02 PM | 15.960 | 0.266 | -0.302 | 8.336 | |
| 1:02:03 PM | 16.920 | 0.282 | -0.294 | 8.318 | |
| 1:02:04 PM | 17.880 | 0.298 | -0.285 | 8.298 | |
| 1:02:05 PM | 18.960 | 0.316 | -0.278 | 8.281 | |
| 1:02:06 PM | 20.100 | 0.335 | -0.268 | 8.259 | |
| 1:02:08 PM | 21.300 | 0.355 | -0.260 | 8.239 | |
| 1:02:09 PM | 22.611 | 0.377 | -0.251 | 8.219 | |
| 1:02:10 PM | 23.880 | 0.398 | -0.242 | 8.198 | |
| 1:02:12 PM | 25.320 | 0.422 | -0.232 | 8.176 | |
| 1:02:13 PM | 26.820 | 0.447 | -0.222 | 8.152 | |
| 1:02:15 PM | 28.498 | 0.475 | -0.213 | 8.131 | |
| 1:02:16 PM | 30.060 | 0.501 | -0.204 | 8.111 | 8.250 |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10A Slug Out Test**
**W&R Project No. 03130430.01**

| | Elapsed Time | | Sensor: Pres 15G SN#: 127883 | Sensor: Pres 15G SN#: 127883 | Manual Wate Level Check |
|---|---|---|---|---|---|
| Clock Time | Seconds | Minutes | Pressure (PSI) | Level Depth To Water (ft) | (ft BTOC) |
| 1:02:18 PM | 31.860 | 0.531 | -0.196 | 8.092 | |
| 1:02:20 PM | 33.720 | 0.562 | -0.185 | 8.066 | |
| 1:02:22 PM | 35.760 | 0.596 | -0.175 | 8.044 | |
| 1:02:24 PM | 37.860 | 0.631 | -0.167 | 8.024 | |
| 1:02:26 PM | 40.080 | 0.668 | -0.156 | 8.001 | |
| 1:02:29 PM | 42.480 | 0.708 | -0.146 | 7.978 | |
| 1:02:31 PM | 45.000 | 0.750 | -0.138 | 7.959 | |
| 1:02:34 PM | 47.640 | 0.794 | -0.129 | 7.937 | |
| 1:02:37 PM | 50.460 | 0.841 | -0.120 | 7.917 | |
| 1:02:40 PM | 53.460 | 0.891 | -0.111 | 7.897 | |
| 1:02:43 PM | 56.640 | 0.944 | -0.103 | 7.878 | |
| 1:02:46 PM | 60.000 | 1.000 | -0.096 | 7.860 | 7.900 |
| 1:02:50 PM | 63.600 | 1.060 | -0.087 | 7.840 | |
| 1:02:54 PM | 67.289 | 1.121 | -0.080 | 7.825 | |
| 1:02:58 PM | 71.400 | 1.190 | -0.072 | 7.805 | |
| 1:03:02 PM | 75.600 | 1.260 | -0.065 | 7.790 | |
| 1:03:06 PM | 79.829 | 1.330 | -0.059 | 7.776 | |
| 1:03:11 PM | 84.600 | 1.410 | -0.053 | 7.763 | |
| 1:03:16 PM | 90.000 | 1.500 | -0.045 | 7.743 | 7.750 |
| 1:03:21 PM | 94.849 | 1.581 | -0.040 | 7.732 | |
| 1:03:27 PM | 100.858 | 1.681 | -0.034 | 7.719 | |
| 1:03:33 PM | 106.865 | 1.781 | -0.030 | 7.709 | |
| 1:03:39 PM | 112.874 | 1.881 | -0.028 | 7.703 | |
| 1:03:46 PM | 119.400 | 1.990 | -0.025 | 7.698 | 7.690 |
| 1:03:53 PM | 126.600 | 2.110 | -0.021 | 7.689 | |
| 1:04:01 PM | 134.400 | 2.240 | -0.017 | 7.680 | |
| 1:04:09 PM | 142.200 | 2.370 | -0.015 | 7.674 | |
| 1:04:17 PM | 150.600 | 2.510 | -0.012 | 7.667 | 7.640 |
| 1:04:26 PM | 159.600 | 2.660 | -0.008 | 7.658 | |
| 1:04:36 PM | 169.200 | 2.820 | -0.005 | 7.652 | |
| 1:04:45 PM | 178.964 | 2.983 | -0.001 | 7.642 | 7.620 |
| 1:04:56 PM | 189.600 | 3.160 | 0.001 | 7.637 | |
| 1:05:07 PM | 201.000 | 3.350 | 0.002 | 7.635 | |
| 1:05:19 PM | 213.000 | 3.550 | 0.004 | 7.632 | |
| 1:05:32 PM | 225.648 | 3.761 | 0.002 | 7.635 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10B Slug In Test**
**W&R Project No. 03130430.01**

| | |
|---|---|
| Report Date: | 42031 |
| Report User Name: | Administrator |
| Report Computer Name: | WR1105 |

Log File Properties

| | |
|---|---|
| File Name | MW-10B In XD Data |
| Create Date | 42051 |

Device Properties

| | |
|---|---|
| Device | Level TROLL® 700 |
| Site | Trex Property |
| Device Name | |
| Serial Number | 127883 |
| Firmware Version | 2.07 |

Log Configuration

| | |
|---|---|
| Log Name | MW-10B In |
| Created By | Administrator |
| Computer Name | WR1105 |
| Application | WinSitu.exe |
| Application Version | 5.6.1.8 |
| Create Date | 42031 |
| Notes Size(bytes) | 4096 |
| Type | True Logarithmic |
| Overwrite when full | Disabled |
| Scheduled Start Time | Manual Start |
| Scheduled Stop | No Stop Time |
| Max Interval | Days: 0 Hours: 00 Mins: 02 Secs: 00 |

Level Reference Settings At Log Creation

| | |
|---|---|
| Level Measurement Mode | Level Depth To Water |
| Specific Gravity | 0.999 |
| Level Reference Mode: | Set new reference |
| Level Reference Value: | 7.44 (ft) |
| Level Reference Head Pressure | -0.00257301 (PSI) |
| Head Pressure | -0.00192165 (PSI) |
| Temperature | 16.9392 (C) |
| Depth of Probe | 5 feet below SWL |

Log Notes:

| Date and Time | Note |
|---|---|
| 1/27/2015 12:02 | Device Taken Offline |
| 1/27/2015 12:02 | User Note: "Pressure Zero - Offset: 2.18095(pounds per square inch)" |
| 1/27/2015 12:03 | Device Put Online |
| 1/27/2015 12:09 | Manual Start Command |
| 1/27/2015 12:22 | Manual Stop Command |

Log Data:

| | |
|---|---|
| Record Count | 109 |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10B Slug In Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Wate Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 12:09:33 PM | 0.000 | 0.000 | 0.002 | 7.428 | |
| 12:09:33 PM | 0.250 | 0.004 | 0.003 | 7.428 | |
| 12:09:33 PM | 0.500 | 0.008 | 0.002 | 7.429 | |
| 12:09:33 PM | 0.750 | 0.013 | 0.002 | 7.430 | |
| 12:09:34 PM | 1.000 | 0.017 | 0.002 | 7.429 | |
| 12:09:34 PM | 1.250 | 0.021 | 0.002 | 7.430 | |
| 12:09:34 PM | 1.500 | 0.025 | 0.001 | 7.431 | |
| 12:09:34 PM | 1.750 | 0.029 | 0.002 | 7.429 | |
| 12:09:35 PM | 2.000 | 0.033 | 0.001 | 7.432 | |
| 12:09:35 PM | 2.250 | 0.038 | 0.001 | 7.432 | |
| 12:09:35 PM | 2.500 | 0.042 | 0.001 | 7.432 | |
| 12:09:35 PM | 2.750 | 0.046 | 0.001 | 7.431 | |
| 12:09:36 PM | 3.000 | 0.050 | 0.001 | 7.431 | |
| 12:09:36 PM | 3.250 | 0.054 | 0.002 | 7.430 | |
| 12:09:36 PM | 3.500 | 0.058 | 0.001 | 7.431 | |
| 12:09:36 PM | 3.750 | 0.063 | 0.001 | 7.432 | |
| 12:09:37 PM | 4.000 | 0.067 | 0.002 | 7.429 | |
| 12:09:37 PM | 4.289 | 0.071 | 0.001 | 7.431 | |
| 12:09:37 PM | 4.509 | 0.075 | 0.001 | 7.432 | |
| 12:09:37 PM | 4.750 | 0.079 | 0.001 | 7.431 | |
| 12:09:38 PM | 5.000 | 0.083 | 0.001 | 7.433 | |
| 12:09:38 PM | 5.250 | 0.088 | 0.001 | 7.432 | |
| 12:09:38 PM | 5.500 | 0.092 | 0.001 | 7.433 | |
| 12:09:38 PM | 5.750 | 0.096 | 0.000 | 7.433 | |
| 12:09:39 PM | 6.000 | 0.100 | 0.000 | 7.435 | |
| 12:09:39 PM | 6.360 | 0.106 | 0.000 | 7.434 | |
| 12:09:39 PM | 6.720 | 0.112 | 0.001 | 7.433 | |
| 12:09:40 PM | 7.140 | 0.119 | 0.001 | 7.432 | |
| 12:09:40 PM | 7.644 | 0.127 | 0.001 | 7.432 | |
| 12:09:41 PM | 7.980 | 0.133 | 0.001 | 7.431 | |
| 12:09:41 PM | 8.460 | 0.141 | 0.002 | 7.430 | |
| 12:09:42 PM | 9.000 | 0.150 | 0.001 | 7.432 | |
| 12:09:42 PM | 9.480 | 0.158 | 0.001 | 7.433 | |
| 12:09:43 PM | 10.080 | 0.168 | 0.001 | 7.433 | |
| 12:09:43 PM | 10.680 | 0.178 | 0.006 | 7.419 | |
| 12:09:44 PM | 11.280 | 0.188 | 0.001 | 7.432 | |
| 12:09:45 PM | 12.233 | 0.204 | 0.001 | 7.432 | |
| 12:09:45 PM | 12.660 | 0.211 | 0.001 | 7.432 | |
| 12:09:46 PM | 13.440 | 0.224 | 0.001 | 7.431 | |
| 12:09:47 PM | 14.220 | 0.237 | 0.003 | 7.428 | |
| 12:09:48 PM | 15.060 | 0.251 | 0.001 | 7.433 | |
| 12:09:49 PM | 15.960 | 0.266 | 0.001 | 7.432 | |
| 12:09:50 PM | 17.014 | 0.284 | 0.002 | 7.431 | |
| 12:09:51 PM | 18.085 | 0.301 | 0.002 | 7.430 | |
| 12:09:52 PM | 18.960 | 0.316 | 0.000 | 7.433 | |
| 12:09:53 PM | 20.100 | 0.335 | 0.001 | 7.432 | |
| 12:09:54 PM | 21.300 | 0.355 | 0.001 | 7.433 | |
| 12:09:55 PM | 22.560 | 0.376 | 0.002 | 7.429 | |
| 12:09:56 PM | 23.880 | 0.398 | 0.175 | 7.031 | |
| 12:09:58 PM | 25.320 | 0.422 | 0.882 | 5.398 | |
| 12:09:59 PM | 26.820 | 0.447 | 0.478 | 6.330 | |
| 12:10:01 PM | 28.380 | 0.473 | 0.524 | 6.223 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10B Slug In Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Wate Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 12:10:03 PM | 30.060 | 0.501 | 0.512 | 6.253 | |
| 12:10:04 PM | 31.860 | 0.531 | 0.259 | 6.836 | |
| 12:10:06 PM | 33.720 | 0.562 | 0.254 | 6.847 | |
| 12:10:08 PM | 35.760 | 0.596 | 0.025 | 7.375 | |
| 12:10:11 PM | 37.990 | 0.633 | 0.263 | 6.826 | |
| 12:10:13 PM | 40.080 | 0.668 | 0.236 | 6.890 | |
| 12:10:15 PM | 42.480 | 0.708 | 0.221 | 6.923 | |
| 12:10:18 PM | 45.000 | 0.750 | 0.217 | 6.934 | |
| 12:10:20 PM | 47.640 | 0.794 | 0.169 | 7.043 | |
| 12:10:23 PM | 50.460 | 0.841 | 0.156 | 7.073 | |
| 12:10:26 PM | 53.460 | 0.891 | 0.140 | 7.110 | |
| 12:10:29 PM | 56.640 | 0.944 | 0.175 | 7.030 | |
| 12:10:33 PM | 60.000 | 1.000 | 0.159 | 7.067 | |
| 12:10:36 PM | 63.600 | 1.060 | 0.101 | 7.200 | |
| 12:10:40 PM | 67.250 | 1.121 | 0.091 | 7.224 | |
| 12:10:44 PM | 71.400 | 1.190 | 0.083 | 7.243 | |
| 12:10:48 PM | 75.600 | 1.260 | 0.074 | 7.263 | |
| 12:10:52 PM | 79.800 | 1.330 | 0.067 | 7.279 | |
| 12:10:57 PM | 84.600 | 1.410 | 0.060 | 7.296 | |
| 12:11:03 PM | 90.000 | 1.500 | 0.053 | 7.312 | |
| 12:11:07 PM | 94.810 | 1.580 | 0.049 | 7.322 | |
| 12:11:13 PM | 100.819 | 1.680 | 0.044 | 7.333 | |
| 12:11:19 PM | 106.826 | 1.780 | 0.040 | 7.341 | |
| 12:11:25 PM | 112.835 | 1.881 | 0.037 | 7.350 | |
| 12:11:32 PM | 119.400 | 1.990 | 0.034 | 7.356 | |
| 12:11:39 PM | 126.600 | 2.110 | 0.031 | 7.363 | |
| 12:11:47 PM | 134.400 | 2.240 | 0.027 | 7.371 | |
| 12:11:55 PM | 142.200 | 2.370 | 0.025 | 7.376 | |
| 12:12:03 PM | 150.600 | 2.510 | 0.024 | 7.379 | |
| 12:12:12 PM | 159.600 | 2.660 | 0.022 | 7.382 | |
| 12:12:22 PM | 169.200 | 2.820 | 0.018 | 7.392 | |
| 12:12:31 PM | 178.924 | 2.982 | 0.018 | 7.392 | |
| 12:12:42 PM | 189.599 | 3.160 | 0.017 | 7.394 | |
| 12:12:54 PM | 201.000 | 3.350 | 0.014 | 7.401 | |
| 12:13:06 PM | 213.000 | 3.550 | 0.015 | 7.400 | |
| 12:13:18 PM | 225.599 | 3.760 | 0.014 | 7.403 | |
| 12:13:32 PM | 239.007 | 3.983 | 0.013 | 7.404 | |
| 12:13:46 PM | 253.200 | 4.220 | 0.013 | 7.403 | |
| 12:14:01 PM | 268.200 | 4.470 | 0.014 | 7.402 | |
| 12:14:16 PM | 283.806 | 4.730 | 0.010 | 7.411 | |
| 12:14:33 PM | 300.599 | 5.010 | 0.008 | 7.415 | |
| 12:14:51 PM | 318.599 | 5.310 | 0.009 | 7.413 | |
| 12:15:10 PM | 337.200 | 5.620 | 0.009 | 7.414 | |
| 12:15:30 PM | 357.599 | 5.960 | 0.008 | 7.415 | |
| 12:15:51 PM | 378.599 | 6.310 | 0.010 | 7.412 | |
| 12:16:14 PM | 400.966 | 6.683 | 0.009 | 7.412 | |
| 12:16:38 PM | 424.997 | 7.083 | 0.008 | 7.414 | |
| 12:17:03 PM | 450.000 | 7.500 | 0.008 | 7.415 | |
| 12:17:29 PM | 476.400 | 7.940 | 0.008 | 7.416 | |
| 12:17:57 PM | 504.599 | 8.410 | 0.010 | 7.411 | |
| 12:18:27 PM | 534.599 | 8.910 | 0.011 | 7.409 | |
| 12:18:59 PM | 566.451 | 9.441 | 0.007 | 7.419 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10B Slug In Test**
**W&R Project No. 03130430.01**

| | Elapsed Time | | Sensor: Pres 15G SN#: 127883 | Sensor: Pres 15G SN#: 127883 | Manual Wate Level Check |
|---|---|---|---|---|---|
| Clock Time | Seconds | Minutes | Pressure (PSI) | Level Depth To Water (ft) | (ft BTOC) |
| 12:19:33 PM | 599.999 | 10.000 | 0.008 | 7.415 | |
| 12:20:09 PM | 635.999 | 10.600 | 0.005 | 7.424 | |
| 12:20:45 PM | 672.075 | 11.201 | 0.006 | 7.420 | |
| 12:21:27 PM | 714.133 | 11.902 | 0.006 | 7.419 | 7.42 |
| 12:22:09 PM | 755.999 | 12.600 | 0.011 | 7.409 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10B Slug Out Test**
**W&R Project No. 03130430.01**

| | |
|---|---|
| Report Date: | 42031 |
| Report User Name: | Administrator |
| Report Computer Name: | WR1105 |

Log File Properties

| | |
|---|---|
| File Name | MW-10B Out XD Data |
| Create Date | 42051 |

Device Properties

| | |
|---|---|
| Device | Level TROLL® 700 |
| Site | Trex Property |
| Device Name | |
| Serial Number | 127883 |
| Firmware Version | 2.07 |

Log Configuration

| | |
|---|---|
| Log Name | MW-10B Out |
| Created By | Administrator |
| Computer Name | WR1105 |
| Application | WinSitu.exe |
| Application Version | 5.6.1.8 |
| Create Date | 42031 |
| Notes Size(bytes) | 4096 |
| Type | True Logarithmic |
| Overwrite when full | Disabled |
| Scheduled Start Time | Manual Start |
| Scheduled Stop | No Stop Time |
| Max Interval | Days: 0 Hours: 00 Mins: 02 Secs: 00 |

Level Reference Settings At Log Creation

| | |
|---|---|
| Level Measurement Mode | Level Depth To Water |
| Specific Gravity | 0.999 |
| Level Reference Mode: | Set new reference |
| Level Reference Value: | 7.44 (ft) |
| Level Reference Head Pressure | 0.00378942 (PSI) |
| Head Pressure | 0.00409889 (PSI) |
| Temperature | 16.7535 (C) |
| Depth of Probe | 5 feet below SWL |

Log Notes:

| Date and Time | Note |
|---|---|
| 1/27/2015 12:28 | Manual Start Command |
| 1/27/2015 12:37 | Manual Stop Command |

Log Data:

| | |
|---|---|
| Record Count | 102 |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10B Slug Out Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Water Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 12:28:44 PM | 0.000 | 0.000 | -0.312 | 8.169 | |
| 12:28:45 PM | 0.491 | 0.008 | -0.302 | 8.146 | |
| 12:28:45 PM | 0.712 | 0.012 | -0.299 | 8.139 | |
| 12:28:45 PM | 0.933 | 0.016 | -0.296 | 8.132 | |
| 12:28:45 PM | 1.153 | 0.019 | -0.293 | 8.125 | |
| 12:28:45 PM | 1.375 | 0.023 | -0.289 | 8.116 | |
| 12:28:46 PM | 1.600 | 0.027 | -0.285 | 8.108 | |
| 12:28:46 PM | 1.822 | 0.030 | -0.282 | 8.101 | |
| 12:28:46 PM | 2.046 | 0.034 | -0.279 | 8.093 | |
| 12:28:46 PM | 2.269 | 0.038 | -0.276 | 8.086 | |
| 12:28:47 PM | 2.750 | 0.046 | -0.269 | 8.069 | |
| 12:28:47 PM | 2.971 | 0.050 | -0.265 | 8.060 | |
| 12:28:47 PM | 3.192 | 0.053 | -0.263 | 8.057 | |
| 12:28:47 PM | 3.412 | 0.057 | -0.261 | 8.051 | |
| 12:28:48 PM | 3.634 | 0.061 | -0.258 | 8.044 | |
| 12:28:48 PM | 3.858 | 0.064 | -0.255 | 8.036 | |
| 12:28:48 PM | 4.081 | 0.068 | -0.252 | 8.030 | |
| 12:28:48 PM | 4.304 | 0.072 | -0.249 | 8.025 | |
| 12:28:49 PM | 4.527 | 0.075 | -0.246 | 8.017 | |
| 12:28:49 PM | 4.750 | 0.079 | -0.243 | 8.011 | |
| 12:28:49 PM | 5.240 | 0.087 | -0.237 | 7.996 | |
| 12:28:49 PM | 5.461 | 0.091 | -0.235 | 7.990 | |
| 12:28:50 PM | 5.682 | 0.095 | -0.233 | 7.988 | |
| 12:28:50 PM | 5.903 | 0.098 | -0.231 | 7.982 | |
| 12:28:50 PM | 6.126 | 0.102 | -0.228 | 7.974 | |
| 12:28:51 PM | 6.644 | 0.111 | -0.223 | 7.963 | |
| 12:28:51 PM | 6.867 | 0.114 | -0.220 | 7.956 | |
| 12:28:51 PM | 7.141 | 0.119 | -0.218 | 7.952 | |
| 12:28:52 PM | 7.827 | 0.130 | -0.210 | 7.934 | |
| 12:28:52 PM | 8.050 | 0.134 | -0.208 | 7.929 | |
| 12:28:52 PM | 8.461 | 0.141 | -0.206 | 7.924 | |
| 12:28:53 PM | 9.011 | 0.150 | -0.200 | 7.911 | |
| 12:28:54 PM | 9.480 | 0.158 | -0.197 | 7.903 | |
| 12:28:54 PM | 10.188 | 0.170 | -0.192 | 7.891 | |
| 12:28:55 PM | 10.681 | 0.178 | -0.187 | 7.882 | |
| 12:28:55 PM | 11.400 | 0.190 | -0.181 | 7.868 | |
| 12:28:56 PM | 11.940 | 0.199 | -0.178 | 7.860 | |
| 12:28:57 PM | 12.660 | 0.211 | -0.173 | 7.848 | |
| 12:28:57 PM | 13.440 | 0.224 | -0.168 | 7.836 | |
| 12:28:58 PM | 14.220 | 0.237 | -0.163 | 7.825 | |
| 12:28:59 PM | 15.060 | 0.251 | -0.158 | 7.814 | |
| 12:29:00 PM | 15.960 | 0.266 | -0.148 | 7.791 | |
| 12:29:01 PM | 16.920 | 0.282 | -0.147 | 7.788 | |
| 12:29:02 PM | 17.880 | 0.298 | -0.143 | 7.778 | |
| 12:29:03 PM | 18.960 | 0.316 | -0.136 | 7.763 | |
| 12:29:04 PM | 20.101 | 0.335 | -0.131 | 7.751 | |
| 12:29:05 PM | 21.300 | 0.355 | -0.125 | 7.738 | |
| 12:29:07 PM | 22.562 | 0.376 | -0.121 | 7.727 | |
| 12:29:08 PM | 23.880 | 0.398 | -0.115 | 7.714 | |
| 12:29:09 PM | 25.320 | 0.422 | -0.110 | 7.702 | |
| 12:29:11 PM | 26.820 | 0.447 | -0.104 | 7.689 | |
| 12:29:12 PM | 28.380 | 0.473 | -0.100 | 7.680 | |
| 12:29:14 PM | 30.060 | 0.501 | -0.093 | 7.664 | |
| 12:29:16 PM | 31.860 | 0.531 | -0.090 | 7.657 | |
| 12:29:18 PM | 33.837 | 0.564 | -0.086 | 7.646 | |
| 12:29:20 PM | 35.760 | 0.596 | -0.081 | 7.636 | 7.70 |
| 12:29:22 PM | 37.860 | 0.631 | -0.077 | 7.626 | |

**Trex Properties, Charlotte NC: Data Logger Record for MW-10B Slug Out Test**
**W&R Project No. 03130430.01**

| Clock Time | Elapsed Time Seconds | Elapsed Time Minutes | Sensor: Pres 15G SN#: 127883 Pressure (PSI) | Sensor: Pres 15G SN#: 127883 Level Depth To Water (ft) | Manual Water Level Check (ft BTOC) |
|---|---|---|---|---|---|
| 12:29:24 PM | 40.080 | 0.668 | -0.071 | 7.614 | |
| 12:29:27 PM | 42.578 | 0.710 | -0.067 | 7.603 | |
| 12:29:29 PM | 45.000 | 0.750 | -0.062 | 7.593 | |
| 12:29:32 PM | 47.640 | 0.794 | -0.059 | 7.585 | |
| 12:29:34 PM | 50.460 | 0.841 | -0.055 | 7.575 | |
| 12:29:37 PM | 53.460 | 0.891 | -0.051 | 7.567 | |
| 12:29:41 PM | 56.640 | 0.944 | -0.047 | 7.558 | |
| 12:29:44 PM | 60.000 | 1.000 | -0.045 | 7.552 | 7.59 |
| 12:29:48 PM | 63.606 | 1.060 | -0.041 | 7.544 | |
| 12:29:51 PM | 67.200 | 1.120 | -0.040 | 7.541 | |
| 12:29:55 PM | 71.400 | 1.190 | -0.036 | 7.532 | |
| 12:30:00 PM | 75.623 | 1.260 | -0.033 | 7.526 | |
| 12:30:04 PM | 79.800 | 1.330 | -0.030 | 7.519 | |
| 12:30:09 PM | 84.635 | 1.411 | -0.029 | 7.515 | |
| 12:30:14 PM | 90.000 | 1.500 | -0.025 | 7.508 | 7.51 |
| 12:30:19 PM | 94.800 | 1.580 | -0.024 | 7.503 | |
| 12:30:25 PM | 100.800 | 1.680 | -0.022 | 7.499 | |
| 12:30:31 PM | 106.800 | 1.780 | -0.020 | 7.496 | |
| 12:30:37 PM | 112.800 | 1.880 | -0.018 | 7.490 | |
| 12:30:43 PM | 119.400 | 1.990 | -0.018 | 7.490 | 7.49 |
| 12:30:51 PM | 126.702 | 2.112 | -0.016 | 7.486 | |
| 12:30:58 PM | 134.400 | 2.240 | -0.015 | 7.484 | |
| 12:31:06 PM | 142.200 | 2.370 | -0.015 | 7.484 | |
| 12:31:15 PM | 150.736 | 2.512 | -0.012 | 7.477 | |
| 12:31:24 PM | 159.747 | 2.662 | -0.011 | 7.474 | |
| 12:31:33 PM | 169.200 | 2.820 | -0.011 | 7.475 | |
| 12:31:43 PM | 178.800 | 2.980 | -0.009 | 7.470 | |
| 12:31:54 PM | 189.787 | 3.163 | -0.008 | 7.468 | |
| 12:32:05 PM | 201.000 | 3.350 | -0.006 | 7.462 | 7.46 |
| 12:32:17 PM | 213.000 | 3.550 | -0.005 | 7.461 | |
| 12:32:30 PM | 225.600 | 3.760 | -0.004 | 7.459 | |
| 12:32:43 PM | 238.800 | 3.980 | -0.005 | 7.459 | |
| 12:32:57 PM | 253.200 | 4.220 | -0.004 | 7.459 | |
| 12:33:12 PM | 268.377 | 4.473 | -0.005 | 7.460 | |
| 12:33:28 PM | 283.800 | 4.730 | -0.004 | 7.459 | |
| 12:33:45 PM | 300.677 | 5.011 | -0.003 | 7.457 | 7.45 |
| 12:34:03 PM | 318.702 | 5.312 | -0.003 | 7.455 | |
| 12:34:21 PM | 337.250 | 5.621 | -0.001 | 7.450 | |
| 12:34:42 PM | 357.600 | 5.960 | -0.003 | 7.455 | |
| 12:35:03 PM | 378.601 | 6.310 | -0.002 | 7.454 | |
| 12:35:25 PM | 400.800 | 6.680 | -0.002 | 7.454 | |
| 12:35:49 PM | 424.800 | 7.080 | -0.002 | 7.453 | |
| 12:36:14 PM | 450.000 | 7.500 | -0.001 | 7.450 | |
| 12:36:40 PM | 476.400 | 7.940 | -0.001 | 7.451 | |
| 12:37:09 PM | 504.600 | 8.410 | 0.001 | 7.447 | |

**WITHERS & RAVENEL**

ENGINEERS | PLANNERS | SURVEYORS

***WATER-LEVEL RECOVERY TEST DATA FORM***
***(For Manual Readings)***

Date: 1/27/15
Tested by: BCWS/PAY
Project Name: TROY
Project Number: 031204430.01

Well ID: MW-10B
Pre-Test Static WL BTOC: 7.44
Well Depth BTOC: 73
Screen Depth BTOC: 68-73

| Clock Time (Military) | Elapsed Time (Hrs:Min:Sec) | Elapsed Time (If different) | WL (ft BTOC) | WL Change (WL-SWL) |
|---|---|---|---|---|
| 1230hrs | Start of test | Seconds | | |
| | 0:00:15 | 35 | 7.70 | |
| | 0:00:30 | 60 | 7.59 | |
| | 0:00:45 | 90 | 7.51 | |
| 1232 | 2min 0:01:00 | 120 | 7.49 | |
| | 0:01:15 | 3:30 | 7.46 | |
| | 0:01:30 | 5:00 | 7.45 | |
| | 0:01:45 | | EOT. | |
| | 0:02:00 | | | |
| | 0:02:30 | | | |
| | 0:03:00 | | | |
| | 0:03:30 | | | |
| | 0:04:00 | | | |
| | 0:04:30 | | | |
| | 0:05:00 | | | |
| | 0:06:00 | | | |
| | 0:07:00 | | | |
| | 0:08:00 | | | |
| | 0:09:00 | | | |
| | 0:10:00 | | | |
| | 0:12:00 | | | |
| | 0:14:00 | | | |
| | 0:16:00 | | | |
| | 0:18:00 | | | |
| | 0:20:00 | | | |
| | 0:25:00 | | | |
| | 0:30:00 | | | |
| | 0:40:00 | | | |
| | 0:50:00 | | | |
| | 1:00:00 | | | |
| | 2:00:00 | | | |
| | 3:00:00 | | | |
| | 4:00:00 | | | |
| | 5:00:00 | | | |
| | 6:00:00 | | | |

Test Type (Slug-in/out or Rec): Slug out
WL Meter Type/SN: Solinst 347961
Weather: Sunny, Cold

Comments:

**WITHERS & RAVENEL**

ENGINEERS | PLANNERS | SURVEYORS

***WATER-LEVEL RECOVERY TEST DATA FORM***
***(For Manual Readings)***

Date: 1/27/15 Well ID: PMW-10A
Tested by: BOLLS/FAY Pre-Test Static WL BTOC: 7.61
Project Name: TPCK Well Depth BTOC: 63'
Project Number: 03130430.01 Screen Depth BTOC: 53-63'

| Clock Time (Military) | Elapsed Time (Hrs:Min:Sec) | Elapsed Time (If different) | WL (ft BTOC) | WL Change (WL-SWL) |
|---|---|---|---|---|
| 12:50 | Start of test | Sec | | |
| | 0:00:15 | 30 | 6.98 | |
| | 0:00:30 | 60 | 7.27 | |
| | 0:00:45 | 90 | 7.40 | |
| | 0:01:00 | 120 | 7.47 | |
| | 0:01:15 | 150 | 7.51 | |
| | 0:01:30 | 180 | 7.53 | |
| | 0:01:45 | 4min | 7.56 | |
| | 0:02:00 | 5min | 7.58 | |
| | 0:02:30 | 6min | 7.59 | |
| | 0:03:00 | | | |
| | 0:03:30 | | E.O.T | |
| | 0:04:00 | | | |
| | 0:04:30 | | | |
| | 0:05:00 | | | |
| | 0:06:00 | | | |
| | 0:07:00 | | | |
| | 0:08:00 | | | |
| | 0:09:00 | | | |
| | 0:10:00 | | | |
| | 0:12:00 | | | |
| | 0:14:00 | | | |
| | 0:16:00 | | | |
| | 0:18:00 | | | |
| | 0:20:00 | | | |
| | 0:25:00 | | | |
| | 0:30:00 | | | |
| | 0:40:00 | | | |
| | 0:50:00 | | | |
| | 1:00:00 | | | |
| | 2:00:00 | | | |
| | 3:00:00 | | | |
| | 4:00:00 | | | |
| | 5:00:00 | | | |
| | 6:00:00 | | | |

Test Type (Slug-in/out or Rec): Slug In Comments:
WL Meter Type/SN: Solinst 247961
Weather: Snowy Cold

**WITHERS & RAVENEL**

ENGINEERS | PLANNERS | SURVEYORS

***WATER-LEVEL RECOVERY TEST DATA FORM***
***(For Manual Readings)***

Date: 1/27/15
Tested by: BRUS/FAY
Project Name: TREX
Project Number: 03130430.01

Well ID: PMW-10A
Pre-Test Static WL BTOC: 7.61
Well Depth BTOC: 63'
Screen Depth BTOC: 53-63'

| Clock Time (Military) | Elapsed Time (Hrs:Min:Sec) | Elapsed Time (If different) | WL (ft BTOC) | WL Change (WL-SWL) |
|---|---|---|---|---|
| 1301 | Start of test | | | |
| | 0:00:15 | 30 | 8.25 | |
| | 0:00:30 | 60 | 7.90 | |
| | 0:00:45 | 90 | 7.75 | |
| | 0:01:00 | 120 | 7.69 | |
| | 0:01:15 | 150 | 7.64 | |
| | 0:01:30 | 180 | 7.62 | |
| | 0:01:45 | | | |
| | 0:02:00 | | E.O.T | |
| | 0:02:30 | | | |
| | 0:03:00 | | | |
| | 0:03:30 | | | |
| | 0:04:00 | | | |
| | 0:04:30 | | | |
| | 0:05:00 | | | |
| | 0:06:00 | | | |
| | 0:07:00 | | | |
| | 0:08:00 | | | |
| | 0:09:00 | | | |
| | 0:10:00 | | | |
| | 0:12:00 | | | |
| | 0:14:00 | | | |
| | 0:16:00 | | | |
| | 0:18:00 | | | |
| | 0:20:00 | | | |
| | 0:25:00 | | | |
| | 0:30:00 | | | |
| | 0:40:00 | | | |
| | 0:50:00 | | | |
| | 1:00:00 | | | |
| | 2:00:00 | | | |
| | 3:00:00 | | | |
| | 4:00:00 | | | |
| | 5:00:00 | | | |
| | 6:00:00 | | | |

Test Type (Slug-in/out or Rec): Slug Out
WL Meter Type/SN: Solinst 247961
Weather: Sunny Cold

Comments:

**WITHERS & RAVENEL**

ENGINEERS | PLANNERS | SURVEYORS

***WATER-LEVEL RECOVERY TEST DATA FORM***
***(For Manual Readings)***

Date: 1/27/15
Tested by: Bullis/Fay
Project Name: TRex
Project Number: 03130480.01

Well ID: PMW-13B
Pre-Test Static WL BTOC: 8.61
Well Depth BTOC: 103'
Screen Depth BTOC: 98-103

| Clock Time (Military) | Elapsed Time (Hrs:Min:Sec) | Elapsed Time (If different) | WL (ft BTOC) | WL Change (WL-SWL) |
|---|---|---|---|---|
| 1400 hrs | Start of test | | | |
| | 0:00:15 | | 6.96 | |
| | 0:00:30 | | 6.97 | |
| | 0:00:45 | | 6.99 | |
| | 0:01:00 | | 7.00 | |
| | 0:01:15 | | 7.01 | |
| | 0:01:30 | | 7.01 | |
| | ~~0:01:45~~ | | — | |
| | 0:02:00 | | 7.03 | |
| | 0:02:30 | | 7.05 | |
| | 0:03:00 | | 7.06 | |
| | 0:03:30 | | 7.08 | |
| | 0:04:00 | | 7.09 | |
| | 0:04:30 | | 7.10 | |
| | 0:05:00 | | 7.12 | |
| | 0:06:00 | | 7.15 | |
| | 0:07:00 | | 7.19 | |
| | 0:08:00 | | 7.22 | |
| | 0:09:00 | | 7.25 | |
| | 0:10:00 | | 7.28 | |
| | 0:12:00 | | 7.33 | |
| | 0:14:00 | | 7.39 | |
| | 0:16:00 | | 7.43 | |
| | 0:18:00 | | 7.49 | |
| | 0:20:00 | | 7.52 | |
| | 0:25:00 | | 7.62 | |
| | 0:30:00 | | 7.72 | |
| | 0:40:00 | | 7.89 | |
| | 0:50:00 | | 8.03 | |
| | 1:00:00 | | 8.15 | |
| | 2:00:00 | 1:30:00 | 8.39 | |
| | 3:00:00 | ~~2:00:00~~ | 8.50 | |
| | 4:00:00 | 1:58:00 | E.O.T. | |
| | 5:00:00 | | | |
| | 6:00:00 | | | |

Test Type (Slug-in/out or Rec): Slug-In
WL Meter Type/SN Solinst 247961
Weather: Sunny Cool

Comments:

**WITHERS & RAVENEL**

ENGINEERS | PLANNERS | SURVEYORS

***WATER-LEVEL RECOVERY TEST DATA FORM***
***(For Manual Readings)***

Date: 1/27/15
Tested by: Brooks/Eng
Project Name: TRSW
Project Number: 03130430.01

Well ID: PMW-1A
Pre-Test Static WL BTOC: 6.70
Well Depth BTOC: 12' BG 15.83 BTOC
Screen Depth BTOC: 7-12' BG

| Clock Time (Military) | Elapsed Time (Hrs:Min:Sec) | Elapsed Time (If different) | WL (ft BTOC) | WL Change (WL-SWL) |
|---|---|---|---|---|
| | Start of test | | | |
| | 0:00:15 | | | |
| | 0:00:30 | ~3min | 6.72 | Slug out test see computer file |
| | 0:00:45 | | | |
| | 0:01:00 | E.O.T | | |
| | 0:01:15 | | | |
| | 0:01:30 | START SLUG IN @ 15:15hrs | | |
| | 0:01:45 | @1min | 6.55 | |
| | 0:02:00 | 1:30 | 6.61 | |
| | 0:02:30 | 2:00 | 6.63 | |
| | 0:03:00 | 2:30 | 6:64 | |
| | 0:03:30 | 3:00 | 6:65 | |
| | 0:04:00 | 3:30 | 6:65 | |
| | 0:04:30 | | E.O.T. | |
| | 0:05:00 | | | |
| | 0:06:00 | | | |
| | 0:07:00 | | | |
| | 0:08:00 | | | |
| | 0:09:00 | | | |
| | 0:10:00 | | | |
| | 0:12:00 | | | |
| | 0:14:00 | | | |
| | 0:16:00 | | | |
| | 0:18:00 | | | |
| | 0:20:00 | | | |
| | 0:25:00 | | | |
| | 0:30:00 | | | |
| | 0:40:00 | | | |
| | 0:50:00 | | | |
| | 1:00:00 | | | |
| | 2:00:00 | | | |
| | 3:00:00 | | | |
| | 4:00:00 | | | |
| | 5:00:00 | | | |
| | 6:00:00 | | | |

Test Type (Slug-in/out or Rec): Slug out Then Slug in
WL Meter Type/SN Solinst 247961
Weather: Sunny Cold

Comments:

**WITHERS & RAVENEL**

ENGINEERS | PLANNERS | SURVEYORS

***WATER-LEVEL RECOVERY TEST DATA FORM***
***(For Manual Readings)***

Date: 1/27/15
Tested by: Bullis/Fay
Project Name: TROY
Project Number: 03130430.01

Well ID: PMW-13D
Pre-Test Static WL BTOC: 8.61
Well Depth BTOC: 103'
Screen Depth BTOC: 98-103'

| Clock Time (Military) | Elapsed Time (Hrs:Min:Sec) | Elapsed Time (If different) | WL (ft BTOC) | WL Change (WL-SWL) |
|---|---|---|---|---|
| 16:00 | Start of test | Sec | ~~10.21~~ | |
| | 0:00:15 | 15 | 10.21 | |
| | 0:00:30 | 30 | 10.20 | |
| | 0:00:45 | | 10.19 | |
| | 0:01:00 | 1:00 | 10.19 | |
| | 0:01:15 | | 10.18 | |
| | 0:01:30 | 1:30 | 10.17 | |
| | 0:01:45 | | 10.17 | |
| | 0:02:00 | | 10.16 | |
| | 0:02:30 | | 10.15 | |
| | 0:03:00 | | 10.15 | |
| | 0:03:30 | 3:30 | 10.14 | |
| | 0:04:00 | | 10.13 | |
| | 0:04:30 | | 10.12 | |
| | 0:05:00 | 5:00 | 10.11 | |
| | 0:06:00 | | 10.10 | |
| | 0:07:00 | | 10.09 | |
| | 0:08:00 | | 10.07 | |
| | 0:09:00 | | 10.05 | |
| | 0:10:00 | | 10.03 | |
| | 0:12:00 | | 10.00 | |
| | 0:14:00 | 14:00 | 9.96 | |
| | 0:16:00 | | 9.92 | |
| | 0:18:00 | | 9.89 | |
| | 0:20:00 | | 9.85 | |
| | 0:25:00 | | 9.81 | |
| | 0:30:00 | | 9.73 | |
| | 0:40:00 | | 9.61 | |
| | 0:50:00 | | 9.51 | |
| | 1:00:00 | | 9.42 | |
| | 2:00:00 | 1:30:00 | 9.19 | |
| | 3:00:00 | | | |
| | 4:00:00 | | E.O.T. | |
| | 5:00:00 | | | |
| | 6:00:00 | | | |

Test Type (Slug-in/out or Rec): Slug Out
WL Meter Type/SN: Solinst 247961
Weather: Sunny, Cold

Comments:

# Hydraulic Conductivity Calculations

Updated Draft Phase III RFI Report for

3114 & 3124 Cullman Avenue, Charlotte NC

EPA ID # NCD 049 773 245

## 1.1 SLUG TESTING

On January 27, 2015 W&R personnel conducted slug tests within shallow wells PMW-1A and PMW-10A whose screened intervals intersect saturated saprolite, deeper wells PMW-1B and PMW-10B whose screened intervals intersect PWR, and deep well PMW-13B which is screened in the upper portion of competent bedrock. The purpose of conducting these tests was to provide a means of estimating the hydraulic conductivity of the saprolite, PWR and bedrock portions of the aquifer that underlies the site.

The slug tests were performed in substantial accordance with the Procedures for Conducting and Analyzing Slug Tests dated November 10, 2014 and its NCDENR approval letter dated November 25, 2014. The relatively rapid rate of water level recovery in the saprolite and PWR wells necessitated the use of a pressure transducer and data logger to obtain usable early test water level recovery data. As a QA/QC check, manual water level measurements were collected as the slug in and slug out test data were being measured and recorded by the pressure transducer and data logger at the saprolite and PWR well locations.

The rate of water level recovery within bedrock well PMW-13B was slow enough to allow manual measurement of water level recovery data alone. Copies of field notes and photographs taken during the slug testing activities are provided in **Appendix G**. Pertinent test information and water level recovery data recorded by the data logger are included in **Appendix H**, as are the manual readings recorded at each well location. Calculations of hydraulic conductivity estimates from the test data are provided in **Appendix I.**

## 1.2 SLUG TESTING RESULTS

Calculations of hydraulic conductivity estimates using monitoring well installation details and water level recovery data according to the method of Herman Bouwer (1989) are provided in **Appendix H**. The resulting hydraulic conductivity estimates for the saprolite, PWR and bedrock are summarized in **Table 7**. The average hydraulic conductivity for the saprolite was determined to be approximately 3.0 feet per day (ft/d) or about $1.1 \times 10^{-3}$ centimeters per second (cm/s). The average hydraulic conductivity for the PWR was determined to be approximately 2.8 ft/d or about $9.8 \times 10^{-4}$ cm/s, which is essentially equivalent to the average hydraulic conductivity of the saprolite. This hydraulic conductivity range is generally equivalent to that of a silty fine to medium sand that might be found in a coastal plain setting and suggests that the saprolite and PWR beneath the site would be amenable to injection of either high or low viscosity reagents formulated to reduce the concentrations of VOCs in groundwater.

The average hydraulic conductivity of the bedrock at location PMW-13B (0.03 ft/d or $1.1 \times 10^{-5}$ cm/s) was found to be two orders of magnitude lower than that of the saprolite and PWR. W&R expects that the range of bedrock hydraulic conductivity varies within $\pm$ one order of magnitude depending on the amount of fractures present at a given location.

According to the cross-sections provided in Attachment 2A the combined thickness of the saturated saprolite and underlying PWR ranges between approximately 40 and 70 ft. Therefore, using an average hydraulic conductivity of 3 ft/day for these materials, the transmissivity of the unconfined surficial aquifer in the vicinity of the site should range between 140 and 210 $ft^2$/day. Because the surficial aquifer is unconfined, the storativity is equal to the specific yield, which is also known as the effective porosity (Fetter, 1980). According to grain size distribution analysis performed on a saturated soil sample obtained from a depth of 5 to 15 feet from temporary observation well OW-2, the sample contained about 62% sand, 30% silt and 8% clay. According to the method of Johnson (1967), this should equate to a specific yield or storativity value of approximately 20%.

References:

Fetter, C.W., 1980, Applied Hydrogeology, Charles E. Merril Publishing Company, Columbus Ohio, 488 p.

Johnson, A.I, 1967, *Specific Yield – Compilation of Specific Yields for Various Materials*, Geological Survey Water Supply Paper 1662-D, 74 p.

Trex Properties, Charlotte NC
Hydraulic Conductivity (K) Calculation Worksheet
W&R Project No. 03130430.01

| | | | |
|---|---|---|---|
| Well: | PMW-1A (in) | Conducted by: | Fay |
| Test Date: | 1/27/2015 | Entered/date: | 02/05/15 |
| Test Type: | Slug In | Checked/date: | Bellis 2/17/15 |

## WELL DATA

| | | |
|---|---|---|
| SWL = | 6.70 | (ft BTOC) |
| WD = | 15.33 | (ft BTOC) |
| WD = | 12.00 | (ft BGS) |
| DTSP = | 8.33 | (ft BTOC) |
| rc = | 0.083 | (ft) |
| n = | 0.30 | |
| rw = | 0.33 | (ft) |
| rc (adjusted) = | 0.08 | (ft) |
| Le = | 7 | (ft) |
| Lw = | 8.63 | (ft) |
| Le/rw = | 21.21 | |
| H = | 50.00 | (ft) |

## CALCULATION OF K

K = [(rc^2 ln(Re/rw))/2Le]*(1/t)ln(yo/yt)

| | | |
|---|---|---|
| yo = | 1.120 | (ft) from plot |
| yt = | 0.420 | (ft) from plot |
| t = | 0.335 | (minutes) from plot |
| ln(Re/rw) = | 1.96 | |
| **K =** | **4.2E+00** | **(ft/day)** |
| **K =** | **1.5E-03** | **(cm/sec)** |

## Calculation of ln(Re/rw)

Where: Lw < H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{A+Bln((H-Lw)/rw)}/(Le/rw)]^-1= 1.96

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 2.38

## Calculation of Coefficients

Value range for Le/rw from Table of Coefficients

| Le/rw | A | B | C |
|---|---|---|---|
| 20 | 2.23 | 0.29 | 1.75 |
| 30 | 2.5 | 0.35 | 2.1 |

Interpolated values of A, B and C for Le/rw

| | | | |
|---|---|---|---|
| 21.21 | 2.26 | 0.30 | 1.79 |

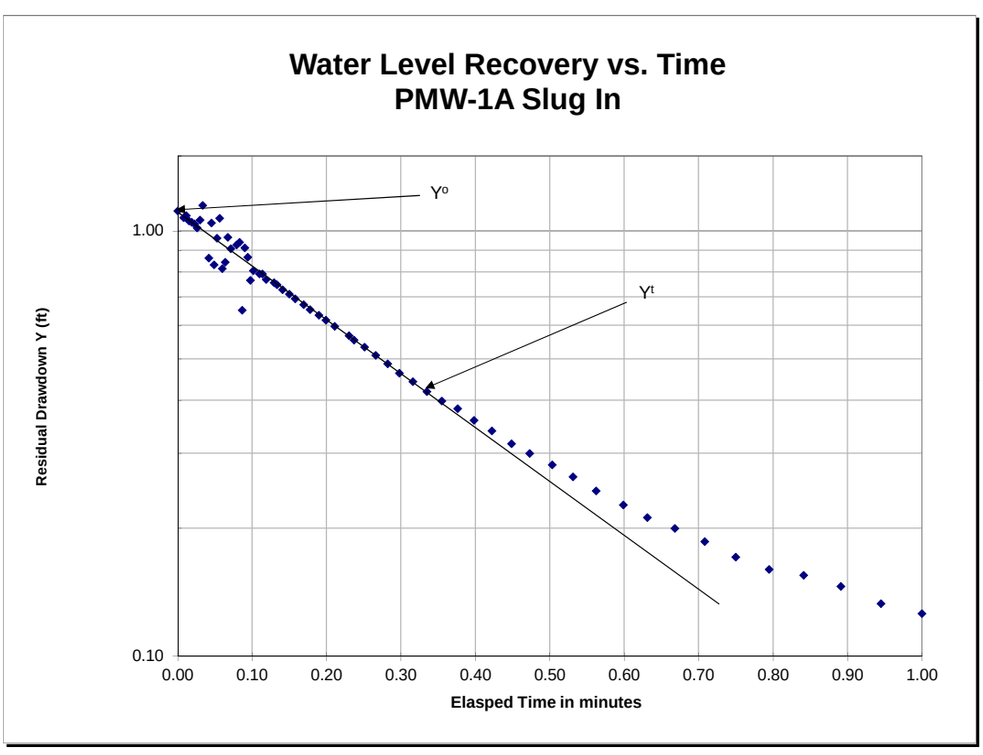
Coefficients Table

| Le/rw | A | Le/rw | B | Le/rw | C |
|---|---|---|---|---|---|
| 4 | 1.75 | 4 | 0.25 | 4 | 0.75 |
| 5 | 1.76 | 5 | 0.25 | 5 | 0.85 |
| 6 | 1.77 | 6 | 0.25 | 6 | 0.90 |
| 7 | 1.80 | 7 | 0.25 | 7 | 1.00 |
| 8 | 1.83 | 8 | 0.25 | 8 | 1.10 |
| 9 | 1.90 | 9 | 0.25 | 9 | 1.20 |
| 10 | 1.95 | 10 | 0.25 | 10 | 1.30 |
| 15 | 2.10 | 15 | 0.27 | 15 | 1.50 |
| 20 | 2.23 | 20 | 0.29 | 20 | 1.75 |
| 25 | 2.40 | 25 | 0.31 | 25 | 1.90 |
| 30 | 2.50 | 30 | 0.35 | 30 | 2.10 |
| 40 | 2.75 | 40 | 0.45 | 40 | 2.45 |
| 50 | 3.00 | 50 | 0.50 | 50 | 2.70 |
| 60 | 3.45 | 60 | 0.52 | 60 | 3.00 |
| 70 | 3.70 | 70 | 0.60 | 70 | 3.40 |
| 80 | 3.90 | 80 | 0.65 | 80 | 3.60 |
| 90 | 4.20 | 90 | 0.70 | 90 | 3.85 |
| 100 | 4.50 | 100 | 0.75 | 100 | 4.20 |
| 150 | 5.45 | 150 | 0.98 | 150 | 5.70 |
| 200 | 6.10 | 200 | 1.20 | 200 | 7.00 |
| 250 | 6.70 | 250 | 1.30 | 250 | 8.00 |
| 300 | 7.10 | 300 | 1.50 | 300 | 8.80 |
| 400 | 7.75 | 400 | 1.90 | 400 | 9.90 |
| 500 | 8.20 | 500 | 2.20 | 500 | 10.60 |
| 600 | 8.50 | 600 | 2.33 | 600 | 11.10 |
| 700 | 8.70 | 700 | 2.50 | 700 | 11.50 |
| 800 | 8.90 | 800 | 2.70 | 800 | 11.80 |
| 900 | 9.00 | 900 | 2.75 | 900 | 12.00 |
| 1000 | 9.20 | 1000 | 2.83 | 1000 | 12.40 |
| 1500 | 9.50 | 1500 | 3.18 | 1500 | 12.90 |

Reference: Bouwer(1989), Bouwer and Rice(1976)

## TEST DATA

| Elapsed time (min) | Log y | y (ft) | WL (ft BTOC) |
|---|---|---|---|
| 0.000 | 0.05 | 1.12 | 5.585 |
| 0.008 | 0.03 | 1.08 | 5.625 |
| 0.012 | 0.04 | 1.09 | 5.614 |
| 0.015 | 0.02 | 1.06 | 5.644 |
| 0.019 | 0.02 | 1.05 | 5.653 |
| 0.023 | 0.02 | 1.04 | 5.660 |
| 0.026 | 0.01 | 1.02 | 5.684 |
| 0.030 | 0.03 | 1.06 | 5.639 |
| 0.034 | 0.06 | 1.15 | 5.551 |
| 0.042 | -0.06 | 0.86 | 5.836 |
| 0.045 | 0.02 | 1.04 | 5.656 |
| 0.049 | -0.08 | 0.83 | 5.868 |
| 0.053 | -0.02 | 0.96 | 5.738 |
| 0.056 | 0.03 | 1.07 | 5.628 |
| 0.060 | -0.09 | 0.82 | 5.884 |
| 0.064 | -0.07 | 0.85 | 5.855 |
| 0.067 | -0.01 | 0.97 | 5.733 |
| 0.071 | -0.04 | 0.91 | 5.792 |
| 0.079 | -0.03 | 0.93 | 5.773 |
| 0.083 | -0.03 | 0.94 | 5.760 |
| 0.087 | -0.19 | 0.65 | 6.049 |
| 0.090 | -0.04 | 0.91 | 5.787 |
| 0.094 | -0.06 | 0.87 | 5.833 |
| 0.098 | -0.12 | 0.77 | 5.934 |
| 0.102 | -0.09 | 0.81 | 5.894 |
| 0.110 | -0.10 | 0.79 | 5.907 |
| 0.114 | -0.10 | 0.79 | 5.907 |
| 0.119 | -0.11 | 0.77 | 5.931 |
| 0.130 | -0.12 | 0.76 | 5.944 |
| 0.133 | -0.13 | 0.75 | 5.953 |
| 0.141 | -0.14 | 0.73 | 5.972 |
| 0.150 | -0.15 | 0.71 | 5.989 |
| 0.158 | -0.16 | 0.69 | 6.007 |
| 0.169 | -0.17 | 0.67 | 6.029 |
| 0.178 | -0.19 | 0.65 | 6.047 |
| 0.190 | -0.20 | 0.63 | 6.066 |
| 0.199 | -0.21 | 0.62 | 6.083 |
| 0.211 | -0.22 | 0.60 | 6.103 |
| 0.230 | -0.25 | 0.57 | 6.133 |
| 0.237 | -0.26 | 0.55 | 6.146 |
| 0.251 | -0.27 | 0.53 | 6.167 |
| 0.266 | -0.29 | 0.51 | 6.190 |
| 0.282 | -0.31 | 0.49 | 6.213 |
| 0.298 | -0.33 | 0.46 | 6.237 |
| 0.316 | -0.35 | 0.44 | 6.258 |
| 0.335 | -0.38 | 0.42 | 6.281 |
| 0.355 | -0.40 | 0.40 | 6.302 |
| 0.376 | -0.42 | 0.38 | 6.318 |
| 0.398 | -0.44 | 0.36 | 6.341 |
| 0.422 | -0.47 | 0.34 | 6.361 |
| 0.449 | -0.50 | 0.32 | 6.384 |
| 0.473 | -0.52 | 0.30 | 6.400 |
| 0.503 | -0.55 | 0.28 | 6.418 |
| 0.531 | -0.58 | 0.26 | 6.436 |
| 0.562 | -0.61 | 0.25 | 6.455 |
| 0.599 | -0.64 | 0.23 | 6.473 |
| 0.631 | -0.67 | 0.21 | 6.488 |
| 0.668 | -0.70 | 0.20 | 6.500 |
| 0.708 | -0.73 | 0.19 | 6.514 |
| 0.750 | -0.77 | 0.17 | 6.529 |
| 0.795 | -0.80 | 0.16 | 6.540 |
| 0.841 | -0.81 | 0.16 | 6.545 |
| 0.891 | -0.84 | 0.15 | 6.554 |
| 0.945 | -0.88 | 0.13 | 6.567 |
| 1.000 | -0.90 | 0.13 | 6.574 |
| 1.060 | -0.92 | 0.12 | 6.580 |
| 1.120 | -0.94 | 0.11 | 6.586 |
| 1.190 | -0.95 | 0.11 | 6.589 |
| 1.260 | -0.98 | 0.11 | 6.595 |
| 1.330 | -1.00 | 0.10 | 6.600 |
| 1.410 | -1.02 | 0.10 | 6.604 |
| 1.500 | -1.03 | 0.09 | 6.606 |
| 1.580 | -1.05 | 0.09 | 6.610 |
| 1.680 | -1.04 | 0.09 | 6.609 |
| 1.780 | -1.07 | 0.09 | 6.614 |
| 1.880 | -1.08 | 0.08 | 6.616 |
| 1.990 | -1.08 | 0.08 | 6.617 |
| 2.110 | -1.10 | 0.08 | 6.620 |
| 2.240 | -1.10 | 0.08 | 6.621 |



Trex Properties, Charlotte NC
Hydraulic Conductivity (K) Calculation Worksheet
W&R Project No. 03130430.01

| | | | |
|---|---|---|---|
| Well: | PMW-1A (out) | Conducted by: | Fay |
| Test Date: | 1/27/2015 | Entered/date: | 02/05/15 |
| Test Type: | Recovery | Checked/date: | Bellis 2/17/15 |

## WELL DATA

| | | |
|---|---|---|
| SWL = | 6.70 | (ft BTOC) |
| WD = | 15.33 | (ft BTOC) |
| WD = | 12.00 | (ft BGS) |
| DTSP = | 8.33 | (ft BTOC) |
| rc = | 0.083 | (ft) |
| n = | 0.30 | |
| rw = | 0.33 | (ft) |
| rc (adjusted) = | 0.08 | (ft) |
| Le = | 7 | (ft) |
| Lw = | 8.63 | (ft) |
| Le/rw = | 21.21 | |
| H = | 50.00 | (ft) |

## CALCULATION OF K

K = [(rc^2 ln(Re/rw))/2Le]*(1/t)ln(yo/yt)

| | | |
|---|---|---|
| yo = | 0.964 | (ft) from plot |
| yt = | 0.291 | (ft) from plot |
| t = | 0.398 | (minutes) from plot |
| ln(Re/rw) = | 1.96 | |
| **K =** | **4.3E+00** | **(ft/day)** |
| **K =** | **1.5E-03** | **(cm/sec)** |

## TEST DATA

| Elapsed time (min) | Log y | y (ft) | WL (ft BTOC) |
|---|---|---|---|
| 0.000 | -0.02 | 0.964 | 7.664 |
| 0.008 | -0.03 | 0.940 | 7.640 |
| 0.011 | -0.03 | 0.931 | 7.631 |
| 0.015 | -0.04 | 0.921 | 7.621 |
| 0.019 | -0.04 | 0.911 | 7.611 |
| 0.022 | -0.05 | 0.900 | 7.600 |
| 0.026 | -0.05 | 0.889 | 7.589 |
| 0.030 | -0.05 | 0.882 | 7.582 |
| 0.034 | -0.06 | 0.870 | 7.570 |
| 0.042 | -0.07 | 0.845 | 7.545 |
| 0.045 | -0.08 | 0.836 | 7.536 |
| 0.049 | -0.08 | 0.827 | 7.527 |
| 0.053 | -0.09 | 0.819 | 7.519 |
| 0.056 | -0.09 | 0.809 | 7.509 |
| 0.060 | -0.10 | 0.800 | 7.500 |
| 0.064 | -0.10 | 0.790 | 7.490 |
| 0.067 | -0.11 | 0.781 | 7.481 |
| 0.071 | -0.11 | 0.772 | 7.472 |
| 0.079 | -0.13 | 0.749 | 7.449 |
| 0.083 | -0.13 | 0.741 | 7.441 |
| 0.087 | -0.13 | 0.734 | 7.434 |
| 0.090 | -0.14 | 0.728 | 7.428 |
| 0.094 | -0.14 | 0.719 | 7.419 |
| 0.098 | -0.15 | 0.710 | 7.410 |
| 0.102 | -0.15 | 0.702 | 7.402 |
| 0.110 | -0.17 | 0.679 | 7.379 |
| 0.114 | -0.17 | 0.672 | 7.372 |
| 0.119 | -0.18 | 0.664 | 7.364 |
| 0.130 | -0.19 | 0.639 | 7.339 |
| 0.133 | -0.20 | 0.630 | 7.330 |
| 0.141 | -0.21 | 0.619 | 7.319 |
| 0.150 | -0.22 | 0.599 | 7.299 |
| 0.158 | -0.23 | 0.588 | 7.288 |
| 0.169 | -0.25 | 0.566 | 7.266 |
| 0.178 | -0.26 | 0.550 | 7.250 |
| 0.190 | -0.28 | 0.530 | 7.230 |
| 0.199 | -0.29 | 0.517 | 7.217 |
| 0.211 | -0.31 | 0.494 | 7.194 |
| 0.230 | -0.33 | 0.466 | 7.166 |
| 0.237 | -0.34 | 0.457 | 7.157 |
| 0.251 | -0.35 | 0.444 | 7.144 |
| 0.266 | -0.38 | 0.420 | 7.120 |
| 0.282 | -0.40 | 0.400 | 7.100 |
| 0.298 | -0.42 | 0.383 | 7.083 |
| 0.316 | -0.44 | 0.363 | 7.063 |
| 0.335 | -0.46 | 0.345 | 7.045 |
| 0.355 | -0.49 | 0.326 | 7.026 |
| 0.376 | -0.51 | 0.309 | 7.009 |
| 0.398 | -0.54 | 0.291 | 6.991 |
| 0.422 | -0.57 | 0.272 | 6.972 |
| 0.447 | -0.59 | 0.256 | 6.956 |
| 0.473 | -0.62 | 0.240 | 6.940 |
| 0.501 | -0.65 | 0.225 | 6.925 |
| 0.531 | -0.67 | 0.212 | 6.912 |
| 0.562 | -0.71 | 0.196 | 6.896 |
| 0.596 | -0.74 | 0.182 | 6.882 |
| 0.631 | -0.77 | 0.170 | 6.870 |
| 0.668 | -0.79 | 0.161 | 6.861 |
| 0.708 | -0.83 | 0.148 | 6.848 |
| 0.750 | -0.86 | 0.139 | 6.839 |
| 0.794 | -0.88 | 0.131 | 6.831 |
| 0.841 | -0.91 | 0.123 | 6.823 |
| 0.891 | -0.94 | 0.114 | 6.814 |
| 0.944 | -0.96 | 0.109 | 6.809 |
| 1.000 | -0.99 | 0.103 | 6.803 |
| 1.060 | -1.01 | 0.098 | 6.798 |
| 1.121 | -1.02 | 0.095 | 6.795 |
| 1.190 | -1.06 | 0.088 | 6.788 |
| 1.260 | -1.07 | 0.085 | 6.785 |
| 1.331 | -1.09 | 0.082 | 6.782 |
| 1.410 | -1.11 | 0.077 | 6.777 |
| 1.500 | -1.13 | 0.074 | 6.774 |
| 1.581 | -1.12 | 0.075 | 6.775 |
| 1.681 | -1.15 | 0.070 | 6.770 |
| 1.782 | -1.17 | 0.068 | 6.768 |
| 1.882 | -1.17 | 0.067 | 6.767 |
| 1.990 | -1.18 | 0.066 | 6.766 |
| 2.110 | -1.21 | 0.062 | 6.762 |
| 2.240 | -1.22 | 0.060 | 6.760 |

## Calculation of ln(Re/rw)

Where: Lw < H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{A+Bln((H-Lw)/rw)}/(Le/rw)]^-1= 1.96

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 2.38

## Calculation of Coefficients

Value range for Le/rw from Table of Coefficients

| Le/rw | A | B | C |
|---|---|---|---|
| 20 | 2.23 | 0.29 | 1.75 |
| 30 | 2.5 | 0.35 | 2.1 |

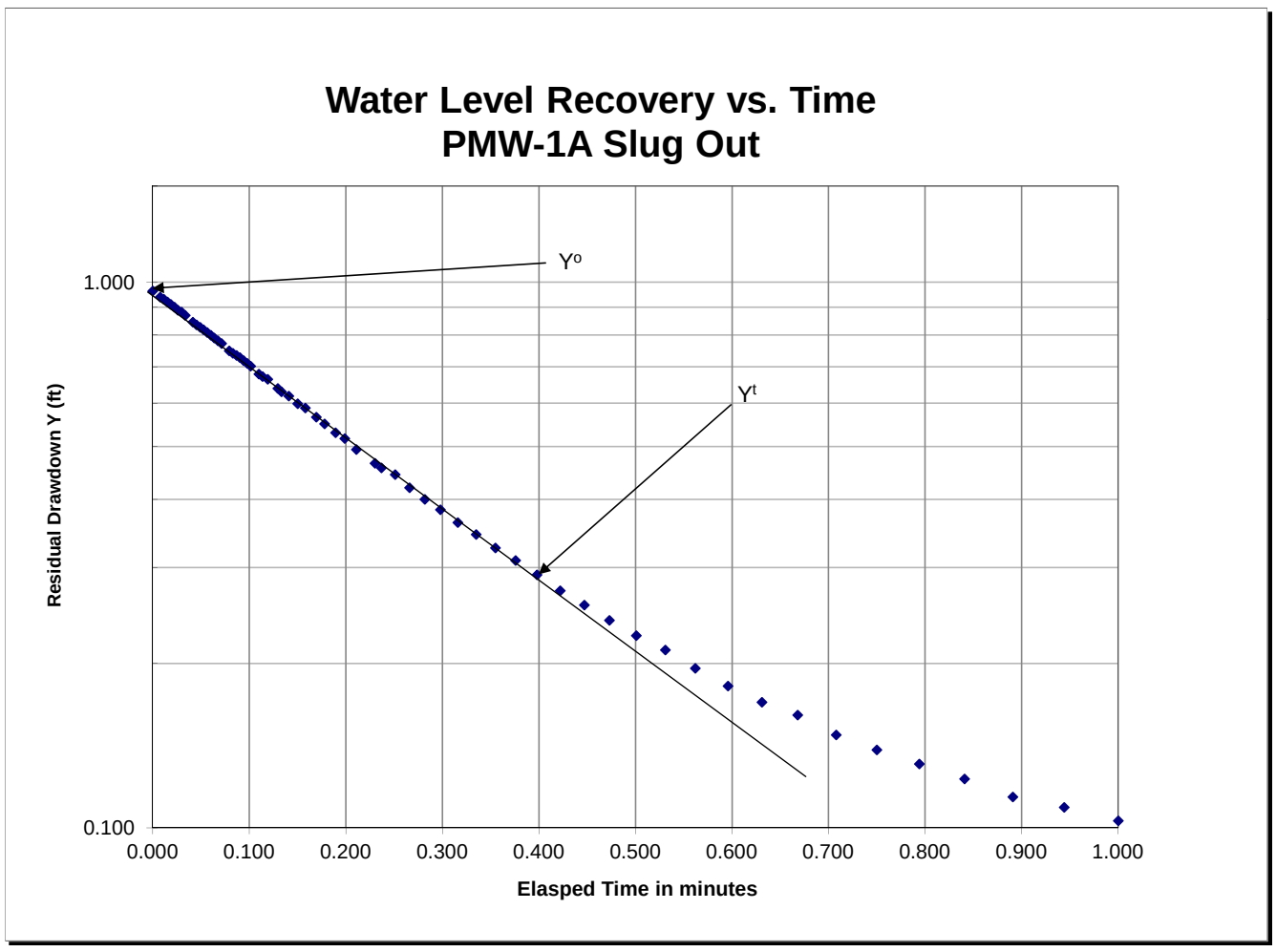
Interpolated values of A, B and C for Le/rw

| | | | |
|---|---|---|---|
| 21.21 | 2.26 | 0.30 | 1.79 |

Coefficients Table

| Le/rw | A | Le/rw | B | Le/rw | C |
|---|---|---|---|---|---|
| 4 | 1.75 | 4 | 0.25 | 4 | 0.75 |
| 5 | 1.76 | 5 | 0.25 | 5 | 0.85 |
| 6 | 1.77 | 6 | 0.25 | 6 | 0.90 |
| 7 | 1.80 | 7 | 0.25 | 7 | 1.00 |
| 8 | 1.83 | 8 | 0.25 | 8 | 1.10 |
| 9 | 1.90 | 9 | 0.25 | 9 | 1.20 |
| 10 | 1.95 | 10 | 0.25 | 10 | 1.30 |
| 15 | 2.10 | 15 | 0.27 | 15 | 1.50 |
| 20 | 2.23 | 20 | 0.29 | 20 | 1.75 |
| 25 | 2.40 | 25 | 0.31 | 25 | 1.90 |
| 30 | 2.50 | 30 | 0.35 | 30 | 2.10 |
| 40 | 2.75 | 40 | 0.45 | 40 | 2.45 |
| 50 | 3.00 | 50 | 0.50 | 50 | 2.70 |
| 60 | 3.45 | 60 | 0.52 | 60 | 3.00 |
| 70 | 3.70 | 70 | 0.60 | 70 | 3.40 |
| 80 | 3.90 | 80 | 0.65 | 80 | 3.60 |
| 90 | 4.20 | 90 | 0.70 | 90 | 3.85 |
| 100 | 4.50 | 100 | 0.75 | 100 | 4.20 |
| 150 | 5.45 | 150 | 0.98 | 150 | 5.70 |
| 200 | 6.10 | 200 | 1.20 | 200 | 7.00 |
| 250 | 6.70 | 250 | 1.30 | 250 | 8.00 |
| 300 | 7.10 | 300 | 1.50 | 300 | 8.80 |
| 400 | 7.75 | 400 | 1.90 | 400 | 9.90 |
| 500 | 8.20 | 500 | 2.20 | 500 | 10.60 |
| 600 | 8.50 | 600 | 2.33 | 600 | 11.10 |
| 700 | 8.70 | 700 | 2.50 | 700 | 11.50 |
| 800 | 8.90 | 800 | 2.70 | 800 | 11.80 |
| 900 | 9.00 | 900 | 2.75 | 900 | 12.00 |
| 1000 | 9.20 | 1000 | 2.83 | 1000 | 12.40 |
| 1500 | 9.50 | 1500 | 3.18 | 1500 | 12.90 |

Reference: Bouwer(1989), Bouwer and Rice(1976)



Trex Properties, Charlotte NC
Hydraulic Conductivity (K) Calculation Worksheet
W&R Project No. 03130430.01

| | | | |
|---|---|---|---|
| Well: | PMW-1B (in) | Conducted by: | Fay |
| Test Date: | 1/27/2015 | Entered/date: | 02/05/15 |
| Test Type: | Slug In | Checked/date: | Bellis 2/17/15 |

## WELL DATA

| | | |
|---|---|---|
| SWL = | 6.79 | (ft BTOC) |
| WD = | 57.75 | (ft BTOC) |
| WD = | 54.00 | (ft BGS) |
| DTSP = | 50.75 | (ft BTOC) |
| rc = | 0.083 | (ft) |
| n = | 0.30 | |
| rw = | 0.33 | (ft) |
| rc (adjusted) = | 0.08 | (ft) |
| Le = | 7 | (ft) |
| Lw = | 50.96 | (ft) |
| Le/rw = | 21.21 | |
| H = | 75.00 | (ft) |

## CALCULATION OF K

K = [(rc^2 ln(Re/rw))/2Le]*(1/t)ln(yo/yt)

| | | |
|---|---|---|
| yo = | 1.635 | (ft) from plot |
| yt = | 0.515 | (ft) from plot |
| t = | 1.661 | (minutes) from plot |
| ln(Re/rw) = | 2.56 | |
| **K =** | **1.3E+00** | **(ft/day)** |
| **K =** | **4.6E-04** | **(cm/sec)** |

## TEST DATA

| Elapsed time (min) | Log y | y (ft) | WL (ft BTOC) |
|---|---|---|---|
| 0.000 | 0.20 | 1.600 | 5.19 |
| 0.008 | 0.23 | 1.717 | 5.073 |
| 0.012 | 0.19 | 1.544 | 5.246 |
| 0.015 | 0.18 | 1.517 | 5.273 |
| 0.019 | 0.21 | 1.635 | 5.155 |
| 0.023 | 0.21 | 1.618 | 5.172 |
| 0.027 | 0.21 | 1.610 | 5.18 |
| 0.030 | 0.21 | 1.618 | 5.172 |
| 0.034 | 0.19 | 1.562 | 5.228 |
| 0.038 | 0.20 | 1.576 | 5.214 |
| 0.045 | 0.18 | 1.509 | 5.281 |
| 0.049 | 0.19 | 1.549 | 5.241 |
| 0.053 | 0.23 | 1.689 | 5.101 |
| 0.056 | 0.20 | 1.581 | 5.209 |
| 0.060 | 0.21 | 1.627 | 5.163 |
| 0.064 | 0.22 | 1.641 | 5.149 |
| 0.067 | 0.19 | 1.565 | 5.225 |
| 0.071 | 0.20 | 1.570 | 5.22 |
| 0.079 | 0.19 | 1.556 | 5.234 |
| 0.083 | 0.21 | 1.611 | 5.179 |
| 0.087 | 0.15 | 1.418 | 5.372 |
| 0.090 | 0.18 | 1.501 | 5.289 |
| 0.094 | 0.19 | 1.543 | 5.247 |
| 0.098 | 0.18 | 1.525 | 5.265 |
| 0.102 | 0.19 | 1.543 | 5.247 |
| 0.110 | 0.18 | 1.523 | 5.267 |
| 0.114 | 0.18 | 1.519 | 5.271 |
| 0.119 | 0.18 | 1.513 | 5.277 |
| 0.130 | 0.18 | 1.504 | 5.286 |
| 0.134 | 0.18 | 1.501 | 5.289 |
| 0.141 | 0.17 | 1.491 | 5.299 |
| 0.150 | 0.17 | 1.484 | 5.306 |
| 0.158 | 0.17 | 1.473 | 5.317 |
| 0.170 | 0.17 | 1.465 | 5.325 |
| 0.178 | 0.16 | 1.455 | 5.335 |
| 0.190 | 0.16 | 1.447 | 5.343 |
| 0.199 | 0.16 | 1.436 | 5.354 |
| 0.211 | 0.15 | 1.427 | 5.363 |
| 0.224 | 0.15 | 1.410 | 5.38 |
| 0.237 | 0.15 | 1.402 | 5.388 |
| 0.251 | 0.14 | 1.386 | 5.404 |
| 0.266 | 0.14 | 1.372 | 5.418 |
| 0.282 | 0.13 | 1.357 | 5.433 |
| 0.298 | 0.13 | 1.345 | 5.445 |
| 0.316 | 0.12 | 1.328 | 5.462 |
| 0.335 | 0.12 | 1.313 | 5.477 |
| 0.355 | 0.11 | 1.293 | 5.497 |
| 0.376 | 0.11 | 1.276 | 5.514 |
| 0.398 | 0.10 | 1.257 | 5.533 |
| 0.422 | 0.09 | 1.239 | 5.551 |
| 0.447 | 0.09 | 1.217 | 5.573 |
| 0.473 | 0.08 | 1.195 | 5.595 |
| 0.502 | 0.07 | 1.170 | 5.62 |
| 0.531 | 0.06 | 1.149 | 5.641 |
| 0.562 | 0.05 | 1.124 | 5.666 |
| 0.597 | 0.04 | 1.103 | 5.687 |
| 0.631 | 0.03 | 1.076 | 5.714 |
| 0.668 | 0.02 | 1.050 | 5.74 |
| 0.708 | 0.01 | 1.021 | 5.769 |
| 0.752 | 0.00 | 0.992 | 5.798 |
| 0.794 | -0.02 | 0.963 | 5.827 |
| 0.841 | -0.03 | 0.935 | 5.855 |
| 0.891 | -0.05 | 0.901 | 5.889 |
| 0.944 | -0.06 | 0.867 | 5.923 |
| 1.002 | -0.08 | 0.834 | 5.956 |
| 1.060 | -0.10 | 0.801 | 5.989 |
| 1.120 | -0.12 | 0.767 | 6.023 |
| 1.190 | -0.14 | 0.731 | 6.059 |
| 1.260 | -0.16 | 0.694 | 6.096 |
| 1.330 | -0.18 | 0.659 | 6.131 |
| 1.410 | -0.21 | 0.623 | 6.167 |
| 1.503 | -0.24 | 0.582 | 6.208 |
| 1.580 | -0.26 | 0.551 | 6.239 |
| 1.680 | -0.29 | 0.515 | 6.275 |
| 1.780 | -0.32 | 0.474 | 6.316 |
| 1.880 | -0.36 | 0.441 | 6.349 |
| 1.990 | -0.39 | 0.410 | 6.38 |
| 2.110 | -0.43 | 0.372 | 6.418 |

## Calculation of ln(Re/rw)

Where: Lw < H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{A+Bln((H-Lw)/rw)}/(Le/rw)]^-1= 2.56

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 3.33

## Calculation of Coefficients

Value range for Le/rw from Table of Coefficients

| Le/rw | A | B | C |
|---|---|---|---|
| 20 | 2.23 | 0.29 | 1.75 |
| 30 | 2.5 | 0.35 | 2.1 |

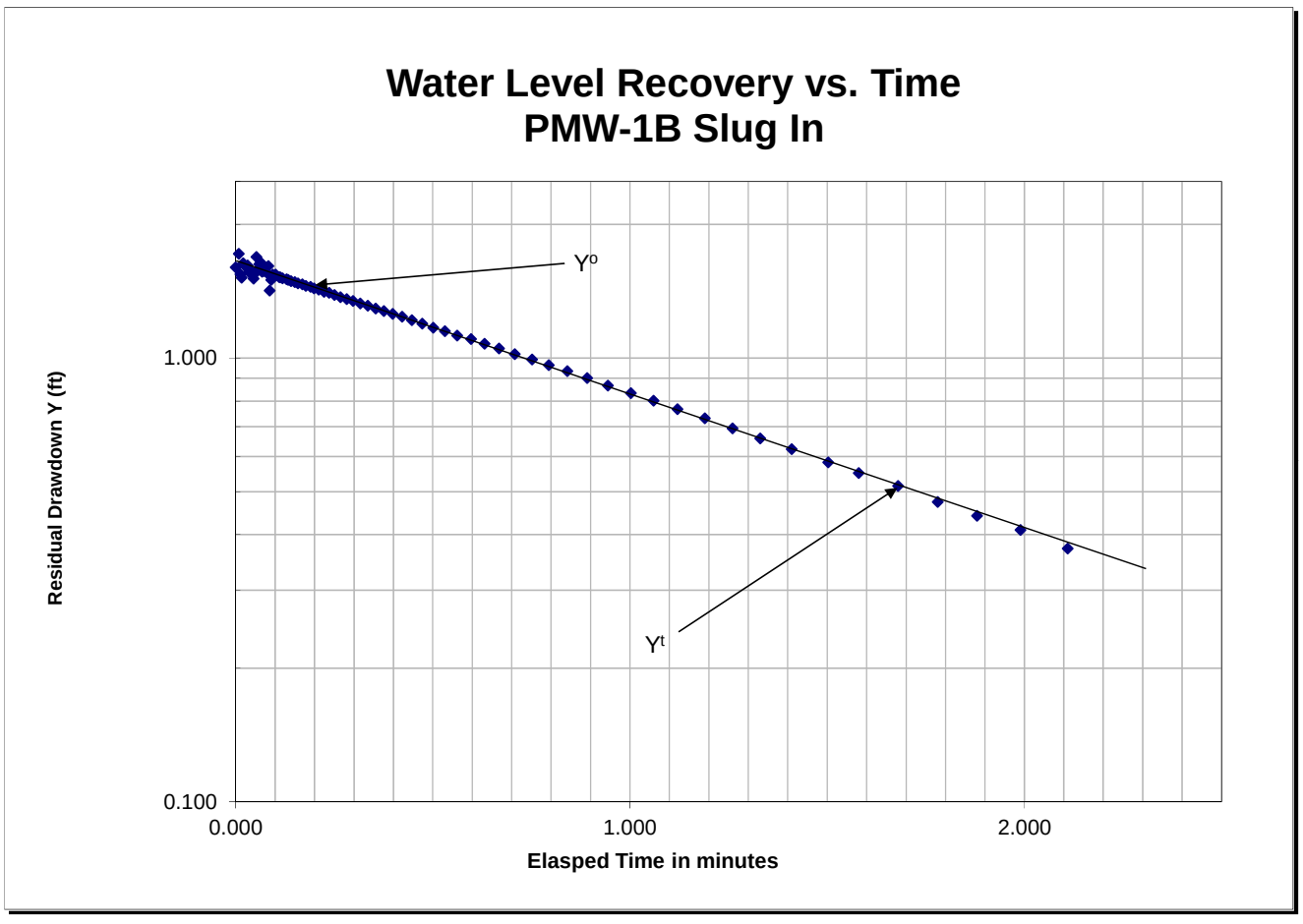
Interpolated values of A, B and C for Le/rw

| | | | |
|---|---|---|---|
| 21.21 | 2.26 | 0.30 | 1.79 |

Coefficients Table

| Le/rw | A | Le/rw | B | Le/rw | C |
|---|---|---|---|---|---|
| 4 | 1.75 | 4 | 0.25 | 4 | 0.75 |
| 5 | 1.76 | 5 | 0.25 | 5 | 0.85 |
| 6 | 1.77 | 6 | 0.25 | 6 | 0.90 |
| 7 | 1.80 | 7 | 0.25 | 7 | 1.00 |
| 8 | 1.83 | 8 | 0.25 | 8 | 1.10 |
| 9 | 1.90 | 9 | 0.25 | 9 | 1.20 |
| 10 | 1.95 | 10 | 0.25 | 10 | 1.30 |
| 15 | 2.10 | 15 | 0.27 | 15 | 1.50 |
| 20 | 2.23 | 20 | 0.29 | 20 | 1.75 |
| 25 | 2.40 | 25 | 0.31 | 25 | 1.90 |
| 30 | 2.50 | 30 | 0.35 | 30 | 2.10 |
| 40 | 2.75 | 40 | 0.45 | 40 | 2.45 |
| 50 | 3.00 | 50 | 0.50 | 50 | 2.70 |
| 60 | 3.45 | 60 | 0.52 | 60 | 3.00 |
| 70 | 3.70 | 70 | 0.60 | 70 | 3.40 |
| 80 | 3.90 | 80 | 0.65 | 80 | 3.60 |
| 90 | 4.20 | 90 | 0.70 | 90 | 3.85 |
| 100 | 4.50 | 100 | 0.75 | 100 | 4.20 |
| 150 | 5.45 | 150 | 0.98 | 150 | 5.70 |
| 200 | 6.10 | 200 | 1.20 | 200 | 7.00 |
| 250 | 6.70 | 250 | 1.30 | 250 | 8.00 |
| 300 | 7.10 | 300 | 1.50 | 300 | 8.80 |
| 400 | 7.75 | 400 | 1.90 | 400 | 9.90 |
| 500 | 8.20 | 500 | 2.20 | 500 | 10.60 |
| 600 | 8.50 | 600 | 2.33 | 600 | 11.10 |
| 700 | 8.70 | 700 | 2.50 | 700 | 11.50 |
| 800 | 8.90 | 800 | 2.70 | 800 | 11.80 |
| 900 | 9.00 | 900 | 2.75 | 900 | 12.00 |
| 1000 | 9.20 | 1000 | 2.83 | 1000 | 12.40 |
| 1500 | 9.50 | 1500 | 3.18 | 1500 | 12.90 |

Reference: Bouwer(1989), Bouwer and Rice(1976)



Trex Properties, Charlotte NC
Hydraulic Conductivity (K) Calculation Worksheet
W&R Project No. 03130430.01

| | | | |
|---|---|---|---|
| Well: | PMW-1B (out) | Conducted by: | Fay |
| Test Date: | 1/27/2015 | Entered/date: | 02/05/15 |
| Test Type: | Recovery | Checked/date: | Bellis 2/17/15 |

## WELL DATA

| | | |
|---|---|---|
| SWL = | 6.79 | (ft BTOC) |
| WD = | 57.75 | (ft BTOC) |
| WD = | 54.00 | (ft BGS) |
| DTSP = | 50.75 | (ft BTOC) |
| rc = | 0.083 | (ft) |
| n = | 0.30 | |
| rw = | 0.33 | (ft) |
| rc (adjusted) = | 0.08 | (ft) |
| Le = | 7 | (ft) |
| Lw = | 50.96 | (ft) |
| Le/rw = | 21.21 | |
| H = | 75.00 | (ft) |

## CALCULATION OF K

K = [(rc^2 ln(Re/rw))/2Le]*(1/t)ln(yo/yt)

| | | |
|---|---|---|
| yo = | 1.632 | (ft) from plot |
| yt = | 0.580 | (ft) from plot |
| t = | 1.500 | (minutes) from plot |
| ln(Re/rw) = | 2.56 | |
| **K =** | **1.3E+00** | **(ft/day)** |
| **K =** | **4.5E-04** | **(cm/sec)** |

## TEST DATA

| Elapsed time (min) | Log y | y (ft) | WL (ft BTOC) |
|---|---|---|---|
| 0.000 | 0.21 | 1.632 | 8.422 |
| 0.008 | 0.21 | 1.624 | 8.414 |
| 0.012 | 0.21 | 1.621 | 8.411 |
| 0.015 | 0.21 | 1.620 | 8.410 |
| 0.019 | 0.21 | 1.615 | 8.405 |
| 0.023 | 0.21 | 1.611 | 8.401 |
| 0.027 | 0.21 | 1.606 | 8.396 |
| 0.030 | 0.20 | 1.603 | 8.393 |
| 0.034 | 0.20 | 1.599 | 8.389 |
| 0.038 | 0.20 | 1.596 | 8.386 |
| 0.045 | 0.20 | 1.585 | 8.375 |
| 0.049 | 0.20 | 1.582 | 8.372 |
| 0.053 | 0.20 | 1.579 | 8.369 |
| 0.056 | 0.20 | 1.576 | 8.366 |
| 0.060 | 0.20 | 1.573 | 8.363 |
| 0.064 | 0.20 | 1.569 | 8.359 |
| 0.068 | 0.19 | 1.566 | 8.356 |
| 0.071 | 0.19 | 1.561 | 8.351 |
| 0.075 | 0.19 | 1.556 | 8.346 |
| 0.083 | 0.19 | 1.546 | 8.336 |
| 0.087 | 0.19 | 1.542 | 8.332 |
| 0.091 | 0.19 | 1.540 | 8.330 |
| 0.094 | 0.19 | 1.536 | 8.326 |
| 0.098 | 0.19 | 1.532 | 8.322 |
| 0.102 | 0.18 | 1.528 | 8.318 |
| 0.110 | 0.18 | 1.515 | 8.305 |
| 0.114 | 0.18 | 1.514 | 8.304 |
| 0.119 | 0.18 | 1.510 | 8.300 |
| 0.130 | 0.18 | 1.497 | 8.287 |
| 0.134 | 0.17 | 1.491 | 8.281 |
| 0.141 | 0.17 | 1.487 | 8.277 |
| 0.150 | 0.17 | 1.477 | 8.267 |
| 0.158 | 0.17 | 1.470 | 8.260 |
| 0.170 | 0.16 | 1.458 | 8.248 |
| 0.178 | 0.16 | 1.450 | 8.240 |
| 0.190 | 0.16 | 1.436 | 8.226 |
| 0.199 | 0.16 | 1.430 | 8.220 |
| 0.211 | 0.15 | 1.414 | 8.204 |
| 0.224 | 0.15 | 1.398 | 8.188 |
| 0.237 | 0.14 | 1.394 | 8.184 |
| 0.251 | 0.14 | 1.379 | 8.169 |
| 0.266 | 0.13 | 1.364 | 8.154 |
| 0.282 | 0.13 | 1.349 | 8.139 |
| 0.298 | 0.13 | 1.335 | 8.125 |
| 0.316 | 0.12 | 1.319 | 8.109 |
| 0.335 | 0.11 | 1.300 | 8.090 |
| 0.355 | 0.11 | 1.284 | 8.074 |
| 0.376 | 0.10 | 1.266 | 8.056 |
| 0.398 | 0.10 | 1.248 | 8.038 |
| 0.422 | 0.09 | 1.226 | 8.016 |
| 0.447 | 0.08 | 1.208 | 7.998 |
| 0.473 | 0.07 | 1.184 | 7.974 |
| 0.501 | 0.07 | 1.163 | 7.953 |
| 0.531 | 0.06 | 1.139 | 7.929 |
| 0.562 | 0.05 | 1.116 | 7.906 |
| 0.596 | 0.04 | 1.090 | 7.880 |
| 0.631 | 0.03 | 1.062 | 7.852 |
| 0.668 | 0.02 | 1.036 | 7.826 |
| 0.708 | 0.00 | 1.010 | 7.800 |
| 0.750 | -0.01 | 0.981 | 7.771 |
| 0.796 | -0.02 | 0.950 | 7.740 |
| 0.842 | -0.04 | 0.920 | 7.710 |
| 0.892 | -0.05 | 0.890 | 7.680 |
| 0.947 | -0.07 | 0.856 | 7.646 |
| 1.000 | -0.08 | 0.825 | 7.615 |
| 1.060 | -0.10 | 0.793 | 7.583 |
| 1.120 | -0.12 | 0.759 | 7.549 |
| 1.193 | -0.14 | 0.721 | 7.511 |
| 1.260 | -0.16 | 0.688 | 7.478 |
| 1.330 | -0.18 | 0.654 | 7.444 |
| 1.410 | -0.21 | 0.618 | 7.408 |
| 1.500 | -0.24 | 0.580 | 7.370 |
| 1.580 | -0.26 | 0.549 | 7.339 |
| 1.680 | -0.29 | 0.510 | 7.300 |
| 1.780 | -0.32 | 0.475 | 7.265 |
| 1.880 | -0.35 | 0.443 | 7.233 |
| 1.990 | -0.39 | 0.411 | 7.201 |
| 2.110 | -0.42 | 0.378 | 7.168 |

## Calculation of ln(Re/rw)

Where: Lw < H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{A+Bln((H-Lw)/rw)}/(Le/rw)]^-1= 2.56

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 3.33

## Calculation of Coefficients

Value range for Le/rw from Table of Coefficients

| Le/rw | A | B | C |
|---|---|---|---|
| 20 | 2.23 | 0.29 | 1.75 |
| 30 | 2.5 | 0.35 | 2.1 |

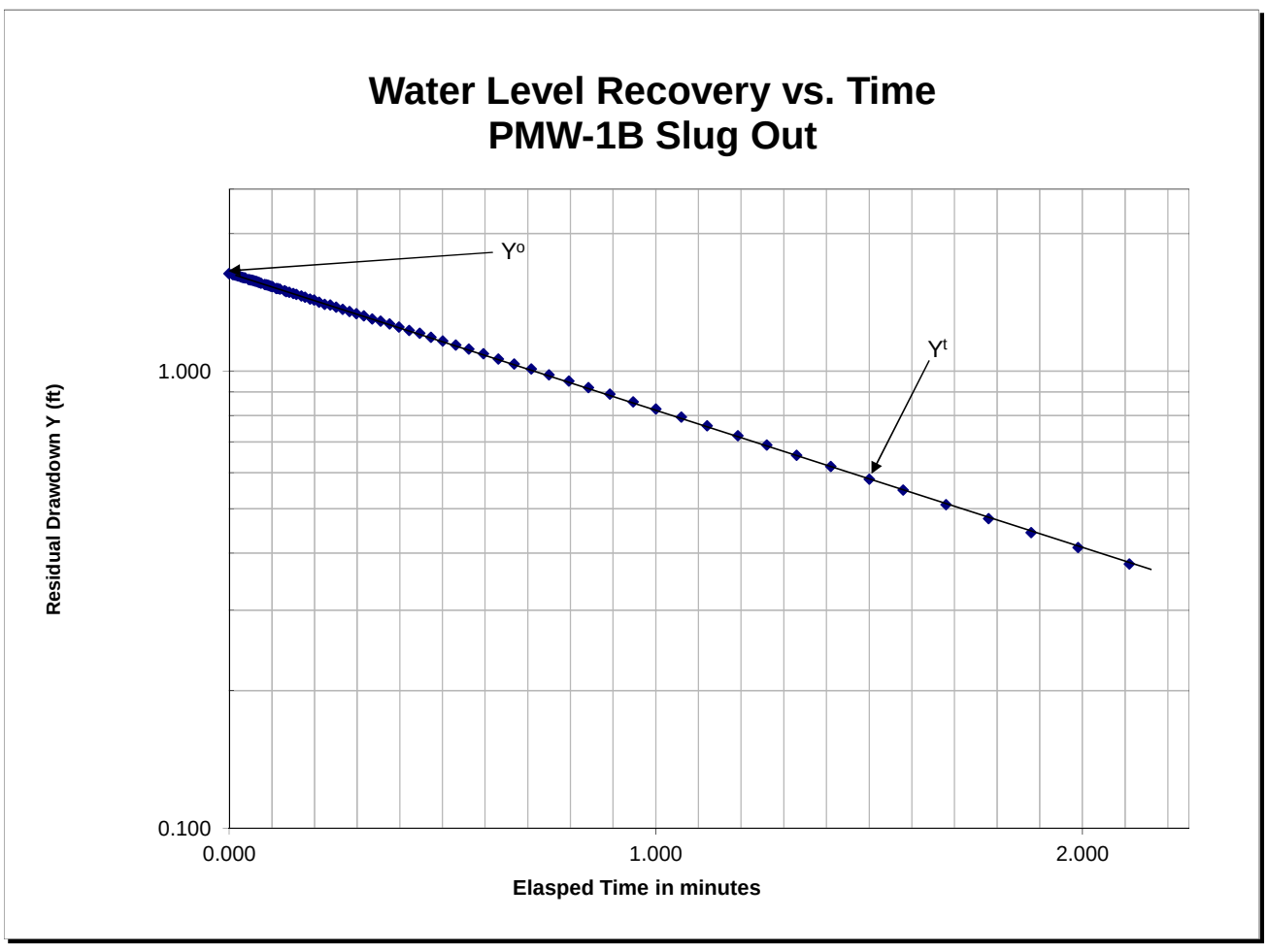
Interpolated values of A, B and C for Le/rw

| | | | |
|---|---|---|---|
| 21.21 | 2.26 | 0.30 | 1.79 |

Coefficients Table

| Le/rw | A | Le/rw | B | Le/rw | C |
|---|---|---|---|---|---|
| 4 | 1.75 | 4 | 0.25 | 4 | 0.75 |
| 5 | 1.76 | 5 | 0.25 | 5 | 0.85 |
| 6 | 1.77 | 6 | 0.25 | 6 | 0.90 |
| 7 | 1.80 | 7 | 0.25 | 7 | 1.00 |
| 8 | 1.83 | 8 | 0.25 | 8 | 1.10 |
| 9 | 1.90 | 9 | 0.25 | 9 | 1.20 |
| 10 | 1.95 | 10 | 0.25 | 10 | 1.30 |
| 15 | 2.10 | 15 | 0.27 | 15 | 1.50 |
| 20 | 2.23 | 20 | 0.29 | 20 | 1.75 |
| 25 | 2.40 | 25 | 0.31 | 25 | 1.90 |
| 30 | 2.50 | 30 | 0.35 | 30 | 2.10 |
| 40 | 2.75 | 40 | 0.45 | 40 | 2.45 |
| 50 | 3.00 | 50 | 0.50 | 50 | 2.70 |
| 60 | 3.45 | 60 | 0.52 | 60 | 3.00 |
| 70 | 3.70 | 70 | 0.60 | 70 | 3.40 |
| 80 | 3.90 | 80 | 0.65 | 80 | 3.60 |
| 90 | 4.20 | 90 | 0.70 | 90 | 3.85 |
| 100 | 4.50 | 100 | 0.75 | 100 | 4.20 |
| 150 | 5.45 | 150 | 0.98 | 150 | 5.70 |
| 200 | 6.10 | 200 | 1.20 | 200 | 7.00 |
| 250 | 6.70 | 250 | 1.30 | 250 | 8.00 |
| 300 | 7.10 | 300 | 1.50 | 300 | 8.80 |
| 400 | 7.75 | 400 | 1.90 | 400 | 9.90 |
| 500 | 8.20 | 500 | 2.20 | 500 | 10.60 |
| 600 | 8.50 | 600 | 2.33 | 600 | 11.10 |
| 700 | 8.70 | 700 | 2.50 | 700 | 11.50 |
| 800 | 8.90 | 800 | 2.70 | 800 | 11.80 |
| 900 | 9.00 | 900 | 2.75 | 900 | 12.00 |
| 1000 | 9.20 | 1000 | 2.83 | 1000 | 12.40 |
| 1500 | 9.50 | 1500 | 3.18 | 1500 | 12.90 |

Reference: Bouwer(1989), Bouwer and Rice(1976)



Trex Properties, Charlotte NC
Hydraulic Conductivity (K) Calculation Worksheet
W&R Project No. 03130430.01

| | | | |
|---|---|---|---|
| Well: | PMW-10A (in) | Conducted by: | Fay |
| Test Date: | 1/27/2015 | Entered/date: | 02/05/15 |
| Test Type: | Slug In | Checked/date: | Bellis 2/17/15 |

## WELL DATA

| | | |
|---|---|---|
| SWL = | 7.61 | (ft BTOC) |
| WD = | 62.69 | (ft BTOC) |
| WD = | 63.00 | (ft BGS) |
| DTSP = | 50.69 | (ft BTOC) |
| rc = | 0.083 | (ft) |
| n = | 0.30 | |
| rw = | 0.33 | (ft) |
| rc (adjusted) = | 0.08 | (ft) |
| Le = | 12 | (ft) |
| Lw = | 55.08 | (ft) |
| Le/rw = | 36.36 | |
| H = | 75.00 | (ft) |

## CALCULATION OF K

K = [(rc^2 ln(Re/rw))/2Le]*(1/t)ln(yo/yt)

| | | |
|---|---|---|
| yo = | 1.057 | (ft) from plot |
| yt = | 0.554 | (ft) from plot |
| t = | 0.596 | (minutes) from plot |
| ln(Re/rw) = | 3.03 | |
| **K =** | **1.4E+00** | **(ft/day)** |
| **K =** | **5.0E-04** | **(cm/sec)** |

Calculation of ln(Re/rw)

Where: Lw < H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{A+Bln((H-Lw)/rw)}/(Le/rw)]^-1= 3.03

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 3.70

Calculation of Coefficients
Value range for Le/rw from Table of Coefficients

| Le/rw | A | B | C |
|---|---|---|---|
| 30 | 2.5 | 0.35 | 2.1 |
| 40 | 2.75 | 0.45 | 2.45 |

Interpolated values of A, B and C for Le/rw

| | | | |
|---|---|---|---|
| 36.36 | 2.66 | 0.41 | 2.32 |

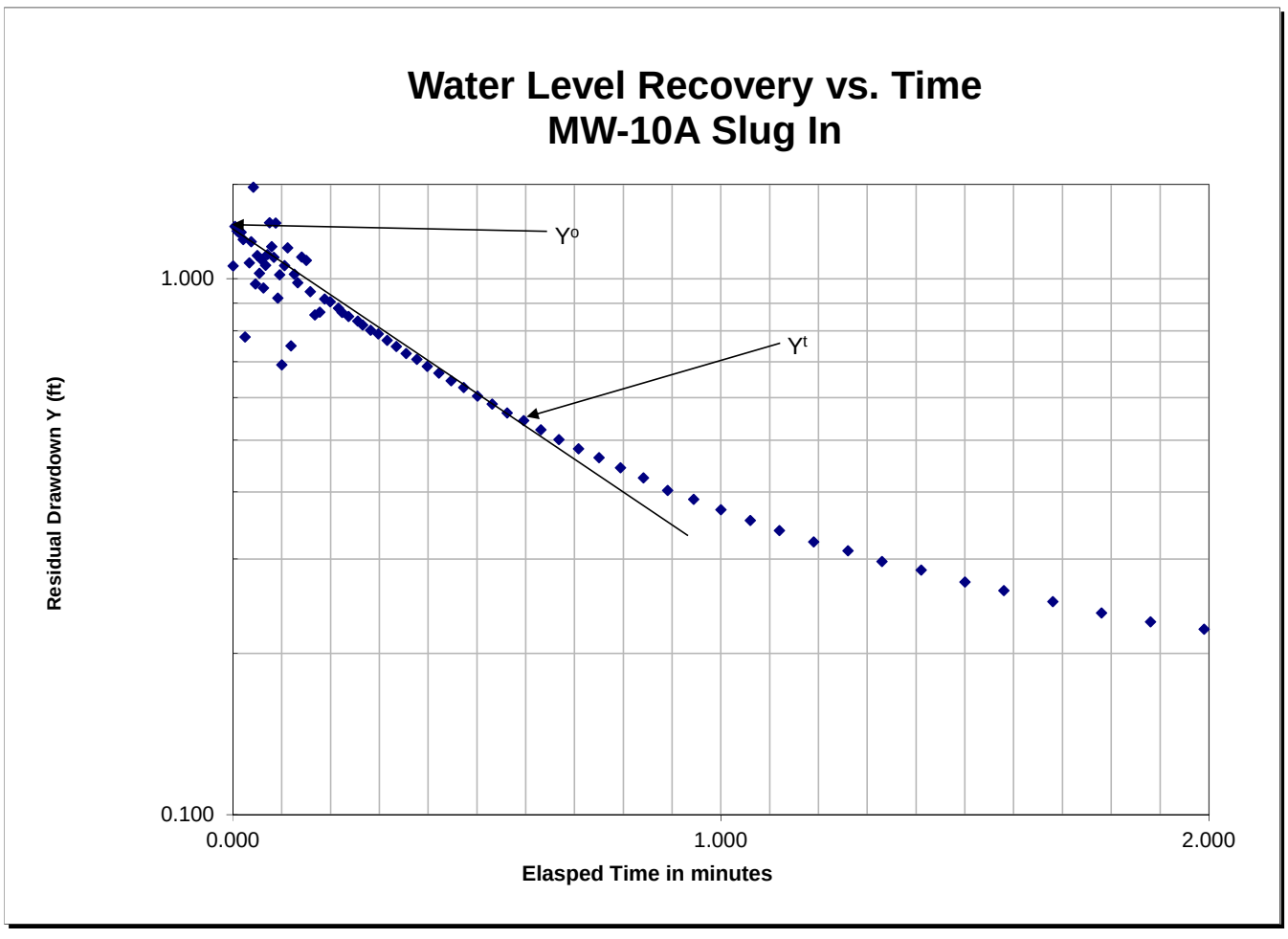
Coefficients Table

| Le/rw | A | Le/rw | B | Le/rw | C |
|---|---|---|---|---|---|
| 4 | 1.75 | 4 | 0.25 | 4 | 0.75 |
| 5 | 1.76 | 5 | 0.25 | 5 | 0.85 |
| 6 | 1.77 | 6 | 0.25 | 6 | 0.90 |
| 7 | 1.80 | 7 | 0.25 | 7 | 1.00 |
| 8 | 1.83 | 8 | 0.25 | 8 | 1.10 |
| 9 | 1.90 | 9 | 0.25 | 9 | 1.20 |
| 10 | 1.95 | 10 | 0.25 | 10 | 1.30 |
| 15 | 2.10 | 15 | 0.27 | 15 | 1.50 |
| 20 | 2.23 | 20 | 0.29 | 20 | 1.75 |
| 25 | 2.40 | 25 | 0.31 | 25 | 1.90 |
| 30 | 2.50 | 30 | 0.35 | 30 | 2.10 |
| 40 | 2.75 | 40 | 0.45 | 40 | 2.45 |
| 50 | 3.00 | 50 | 0.50 | 50 | 2.70 |
| 60 | 3.45 | 60 | 0.52 | 60 | 3.00 |
| 70 | 3.70 | 70 | 0.60 | 70 | 3.40 |
| 80 | 3.90 | 80 | 0.65 | 80 | 3.60 |
| 90 | 4.20 | 90 | 0.70 | 90 | 3.85 |
| 100 | 4.50 | 100 | 0.75 | 100 | 4.20 |
| 150 | 5.45 | 150 | 0.98 | 150 | 5.70 |
| 200 | 6.10 | 200 | 1.20 | 200 | 7.00 |
| 250 | 6.70 | 250 | 1.30 | 250 | 8.00 |
| 300 | 7.10 | 300 | 1.50 | 300 | 8.80 |
| 400 | 7.75 | 400 | 1.90 | 400 | 9.90 |
| 500 | 8.20 | 500 | 2.20 | 500 | 10.60 |
| 600 | 8.50 | 600 | 2.33 | 600 | 11.10 |
| 700 | 8.70 | 700 | 2.50 | 700 | 11.50 |
| 800 | 8.90 | 800 | 2.70 | 800 | 11.80 |
| 900 | 9.00 | 900 | 2.75 | 900 | 12.00 |
| 1000 | 9.20 | 1000 | 2.83 | 1000 | 12.40 |
| 1500 | 9.50 | 1500 | 3.18 | 1500 | 12.90 |

Reference: Bouwer(1989), Bouwer and Rice(1976)

## TEST DATA

| Elapsed time (min) | Log y | y (ft) | WL (ft BTOC) |
|---|---|---|---|
| 0.000 | 0.02 | 1.057 | 6.553 |
| 0.004 | 0.10 | 1.252 | 6.358 |
| 0.008 | 0.09 | 1.228 | 6.382 |
| 0.013 | 0.09 | 1.220 | 6.390 |
| 0.017 | 0.09 | 1.222 | 6.388 |
| 0.021 | 0.07 | 1.184 | 6.426 |
| 0.025 | -0.11 | 0.779 | 6.831 |
| 0.029 | 0.18 | 1.511 | 6.099 |
| 0.033 | 0.03 | 1.071 | 6.539 |
| 0.038 | 0.07 | 1.173 | 6.437 |
| 0.042 | 0.17 | 1.482 | 6.128 |
| 0.046 | -0.01 | 0.978 | 6.632 |
| 0.050 | 0.04 | 1.106 | 6.504 |
| 0.054 | 0.01 | 1.025 | 6.585 |
| 0.058 | 0.04 | 1.087 | 6.523 |
| 0.063 | -0.02 | 0.962 | 6.648 |
| 0.067 | 0.03 | 1.060 | 6.550 |
| 0.071 | 0.05 | 1.110 | 6.500 |
| 0.075 | 0.10 | 1.273 | 6.337 |
| 0.079 | 0.06 | 1.148 | 6.462 |
| 0.084 | 0.04 | 1.097 | 6.513 |
| 0.088 | 0.10 | 1.271 | 6.339 |
| 0.092 | -0.04 | 0.921 | 6.689 |
| 0.096 | 0.01 | 1.018 | 6.592 |
| 0.100 | -0.16 | 0.691 | 6.919 |
| 0.106 | 0.02 | 1.058 | 6.552 |
| 0.112 | 0.06 | 1.142 | 6.468 |
| 0.119 | -0.12 | 0.750 | 6.860 |
| 0.126 | 0.01 | 1.020 | 6.590 |
| 0.133 | -0.01 | 0.983 | 6.627 |
| 0.141 | 0.04 | 1.098 | 6.512 |
| 0.150 | 0.03 | 1.082 | 6.528 |
| 0.159 | -0.02 | 0.947 | 6.663 |
| 0.168 | -0.07 | 0.856 | 6.754 |
| 0.178 | -0.06 | 0.867 | 6.743 |
| 0.188 | -0.04 | 0.917 | 6.693 |
| 0.199 | -0.04 | 0.906 | 6.704 |
| 0.216 | -0.05 | 0.882 | 6.728 |
| 0.224 | -0.06 | 0.866 | 6.744 |
| 0.237 | -0.07 | 0.851 | 6.759 |
| 0.256 | -0.08 | 0.834 | 6.776 |
| 0.266 | -0.09 | 0.820 | 6.790 |
| 0.282 | -0.10 | 0.802 | 6.808 |
| 0.298 | -0.10 | 0.789 | 6.821 |
| 0.316 | -0.11 | 0.768 | 6.842 |
| 0.335 | -0.13 | 0.748 | 6.862 |
| 0.355 | -0.14 | 0.726 | 6.884 |
| 0.377 | -0.15 | 0.708 | 6.902 |
| 0.398 | -0.16 | 0.687 | 6.923 |
| 0.422 | -0.18 | 0.667 | 6.943 |
| 0.447 | -0.19 | 0.645 | 6.965 |
| 0.473 | -0.20 | 0.627 | 6.983 |
| 0.501 | -0.22 | 0.604 | 7.006 |
| 0.531 | -0.23 | 0.584 | 7.026 |
| 0.562 | -0.25 | 0.562 | 7.048 |
| 0.596 | -0.26 | 0.544 | 7.066 |
| 0.631 | -0.28 | 0.523 | 7.087 |
| 0.668 | -0.30 | 0.501 | 7.109 |
| 0.708 | -0.32 | 0.482 | 7.128 |
| 0.750 | -0.33 | 0.464 | 7.146 |
| 0.794 | -0.35 | 0.444 | 7.166 |
| 0.841 | -0.37 | 0.425 | 7.185 |
| 0.891 | -0.39 | 0.403 | 7.207 |
| 0.944 | -0.41 | 0.388 | 7.222 |
| 1.000 | -0.43 | 0.371 | 7.239 |
| 1.060 | -0.45 | 0.354 | 7.256 |
| 1.120 | -0.47 | 0.339 | 7.271 |
| 1.190 | -0.49 | 0.323 | 7.287 |
| 1.260 | -0.51 | 0.311 | 7.299 |
| 1.330 | -0.53 | 0.297 | 7.313 |
| 1.411 | -0.54 | 0.286 | 7.324 |
| 1.500 | -0.57 | 0.272 | 7.338 |
| 1.580 | -0.58 | 0.262 | 7.348 |
| 1.680 | -0.60 | 0.250 | 7.360 |
| 1.780 | -0.62 | 0.238 | 7.372 |
| 1.880 | -0.64 | 0.229 | 7.381 |
| 1.990 | -0.65 | 0.222 | 7.388 |
| 2.112 | -0.66 | 0.217 | 7.393 |



Trex Properties, Charlotte NC
Hydraulic Conductivity (K) Calculation Worksheet
W&R Project No. 03130430.01

| | | | |
|---|---|---|---|
| Well: | PMW-10A (out) | Conducted by: | Fay |
| Test Date: | 1/27/2015 | Entered/date: | 02/05/15 |
| Test Type: | Recovery | Checked/date: | Bellis 2/17/15 |

## WELL DATA

| | | |
|---|---|---|
| SWL = | 7.61 | (ft BTOC) |
| WD = | 62.69 | (ft BTOC) |
| WD = | 63.00 | (ft BGS) |
| DTSP = | 50.69 | (ft BTOC) |
| rc = | 0.083 | (ft) |
| n = | 0.30 | |
| rw = | 0.33 | (ft) |
| rc (adjusted) = | 0.08 | (ft) |
| Le = | 12 | (ft) |
| Lw = | 55.08 | (ft) |
| Le/rw = | 36.36 | |
| H = | 75.00 | (ft) |

## CALCULATION OF K

K = [(rc^2 ln(Re/rw))/2Le]*(1/t)ln(yo/yt)

| | | |
|---|---|---|
| yo = | 1.172 | (ft) from plot |
| yt = | 0.327 | (ft) from plot |
| t = | 0.794 | (minutes) from plot |
| ln(Re/rw) = | 3.03 | |
| **K =** | **2.1E+00** | **(ft/day)** |
| **K =** | **7.4E-04** | **(cm/sec)** |

## TEST DATA

| Elapsed time (min) | Log y | y (ft) | WL (ft BTOC) |
|---|---|---|---|
| 0.000 | 0.07 | 1.172 | 8.782 |
| 0.008 | 0.07 | 1.164 | 8.774 |
| 0.012 | 0.06 | 1.155 | 8.765 |
| 0.016 | 0.06 | 1.146 | 8.756 |
| 0.019 | 0.05 | 1.135 | 8.745 |
| 0.023 | 0.05 | 1.127 | 8.737 |
| 0.027 | 0.05 | 1.119 | 8.729 |
| 0.030 | 0.05 | 1.111 | 8.721 |
| 0.034 | 0.04 | 1.100 | 8.710 |
| 0.038 | 0.04 | 1.091 | 8.701 |
| 0.046 | 0.03 | 1.082 | 8.692 |
| 0.050 | 0.02 | 1.056 | 8.666 |
| 0.053 | 0.03 | 1.061 | 8.671 |
| 0.057 | 0.02 | 1.052 | 8.662 |
| 0.061 | 0.02 | 1.050 | 8.660 |
| 0.064 | 0.02 | 1.045 | 8.655 |
| 0.068 | 0.01 | 1.035 | 8.645 |
| 0.072 | 0.01 | 1.028 | 8.638 |
| 0.075 | 0.01 | 1.020 | 8.630 |
| 0.079 | 0.00 | 1.007 | 8.617 |
| 0.087 | 0.00 | 1.001 | 8.611 |
| 0.091 | -0.01 | 0.982 | 8.592 |
| 0.095 | -0.01 | 0.979 | 8.589 |
| 0.098 | -0.01 | 0.973 | 8.583 |
| 0.102 | -0.02 | 0.965 | 8.575 |
| 0.111 | -0.02 | 0.950 | 8.560 |
| 0.114 | -0.02 | 0.947 | 8.557 |
| 0.119 | -0.03 | 0.941 | 8.551 |
| 0.130 | -0.03 | 0.930 | 8.540 |
| 0.134 | -0.04 | 0.915 | 8.525 |
| 0.141 | -0.04 | 0.902 | 8.512 |
| 0.150 | -0.05 | 0.891 | 8.501 |
| 0.158 | -0.06 | 0.876 | 8.486 |
| 0.170 | -0.06 | 0.862 | 8.472 |
| 0.178 | -0.07 | 0.844 | 8.454 |
| 0.190 | -0.08 | 0.834 | 8.444 |
| 0.199 | -0.09 | 0.816 | 8.426 |
| 0.211 | -0.10 | 0.792 | 8.402 |
| 0.224 | -0.11 | 0.783 | 8.393 |
| 0.237 | -0.12 | 0.762 | 8.372 |
| 0.251 | -0.13 | 0.738 | 8.348 |
| 0.266 | -0.14 | 0.726 | 8.336 |
| 0.282 | -0.15 | 0.708 | 8.318 |
| 0.298 | -0.16 | 0.688 | 8.298 |
| 0.316 | -0.17 | 0.671 | 8.281 |
| 0.335 | -0.19 | 0.649 | 8.259 |
| 0.355 | -0.20 | 0.629 | 8.239 |
| 0.376 | -0.22 | 0.609 | 8.219 |
| 0.398 | -0.23 | 0.588 | 8.198 |
| 0.422 | -0.25 | 0.566 | 8.176 |
| 0.447 | -0.27 | 0.542 | 8.152 |
| 0.473 | -0.28 | 0.521 | 8.131 |
| 0.501 | -0.30 | 0.501 | 8.111 |
| 0.531 | -0.32 | 0.482 | 8.092 |
| 0.564 | -0.34 | 0.456 | 8.066 |
| 0.596 | -0.36 | 0.434 | 8.044 |
| 0.631 | -0.38 | 0.414 | 8.024 |
| 0.668 | -0.41 | 0.391 | 8.001 |
| 0.710 | -0.43 | 0.368 | 7.978 |
| 0.750 | -0.46 | 0.349 | 7.959 |
| 0.794 | -0.49 | 0.327 | 7.937 |
| 0.841 | -0.51 | 0.307 | 7.917 |
| 0.891 | -0.54 | 0.287 | 7.897 |
| 0.944 | -0.57 | 0.268 | 7.878 |
| 1.000 | -0.60 | 0.250 | 7.860 |
| 1.060 | -0.64 | 0.230 | 7.840 |
| 1.120 | -0.67 | 0.215 | 7.825 |
| 1.190 | -0.71 | 0.195 | 7.805 |
| 1.260 | -0.74 | 0.180 | 7.790 |
| 1.330 | -0.78 | 0.166 | 7.776 |
| 1.411 | -0.82 | 0.153 | 7.763 |
| 1.500 | -0.88 | 0.133 | 7.743 |
| 1.580 | -0.91 | 0.122 | 7.732 |
| 1.680 | -0.96 | 0.109 | 7.719 |
| 1.780 | -1.00 | 0.099 | 7.709 |
| 1.880 | -1.03 | 0.093 | 7.703 |
| 1.990 | -1.06 | 0.088 | 7.698 |
| 2.112 | -1.10 | 0.079 | 7.689 |

## Calculation of ln(Re/rw)

Where: Lw < H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{A+Bln((H-Lw)/rw)}/(Le/rw)]^-1= 3.03

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 3.70

## Calculation of Coefficients

Value range for Le/rw from Table of Coefficients

| Le/rw | A | B | C |
|---|---|---|---|
| 30 | 2.5 | 0.35 | 2.1 |
| 40 | 2.75 | 0.45 | 2.45 |

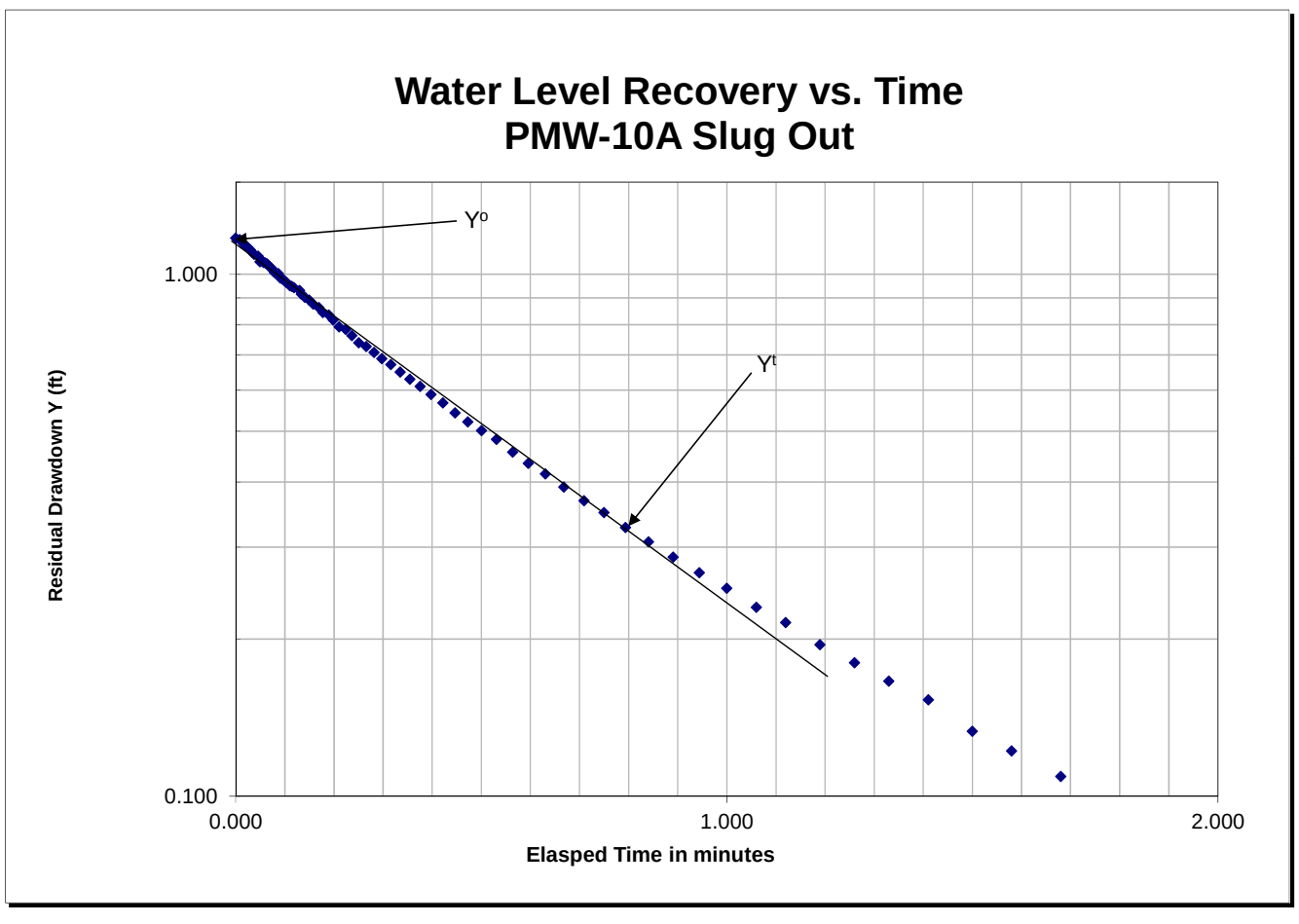
Interpolated values of A, B and C for Le/rw

| | | | |
|---|---|---|---|
| 36.36 | 2.66 | 0.41 | 2.32 |

Coefficients Table

| Le/rw | A | Le/rw | B | Le/rw | C |
|---|---|---|---|---|---|
| 4 | 1.75 | 4 | 0.25 | 4 | 0.75 |
| 5 | 1.76 | 5 | 0.25 | 5 | 0.85 |
| 6 | 1.77 | 6 | 0.25 | 6 | 0.90 |
| 7 | 1.80 | 7 | 0.25 | 7 | 1.00 |
| 8 | 1.83 | 8 | 0.25 | 8 | 1.10 |
| 9 | 1.90 | 9 | 0.25 | 9 | 1.20 |
| 10 | 1.95 | 10 | 0.25 | 10 | 1.30 |
| 15 | 2.10 | 15 | 0.27 | 15 | 1.50 |
| 20 | 2.23 | 20 | 0.29 | 20 | 1.75 |
| 25 | 2.40 | 25 | 0.31 | 25 | 1.90 |
| 30 | 2.50 | 30 | 0.35 | 30 | 2.10 |
| 40 | 2.75 | 40 | 0.45 | 40 | 2.45 |
| 50 | 3.00 | 50 | 0.50 | 50 | 2.70 |
| 60 | 3.45 | 60 | 0.52 | 60 | 3.00 |
| 70 | 3.70 | 70 | 0.60 | 70 | 3.40 |
| 80 | 3.90 | 80 | 0.65 | 80 | 3.60 |
| 90 | 4.20 | 90 | 0.70 | 90 | 3.85 |
| 100 | 4.50 | 100 | 0.75 | 100 | 4.20 |
| 150 | 5.45 | 150 | 0.98 | 150 | 5.70 |
| 200 | 6.10 | 200 | 1.20 | 200 | 7.00 |
| 250 | 6.70 | 250 | 1.30 | 250 | 8.00 |
| 300 | 7.10 | 300 | 1.50 | 300 | 8.80 |
| 400 | 7.75 | 400 | 1.90 | 400 | 9.90 |
| 500 | 8.20 | 500 | 2.20 | 500 | 10.60 |
| 600 | 8.50 | 600 | 2.33 | 600 | 11.10 |
| 700 | 8.70 | 700 | 2.50 | 700 | 11.50 |
| 800 | 8.90 | 800 | 2.70 | 800 | 11.80 |
| 900 | 9.00 | 900 | 2.75 | 900 | 12.00 |
| 1000 | 9.20 | 1000 | 2.83 | 1000 | 12.40 |
| 1500 | 9.50 | 1500 | 3.18 | 1500 | 12.90 |

Reference: Bouwer(1989), Bouwer and Rice(1976)



Trex Properties, Charlotte NC
Hydraulic Conductivity (K) Calculation Worksheet
W&R Project No. 03130430.01

| | | | |
|---|---|---|---|
| Well: | PMW-10B (in) | Conducted by: | Fay |
| Test Date: | 1/27/2015 | Entered/date: | 02/05/15 |
| Test Type: | Slug In | Checked/date: | Bellis 2/18/15 |

## WELL DATA

| | | |
|---|---|---|
| SWL = | 7.44 | (ft BTOC) |
| WD = | 72.68 | (ft BTOC) |
| WD = | 73.00 | (ft BGS) |
| DTSP = | 65.68 | (ft BTOC) |
| rc = | 0.083 | (ft) |
| n = | 0.30 | |
| rw = | 0.33 | (ft) |
| rc (adjusted) = | 0.08 | (ft) |
| Le = | 7 | (ft) |
| Lw = | 65.24 | (ft) |
| Le/rw = | 21.21 | |
| H = | 75.00 | (ft) |

## CALCULATION OF K

K = [(rc^2 ln(Re/rw))/2Le]*(1/t)ln(yo/yt)

| | | |
|---|---|---|
| yo = | 0.614 | (ft) from plot |
| yt = | 0.144 | (ft) from plot |
| t = | 0.996 | (minutes) from plot |
| ln(Re/rw) = | 2.78 | |
| **K =** | **2.9E+00** | **(ft/day)** |
| **K =** | **1.0E-03** | **(cm/sec)** |

## TEST DATA

| Elapsed time (min) | Log y | y (ft) | WL (ft BTOC) |
|---|---|---|---|
| 0.422 | 0.31 | 2.042 | 5.398 |
| 0.447 | 0.05 | 1.110 | 6.330 |
| 0.473 | 0.09 | 1.217 | 6.223 |
| 0.501 | 0.07 | 1.187 | 6.253 |
| 0.531 | -0.22 | 0.604 | 6.836 |
| 0.562 | -0.23 | 0.593 | 6.847 |
| 0.596 | -1.19 | 0.065 | 7.375 |
| 0.633 | -0.21 | 0.614 | 6.826 |
| 0.668 | -0.26 | 0.550 | 6.890 |
| 0.708 | -0.29 | 0.517 | 6.923 |
| 0.750 | -0.30 | 0.506 | 6.934 |
| 0.794 | -0.40 | 0.397 | 7.043 |
| 0.841 | -0.44 | 0.367 | 7.073 |
| 0.891 | -0.48 | 0.330 | 7.110 |
| 0.944 | -0.39 | 0.410 | 7.030 |
| 1.000 | -0.43 | 0.373 | 7.067 |
| 1.060 | -0.62 | 0.240 | 7.200 |
| 1.121 | -0.67 | 0.216 | 7.224 |
| 1.190 | -0.71 | 0.197 | 7.243 |
| 1.260 | -0.75 | 0.177 | 7.263 |
| 1.330 | -0.79 | 0.161 | 7.279 |
| 1.410 | -0.84 | 0.144 | 7.296 |
| 1.500 | -0.89 | 0.128 | 7.312 |
| 1.580 | -0.93 | 0.118 | 7.322 |
| 1.680 | -0.97 | 0.107 | 7.333 |
| 1.780 | -1.00 | 0.099 | 7.341 |
| 1.881 | -1.05 | 0.090 | 7.350 |
| 1.990 | -1.08 | 0.084 | 7.356 |
| 2.110 | -1.11 | 0.077 | 7.363 |
| 2.240 | -1.16 | 0.069 | 7.371 |
| 2.370 | -1.19 | 0.064 | 7.376 |
| 2.510 | -1.21 | 0.061 | 7.379 |
| 2.660 | -1.24 | 0.058 | 7.382 |
| 2.820 | -1.32 | 0.048 | 7.392 |
| 2.982 | -1.32 | 0.048 | 7.392 |
| 3.160 | -1.34 | 0.046 | 7.394 |
| 3.350 | -1.41 | 0.039 | 7.401 |
| 3.550 | -1.40 | 0.040 | 7.400 |
| 3.760 | -1.43 | 0.037 | 7.403 |
| 3.983 | -1.44 | 0.036 | 7.404 |
| 4.220 | -1.43 | 0.037 | 7.403 |
| 4.470 | -1.42 | 0.038 | 7.402 |
| 4.730 | -1.54 | 0.029 | 7.411 |
| 5.010 | -1.60 | 0.025 | 7.415 |
| 5.310 | -1.57 | 0.027 | 7.413 |
| 5.620 | -1.59 | 0.026 | 7.414 |
| 5.960 | -1.60 | 0.025 | 7.415 |
| 6.310 | -1.55 | 0.028 | 7.412 |
| 6.683 | -1.55 | 0.028 | 7.412 |
| 7.083 | -1.59 | 0.026 | 7.414 |
| 7.500 | -1.60 | 0.025 | 7.415 |
| 7.940 | -1.62 | 0.024 | 7.416 |
| 8.410 | -1.54 | 0.029 | 7.411 |
| 8.910 | -1.51 | 0.031 | 7.409 |
| 9.441 | -1.68 | 0.021 | 7.419 |
| 10.000 | -1.60 | 0.025 | 7.415 |
| 10.600 | -1.80 | 0.016 | 7.424 |
| 11.201 | -1.70 | 0.020 | 7.420 |
| 11.902 | -1.68 | 0.021 | 7.419 |
| 12.600 | -1.51 | 0.031 | 7.409 |

## Calculation of ln(Re/rw)

Where: Lw < H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{A+Bln((H-Lw)/rw)}/(Le/rw)]^-1= 2.78

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 3.45

## Calculation of Coefficients

Value range for Le/rw from Table of Coefficients

| Le/rw | A | B | C |
|---|---|---|---|
| 20 | 2.23 | 0.29 | 1.75 |
| 30 | 2.5 | 0.35 | 2.1 |

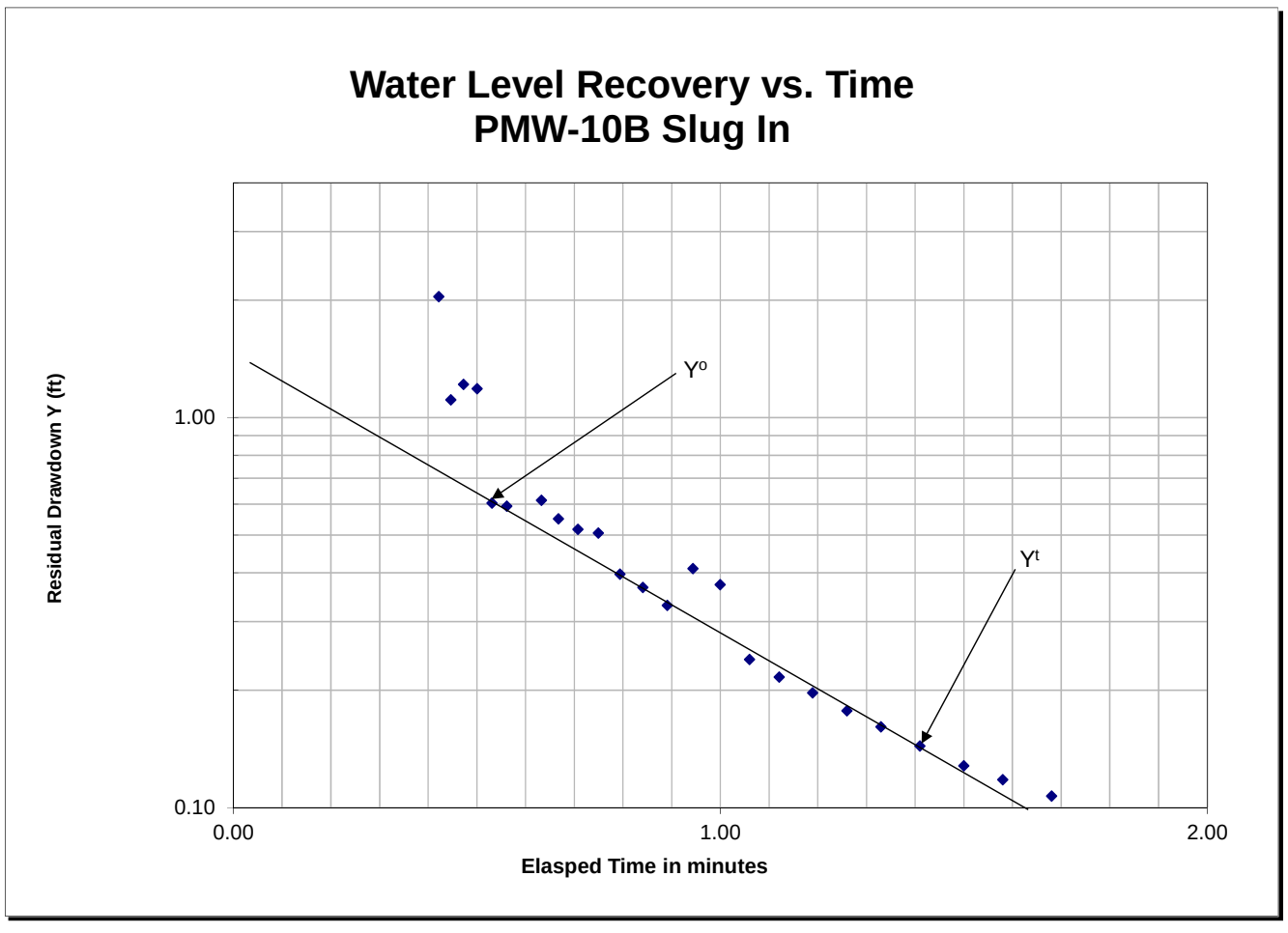
Interpolated values of A, B and C for Le/rw

| | | | |
|---|---|---|---|
| 21.21 | 2.26 | 0.30 | 1.79 |

Coefficients Table

| Le/rw | A | Le/rw | B | Le/rw | C |
|---|---|---|---|---|---|
| 4 | 1.75 | 4 | 0.25 | 4 | 0.75 |
| 5 | 1.76 | 5 | 0.25 | 5 | 0.85 |
| 6 | 1.77 | 6 | 0.25 | 6 | 0.90 |
| 7 | 1.80 | 7 | 0.25 | 7 | 1.00 |
| 8 | 1.83 | 8 | 0.25 | 8 | 1.10 |
| 9 | 1.90 | 9 | 0.25 | 9 | 1.20 |
| 10 | 1.95 | 10 | 0.25 | 10 | 1.30 |
| 15 | 2.10 | 15 | 0.27 | 15 | 1.50 |
| 20 | 2.23 | 20 | 0.29 | 20 | 1.75 |
| 25 | 2.40 | 25 | 0.31 | 25 | 1.90 |
| 30 | 2.50 | 30 | 0.35 | 30 | 2.10 |
| 40 | 2.75 | 40 | 0.45 | 40 | 2.45 |
| 50 | 3.00 | 50 | 0.50 | 50 | 2.70 |
| 60 | 3.45 | 60 | 0.52 | 60 | 3.00 |
| 70 | 3.70 | 70 | 0.60 | 70 | 3.40 |
| 80 | 3.90 | 80 | 0.65 | 80 | 3.60 |
| 90 | 4.20 | 90 | 0.70 | 90 | 3.85 |
| 100 | 4.50 | 100 | 0.75 | 100 | 4.20 |
| 150 | 5.45 | 150 | 0.98 | 150 | 5.70 |
| 200 | 6.10 | 200 | 1.20 | 200 | 7.00 |
| 250 | 6.70 | 250 | 1.30 | 250 | 8.00 |
| 300 | 7.10 | 300 | 1.50 | 300 | 8.80 |
| 400 | 7.75 | 400 | 1.90 | 400 | 9.90 |
| 500 | 8.20 | 500 | 2.20 | 500 | 10.60 |
| 600 | 8.50 | 600 | 2.33 | 600 | 11.10 |
| 700 | 8.70 | 700 | 2.50 | 700 | 11.50 |
| 800 | 8.90 | 800 | 2.70 | 800 | 11.80 |
| 900 | 9.00 | 900 | 2.75 | 900 | 12.00 |
| 1000 | 9.20 | 1000 | 2.83 | 1000 | 12.40 |
| 1500 | 9.50 | 1500 | 3.18 | 1500 | 12.90 |

Reference: Bouwer(1989), Bouwer and Rice(1976)



Trex Properties, Charlotte NC
Hydraulic Conductivity (K) Calculation Worksheet
W&R Project No. 03130430.01

| | | | |
|---|---|---|---|
| Well: | PMW-10B (out) | Conducted by: | Fay |
| Test Date: | 1/27/2015 | Entered/date: | 02/05/15 |
| Test Type: | Recovery | Checked/date: | Bellis 2/18/15 |

## WELL DATA

| | | |
|---|---|---|
| SWL = | 7.44 | (ft BTOC) |
| WD = | 72.68 | (ft BTOC) |
| WD = | 73.00 | (ft BGS) |
| DTSP = | 65.68 | (ft BTOC) |
| rc = | 0.083 | (ft) |
| n = | 0.30 | |
| rw = | 0.33 | (ft) |
| rc (adjusted) = | 0.08 | (ft) |
| Le = | 7 | (ft) |
| Lw = | 65.24 | (ft) |
| Le/rw = | 21.21 | |
| H = | 75.00 | (ft) |

## CALCULATION OF K

K = [(rc^2 ln(Re/rw))/2Le]*(1/t)ln(yo/yt)

| | | |
|---|---|---|
| yo = | 0.729 | (ft) from plot |
| yt = | 0.351 | (ft) from plot |
| t = | 0.266 | (minutes) from plot |
| ln(Re/rw) = | 2.78 | |
| **K =** | **5.5E+00** | **(ft/day)** |
| **K =** | **2.0E-03** | **(cm/sec)** |

### Calculation of ln(Re/rw)

Where: Lw < H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{A+Bln((H-Lw)/rw)}/(Le/rw)]^-1= 2.78

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 3.45

### Calculation of Coefficients

Value range for Le/rw from Table of Coefficients

| Le/rw | A | B | C |
|---|---|---|---|
| 20 | 2.23 | 0.29 | 1.75 |
| 30 | 2.5 | 0.35 | 2.1 |

Interpolated values of A, B and C for Le/rw

| | | | |
|---|---|---|---|
| 21.21 | 2.26 | 0.30 | 1.79 |

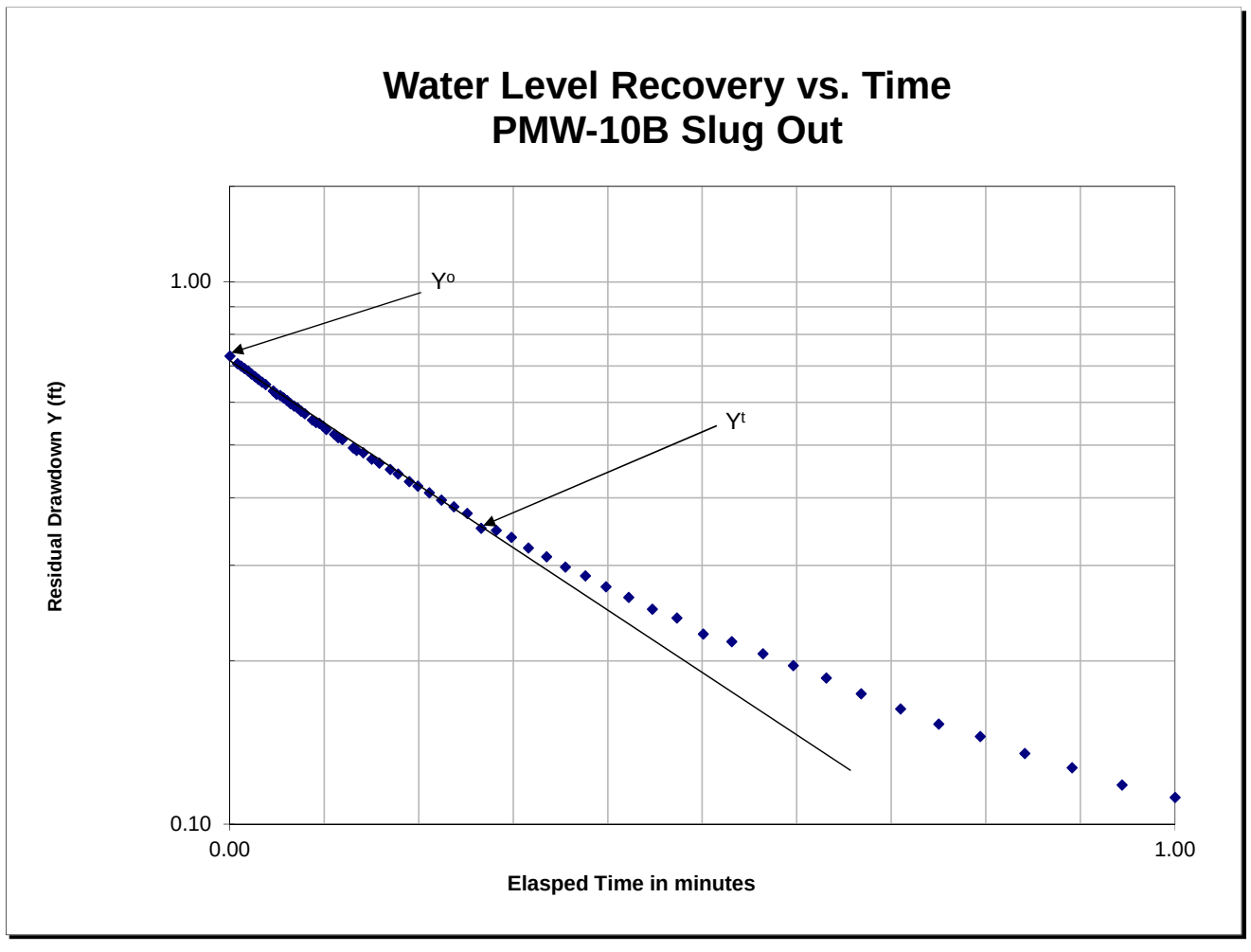
### Coefficients Table

| Le/rw | A | Le/rw | B | Le/rw | C |
|---|---|---|---|---|---|
| 4 | 1.75 | 4 | 0.25 | 4 | 0.75 |
| 5 | 1.76 | 5 | 0.25 | 5 | 0.85 |
| 6 | 1.77 | 6 | 0.25 | 6 | 0.90 |
| 7 | 1.80 | 7 | 0.25 | 7 | 1.00 |
| 8 | 1.83 | 8 | 0.25 | 8 | 1.10 |
| 9 | 1.90 | 9 | 0.25 | 9 | 1.20 |
| 10 | 1.95 | 10 | 0.25 | 10 | 1.30 |
| 15 | 2.10 | 15 | 0.27 | 15 | 1.50 |
| 20 | 2.23 | 20 | 0.29 | 20 | 1.75 |
| 25 | 2.40 | 25 | 0.31 | 25 | 1.90 |
| 30 | 2.50 | 30 | 0.35 | 30 | 2.10 |
| 40 | 2.75 | 40 | 0.45 | 40 | 2.45 |
| 50 | 3.00 | 50 | 0.50 | 50 | 2.70 |
| 60 | 3.45 | 60 | 0.52 | 60 | 3.00 |
| 70 | 3.70 | 70 | 0.60 | 70 | 3.40 |
| 80 | 3.90 | 80 | 0.65 | 80 | 3.60 |
| 90 | 4.20 | 90 | 0.70 | 90 | 3.85 |
| 100 | 4.50 | 100 | 0.75 | 100 | 4.20 |
| 150 | 5.45 | 150 | 0.98 | 150 | 5.70 |
| 200 | 6.10 | 200 | 1.20 | 200 | 7.00 |
| 250 | 6.70 | 250 | 1.30 | 250 | 8.00 |
| 300 | 7.10 | 300 | 1.50 | 300 | 8.80 |
| 400 | 7.75 | 400 | 1.90 | 400 | 9.90 |
| 500 | 8.20 | 500 | 2.20 | 500 | 10.60 |
| 600 | 8.50 | 600 | 2.33 | 600 | 11.10 |
| 700 | 8.70 | 700 | 2.50 | 700 | 11.50 |
| 800 | 8.90 | 800 | 2.70 | 800 | 11.80 |
| 900 | 9.00 | 900 | 2.75 | 900 | 12.00 |
| 1000 | 9.20 | 1000 | 2.83 | 1000 | 12.40 |
| 1500 | 9.50 | 1500 | 3.18 | 1500 | 12.90 |

Reference: Bouwer(1989), Bouwer and Rice(1976)

## TEST DATA

| Elapsed time (min) | Log y | y (ft) | WL (ft BTOC) |
|---|---|---|---|
| 0.000 | -0.14 | 0.729 | 8.169 |
| 0.008 | -0.15 | 0.706 | 8.146 |
| 0.012 | -0.16 | 0.699 | 8.139 |
| 0.016 | -0.16 | 0.692 | 8.132 |
| 0.019 | -0.16 | 0.685 | 8.125 |
| 0.023 | -0.17 | 0.676 | 8.116 |
| 0.027 | -0.18 | 0.668 | 8.108 |
| 0.030 | -0.18 | 0.661 | 8.101 |
| 0.034 | -0.19 | 0.653 | 8.093 |
| 0.038 | -0.19 | 0.646 | 8.086 |
| 0.046 | -0.20 | 0.629 | 8.069 |
| 0.050 | -0.21 | 0.620 | 8.060 |
| 0.053 | -0.21 | 0.617 | 8.057 |
| 0.057 | -0.21 | 0.611 | 8.051 |
| 0.061 | -0.22 | 0.604 | 8.044 |
| 0.064 | -0.22 | 0.596 | 8.036 |
| 0.068 | -0.23 | 0.590 | 8.030 |
| 0.072 | -0.23 | 0.585 | 8.025 |
| 0.075 | -0.24 | 0.577 | 8.017 |
| 0.079 | -0.24 | 0.571 | 8.011 |
| 0.087 | -0.25 | 0.556 | 7.996 |
| 0.091 | -0.26 | 0.550 | 7.990 |
| 0.095 | -0.26 | 0.548 | 7.988 |
| 0.098 | -0.27 | 0.542 | 7.982 |
| 0.102 | -0.27 | 0.534 | 7.974 |
| 0.111 | -0.28 | 0.523 | 7.963 |
| 0.114 | -0.29 | 0.516 | 7.956 |
| 0.119 | -0.29 | 0.512 | 7.952 |
| 0.130 | -0.31 | 0.494 | 7.934 |
| 0.134 | -0.31 | 0.489 | 7.929 |
| 0.141 | -0.32 | 0.484 | 7.924 |
| 0.150 | -0.33 | 0.471 | 7.911 |
| 0.158 | -0.33 | 0.463 | 7.903 |
| 0.170 | -0.35 | 0.451 | 7.891 |
| 0.178 | -0.35 | 0.442 | 7.882 |
| 0.190 | -0.37 | 0.428 | 7.868 |
| 0.199 | -0.38 | 0.420 | 7.860 |
| 0.211 | -0.39 | 0.408 | 7.848 |
| 0.224 | -0.40 | 0.396 | 7.836 |
| 0.237 | -0.41 | 0.385 | 7.825 |
| 0.251 | -0.43 | 0.374 | 7.814 |
| 0.266 | -0.45 | 0.351 | 7.791 |
| 0.282 | -0.46 | 0.348 | 7.788 |
| 0.298 | -0.47 | 0.338 | 7.778 |
| 0.316 | -0.49 | 0.323 | 7.763 |
| 0.335 | -0.51 | 0.311 | 7.751 |
| 0.355 | -0.53 | 0.298 | 7.738 |
| 0.376 | -0.54 | 0.287 | 7.727 |
| 0.398 | -0.56 | 0.274 | 7.714 |
| 0.422 | -0.58 | 0.262 | 7.702 |
| 0.447 | -0.60 | 0.249 | 7.689 |
| 0.473 | -0.62 | 0.240 | 7.680 |
| 0.501 | -0.65 | 0.224 | 7.664 |
| 0.531 | -0.66 | 0.217 | 7.657 |
| 0.564 | -0.69 | 0.206 | 7.646 |
| 0.596 | -0.71 | 0.196 | 7.636 |
| 0.631 | -0.73 | 0.186 | 7.626 |
| 0.668 | -0.76 | 0.174 | 7.614 |
| 0.710 | -0.79 | 0.163 | 7.603 |
| 0.750 | -0.82 | 0.153 | 7.593 |
| 0.794 | -0.84 | 0.145 | 7.585 |
| 0.841 | -0.87 | 0.135 | 7.575 |
| 0.891 | -0.90 | 0.127 | 7.567 |
| 0.944 | -0.93 | 0.118 | 7.558 |
| 1.000 | -0.95 | 0.112 | 7.552 |
| 1.060 | -0.98 | 0.104 | 7.544 |
| 1.120 | -1.00 | 0.101 | 7.541 |
| 1.190 | -1.04 | 0.092 | 7.532 |
| 1.260 | -1.07 | 0.086 | 7.526 |
| 1.330 | -1.10 | 0.079 | 7.519 |
| 1.411 | -1.12 | 0.075 | 7.515 |
| 1.500 | -1.17 | 0.068 | 7.508 |
| 1.580 | -1.20 | 0.063 | 7.503 |
| 1.680 | -1.23 | 0.059 | 7.499 |
| 1.780 | -1.25 | 0.056 | 7.496 |
| 1.880 | -1.30 | 0.050 | 7.490 |
| 1.990 | -1.30 | 0.050 | 7.490 |
| 2.112 | -1.34 | 0.046 | 7.486 |



Trex Properties, Charlotte NC
Hydraulic Conductivity (K) Calculation Worksheet
W&R Project No. 03130430.01

| | | | |
|---|---|---|---|
| Well: | PMW-13B (in) | Conducted by: | Fay |
| Test Date: | 1/27/2015 | Entered/date: | 02/05/15 |
| Test Type: | Slug In | Checked/date: | Bellis 2/18/15 |

## WELL DATA

| | | |
|---|---|---|
| SWL = | 8.61 | (ft BTOC) |
| WD = | 102.72 | (ft BTOC) |
| WD = | 103.00 | (ft BGS) |
| DTSP = | 95.72 | (ft BTOC) |
| rc = | 0.083 | (ft) |
| n = | 0.30 | |
| rw = | 0.33 | (ft) |
| rc (adjusted) = | 0.08 | (ft) |
| Le = | 7 | (ft) |
| Lw = | 94.11 | (ft) |
| Le/rw = | 21.21 | |
| H = | 150.00 | (ft) |

## CALCULATION OF K

K = [(rc^2 ln(Re/rw))/2Le]*(1/t)ln(yo/yt)

| | | |
|---|---|---|
| yo = | 1.650 | (ft) from plot |
| yt = | 0.460 | (ft) from plot |
| t = | 60.000 | (minutes) from plot |
| ln(Re/rw) = | 2.70 | |
| **K =** | **4.0E-02** | **(ft/day)** |
| **K =** | **1.4E-05** | **(cm/sec)** |

## TEST DATA

| Elapsed time (min) | Log y | y (ft) | WL (ft BTOC) |
|---|---|---|---|
| 0.250 | 0.22 | 1.650 | 6.96 |
| 0.500 | 0.21 | 1.640 | 6.97 |
| 0.750 | 0.21 | 1.620 | 6.99 |
| 1.000 | 0.21 | 1.610 | 7.00 |
| 1.250 | 0.20 | 1.600 | 7.01 |
| 1.500 | 0.20 | 1.600 | 7.01 |
| 2.000 | 0.20 | 1.580 | 7.03 |
| 2.500 | 0.19 | 1.560 | 7.05 |
| 3.000 | 0.19 | 1.550 | 7.06 |
| 3.500 | 0.18 | 1.530 | 7.08 |
| 4.000 | 0.18 | 1.520 | 7.09 |
| 4.500 | 0.18 | 1.510 | 7.10 |
| 5.000 | 0.17 | 1.490 | 7.12 |
| 6.000 | 0.16 | 1.460 | 7.15 |
| 7.000 | 0.15 | 1.420 | 7.19 |
| 8.000 | 0.14 | 1.390 | 7.22 |
| 9.000 | 0.13 | 1.360 | 7.25 |
| 10.000 | 0.12 | 1.330 | 7.28 |
| 12.000 | 0.11 | 1.280 | 7.33 |
| 14.000 | 0.09 | 1.220 | 7.39 |
| 16.000 | 0.07 | 1.180 | 7.43 |
| 18.000 | 0.05 | 1.120 | 7.49 |
| 20.000 | 0.04 | 1.090 | 7.52 |
| 25.000 | 0.00 | 0.990 | 7.62 |
| 30.000 | -0.05 | 0.890 | 7.72 |
| 40.000 | -0.14 | 0.720 | 7.89 |
| 50.000 | -0.24 | 0.580 | 8.03 |
| 60.000 | -0.34 | 0.460 | 8.15 |
| 90.000 | -0.66 | 0.220 | 8.39 |
| 118.000 | -0.96 | 0.110 | 8.50 |

Calculation of ln(Re/rw)

Where: Lw < H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{A+Bln((H-Lw)/rw)}/(Le/rw)]^-1= 2.70

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 3.70

Calculation of Coefficients
Value range for Le/rw from Table of Coefficients

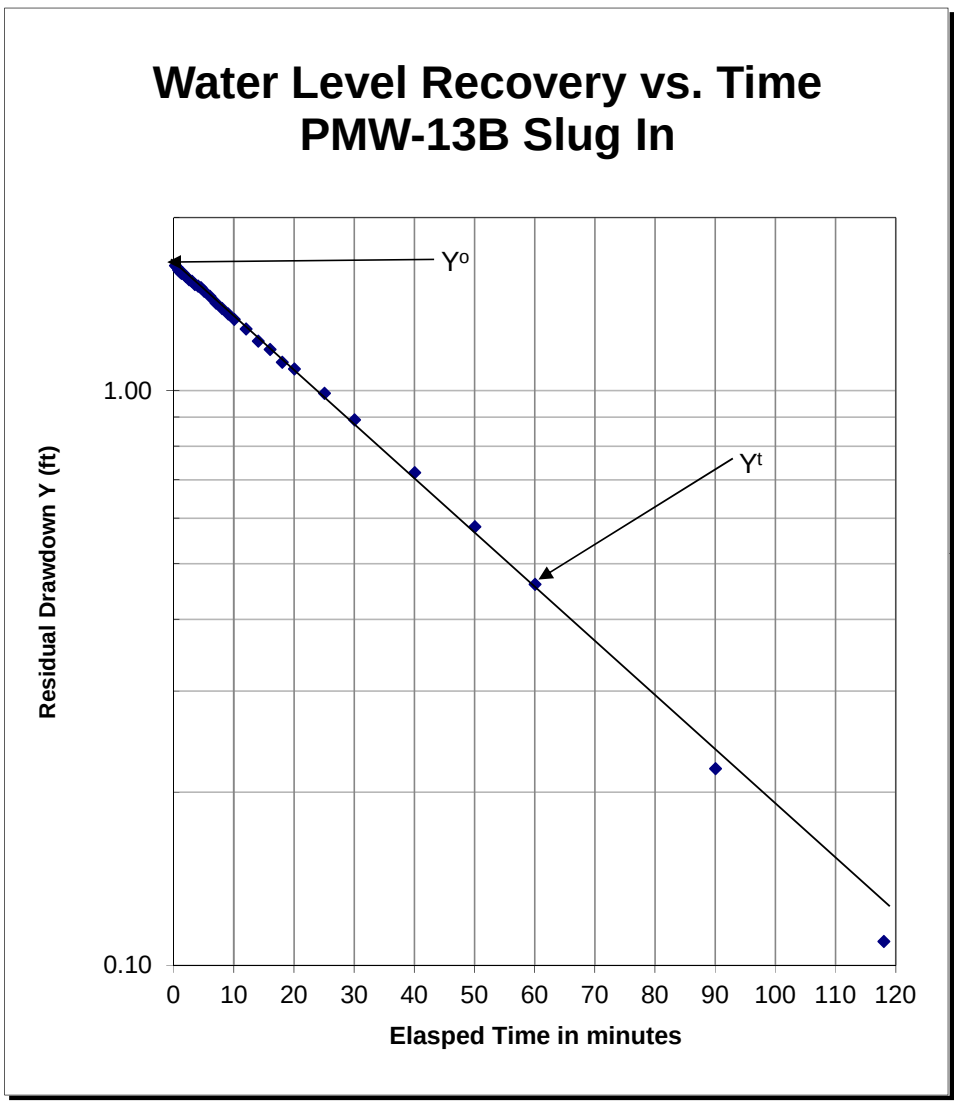
| Le/rw | A | B | C |
|---|---|---|---|
| 20 | 2.23 | 0.29 | 1.75 |
| 30 | 2.5 | 0.35 | 2.1 |

Interpolated values of A, B and C for Le/rw

| | | | |
|---|---|---|---|
| 21.21 | 2.26 | 0.30 | 1.79 |

Coefficients Table

| Le/rw | A | Le/rw | B | Le/rw | C |
|---|---|---|---|---|---|
| 4 | 1.75 | 4 | 0.25 | 4 | 0.75 |
| 5 | 1.76 | 5 | 0.25 | 5 | 0.85 |
| 6 | 1.77 | 6 | 0.25 | 6 | 0.90 |
| 7 | 1.80 | 7 | 0.25 | 7 | 1.00 |
| 8 | 1.83 | 8 | 0.25 | 8 | 1.10 |
| 9 | 1.90 | 9 | 0.25 | 9 | 1.20 |
| 10 | 1.95 | 10 | 0.25 | 10 | 1.30 |
| 15 | 2.10 | 15 | 0.27 | 15 | 1.50 |
| 20 | 2.23 | 20 | 0.29 | 20 | 1.75 |
| 25 | 2.40 | 25 | 0.31 | 25 | 1.90 |
| 30 | 2.50 | 30 | 0.35 | 30 | 2.10 |
| 40 | 2.75 | 40 | 0.45 | 40 | 2.45 |
| 50 | 3.00 | 50 | 0.50 | 50 | 2.70 |
| 60 | 3.45 | 60 | 0.52 | 60 | 3.00 |
| 70 | 3.70 | 70 | 0.60 | 70 | 3.40 |
| 80 | 3.90 | 80 | 0.65 | 80 | 3.60 |
| 90 | 4.20 | 90 | 0.70 | 90 | 3.85 |
| 100 | 4.50 | 100 | 0.75 | 100 | 4.20 |
| 150 | 5.45 | 150 | 0.98 | 150 | 5.70 |
| 200 | 6.10 | 200 | 1.20 | 200 | 7.00 |
| 250 | 6.70 | 250 | 1.30 | 250 | 8.00 |
| 300 | 7.10 | 300 | 1.50 | 300 | 8.80 |
| 400 | 7.75 | 400 | 1.90 | 400 | 9.90 |
| 500 | 8.20 | 500 | 2.20 | 500 | 10.60 |
| 600 | 8.50 | 600 | 2.33 | 600 | 11.10 |
| 700 | 8.70 | 700 | 2.50 | 700 | 11.50 |
| 800 | 8.90 | 800 | 2.70 | 800 | 11.80 |
| 900 | 9.00 | 900 | 2.75 | 900 | 12.00 |
| 1000 | 9.20 | 1000 | 2.83 | 1000 | 12.40 |
| 1500 | 9.50 | 1500 | 3.18 | 1500 | 12.90 |




Reference: Bouwer(1989), Bouwer and Rice(1976)

Trex Properties, Charlotte NC
Hydraulic Conductivity (K) Calculation Worksheet
W&R Project No. 03130430.01

| | | | |
|---|---|---|---|
| Well: | PMW-13B (out) | Conducted by: | Fay |
| Test Date: | 1/27/2015 | Entered/date: | 02/05/15 |
| Test Type: | Recovery | Checked/date: | Bellis 2/18/15 |

## WELL DATA

| | | |
|---|---|---|
| SWL = | 8.61 | (ft BTOC) |
| WD = | 102.72 | (ft BTOC) |
| WD = | 103.00 | (ft BGS) |
| DTSP = | 95.72 | (ft BTOC) |
| rc = | 0.083 | (ft) |
| n = | 0.30 | |
| rw = | 0.33 | (ft) |
| rc (adjusted) = | 0.08 | (ft) |
| Le = | 7 | (ft) |
| Lw = | 94.11 | (ft) |
| Le/rw = | 21.21 | |
| H = | 150.00 | (ft) |

## CALCULATION OF K

K = [(rc^2 ln(Re/rw))/2Le]*(1/t)ln(yo/yt)

| | | |
|---|---|---|
| yo = | 1.600 | (ft) from plot |
| yt = | 0.810 | (ft) from plot |
| t = | 60.000 | (minutes) from plot |
| ln(Re/rw) = | 2.70 | |
| **K =** | **2.1E-02** | **(ft/day)** |
| **K =** | **7.5E-06** | **(cm/sec)** |

## TEST DATA

| Elapsed time (min) | Log y | y (ft) | WL (ft BTOC) |
|---|---|---|---|
| 0.25 | 0.20 | 1.600 | 10.21 |
| 0.50 | 0.20 | 1.590 | 10.20 |
| 0.75 | 0.20 | 1.580 | 10.19 |
| 1.00 | 0.20 | 1.580 | 10.19 |
| 1.25 | 0.20 | 1.570 | 10.18 |
| 1.50 | 0.19 | 1.560 | 10.17 |
| 1.75 | 0.19 | 1.560 | 10.17 |
| 2.00 | 0.19 | 1.550 | 10.16 |
| 2.50 | 0.19 | 1.540 | 10.15 |
| 3.00 | 0.19 | 1.540 | 10.15 |
| 3.50 | 0.18 | 1.530 | 10.14 |
| 4.00 | 0.18 | 1.520 | 10.13 |
| 4.50 | 0.18 | 1.510 | 10.12 |
| 5.00 | 0.18 | 1.500 | 10.11 |
| 6.00 | 0.17 | 1.490 | 10.10 |
| 7.00 | 0.17 | 1.480 | 10.09 |
| 8.00 | 0.16 | 1.460 | 10.07 |
| 9.00 | 0.16 | 1.440 | 10.05 |
| 10.00 | 0.15 | 1.420 | 10.03 |
| 12.00 | 0.14 | 1.390 | 10.00 |
| 14.00 | 0.13 | 1.350 | 9.96 |
| 16.00 | 0.12 | 1.310 | 9.92 |
| 18.00 | 0.11 | 1.280 | 9.89 |
| 20.00 | 0.09 | 1.240 | 9.85 |
| 25.00 | 0.08 | 1.200 | 9.81 |
| 30.00 | 0.05 | 1.120 | 9.73 |
| 40.00 | 0.00 | 1.000 | 9.61 |
| 50.00 | -0.05 | 0.900 | 9.51 |
| 60.00 | -0.09 | 0.810 | 9.42 |
| 90.00 | -0.24 | 0.580 | 9.19 |

Calculation of ln(Re/rw)

Where: Lw < H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{A+Bln((H-Lw)/rw)}/(Le/rw)]^-1= 2.70

Where: Lw = H;

ln(Re/rw) = [{1.1/(ln(Lw/rw))}+{C/(Le/rw)}]^-1 = 3.70

Calculation of Coefficients
Value range for Le/rw from Table of Coefficients

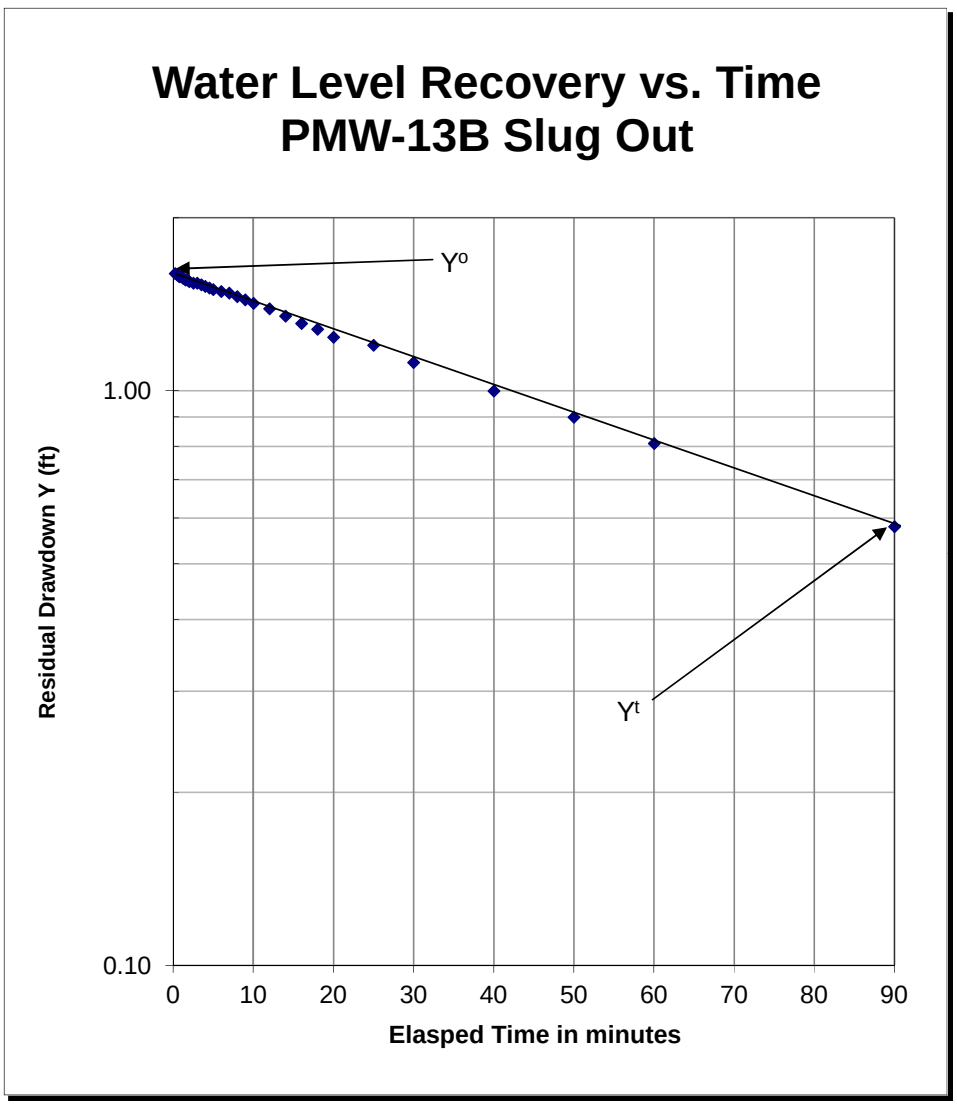
| Le/rw | A | B | C |
|---|---|---|---|
| 20 | 2.23 | 0.29 | 1.75 |
| 30 | 2.5 | 0.35 | 2.1 |

Interpolated values of A, B and C for Le/rw

| | | | |
|---|---|---|---|
| 21.21 | 2.26 | 0.30 | 1.79 |

Coefficients Table

| Le/rw | A | Le/rw | B | Le/rw | C |
|---|---|---|---|---|---|
| 4 | 1.75 | 4 | 0.25 | 4 | 0.75 |
| 5 | 1.76 | 5 | 0.25 | 5 | 0.85 |
| 6 | 1.77 | 6 | 0.25 | 6 | 0.90 |
| 7 | 1.80 | 7 | 0.25 | 7 | 1.00 |
| 8 | 1.83 | 8 | 0.25 | 8 | 1.10 |
| 9 | 1.90 | 9 | 0.25 | 9 | 1.20 |
| 10 | 1.95 | 10 | 0.25 | 10 | 1.30 |
| 15 | 2.10 | 15 | 0.27 | 15 | 1.50 |
| 20 | 2.23 | 20 | 0.29 | 20 | 1.75 |
| 25 | 2.40 | 25 | 0.31 | 25 | 1.90 |
| 30 | 2.50 | 30 | 0.35 | 30 | 2.10 |
| 40 | 2.75 | 40 | 0.45 | 40 | 2.45 |
| 50 | 3.00 | 50 | 0.50 | 50 | 2.70 |
| 60 | 3.45 | 60 | 0.52 | 60 | 3.00 |
| 70 | 3.70 | 70 | 0.60 | 70 | 3.40 |
| 80 | 3.90 | 80 | 0.65 | 80 | 3.60 |
| 90 | 4.20 | 90 | 0.70 | 90 | 3.85 |
| 100 | 4.50 | 100 | 0.75 | 100 | 4.20 |
| 150 | 5.45 | 150 | 0.98 | 150 | 5.70 |
| 200 | 6.10 | 200 | 1.20 | 200 | 7.00 |
| 250 | 6.70 | 250 | 1.30 | 250 | 8.00 |
| 300 | 7.10 | 300 | 1.50 | 300 | 8.80 |
| 400 | 7.75 | 400 | 1.90 | 400 | 9.90 |
| 500 | 8.20 | 500 | 2.20 | 500 | 10.60 |
| 600 | 8.50 | 600 | 2.33 | 600 | 11.10 |
| 700 | 8.70 | 700 | 2.50 | 700 | 11.50 |
| 800 | 8.90 | 800 | 2.70 | 800 | 11.80 |
| 900 | 9.00 | 900 | 2.75 | 900 | 12.00 |
| 1000 | 9.20 | 1000 | 2.83 | 1000 | 12.40 |
| 1500 | 9.50 | 1500 | 3.18 | 1500 | 12.90 |

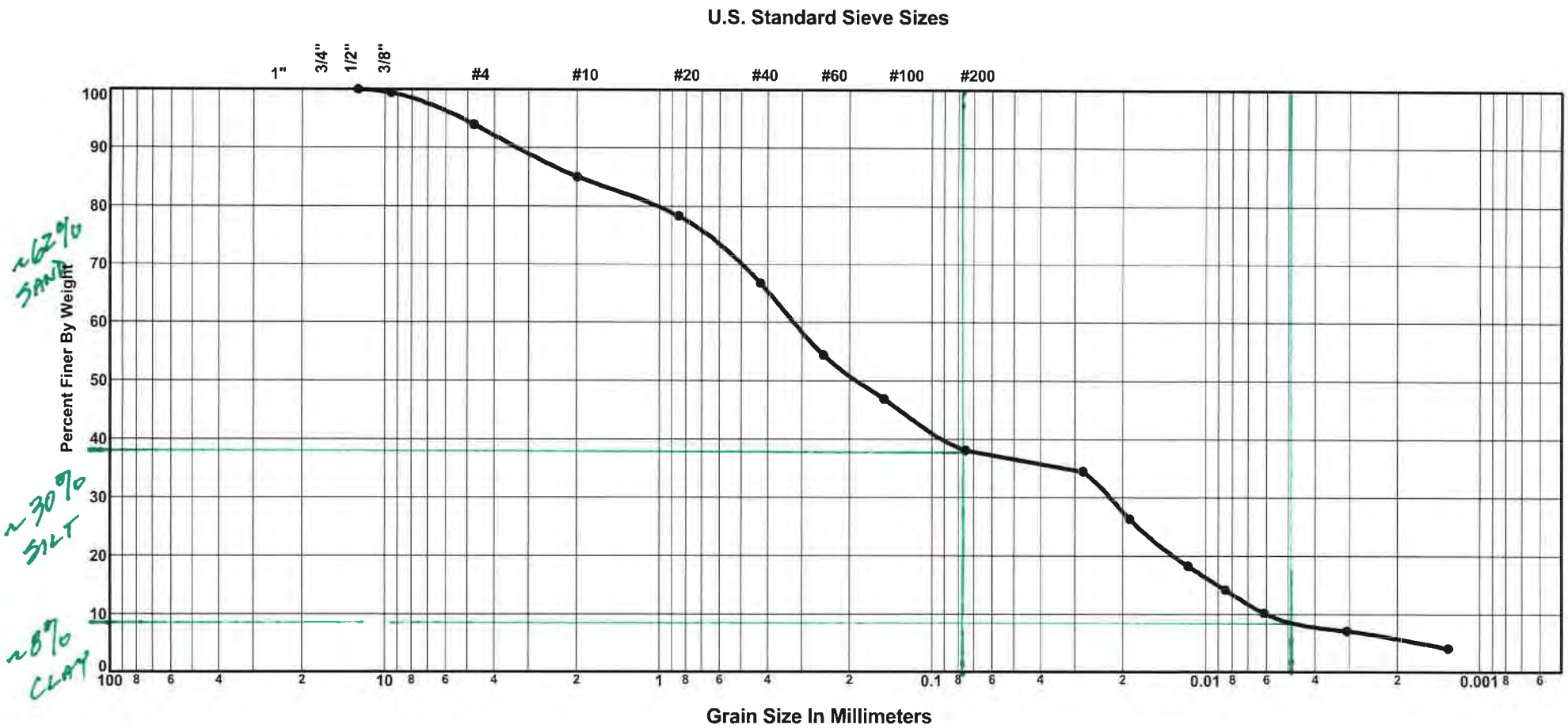



Reference: Bouwer(1989), Bouwer and Rice(1976)

## Table 7: Summary of Hydraulic Conductivity Test Results
### Trex Properties: 3114 and 3124 Cullman Avenue, Charlotte, NC
### W&R Project No. 03130430.01

| Well ID | Portion of Aquifer Tested | Test Type | Hydraulic Conductivity (ft/day) | Hydraulic Conductivity (cm/sec) |
|---|---|---|---|---|
| PMW-1A | Saprolite | Slug-in | 4.2 | 1.5E-03 |
| | | Slug-out | 4.3 | 1.5E-03 |
| PMW-10A | Saprolite | Slug-in | 1.4 | 5.0E-04 |
| | | Slug-out | 2.1 | 7.4E-04 |
| *Avg K for Saprolite Portion of Aquifer* | | | ***3.0*** | ***1.1E-03*** |
| PMW-1B | PWR | Slug-in | 1.3 | 4.6E-04 |
| | | Slug-out | 1.3 | 4.5E-04 |
| PMW-10B | PWR | Slug-in | 2.9 | 1.0E-03 |
| | | Slug-out | 5.5 | 2.0E-03 |
| *Avg K for PWR Portion of Aquifer* | | | ***2.8*** | ***9.8E-04*** |
| PMW-13B | Bedrock | Slug-in | 0.04 | 1.4E-05 |
| | | Slug-out | 0.02 | 7.5E-06 |
| *Avg K for Bedrock Portion of Aquifer* | | | ***0.03*** | ***1.1E-05*** |

Notes:
1. ft/day = feet per day
2. cm/sec = centimeters per second
3. Avg K = average hydraulic conductivity
4. PWR = partially weathered rock
5. Test data and hydraulic conductivity calculation are included in Appendix C of Phase III RFI Report




| GRAVEL | | SAND | | | FINES | |
|---|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | SILT SIZES | CLAY SIZES |

| Boring No. | Elev./Depth | Nat. W.C. | L.L. | P.L. | P.I. | Soil Description or Classification |
|---|---|---|---|---|---|---|
| OW-2 | 5.0-15.0' | | | | | Brown Slightly Clayey Silty Coarse to Fine Sand |

**Project:**

Trox Property
Charlotte, NC

**Job No.:** 1-16-0206-CA

**Date:** 3/10/16

Date Recieved: 3/2/2016

Dates Tested: 3/2-3/10/16

## GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.

3200 Wellington Court, Suite 108
Raleigh, NC 27615

TREX PROPERTIES, CHARLOTTE, NC

FROM GRAINSIZE ANALYSIS OF SATURATED SOIL SAMPLE (5 TO 15') FROM OW-2 (TEMP WELL) INSTALLED FOR THE CLEAN WATER INJECTION PILOT TEST, SAMPLE CONTAINED:

~62% SAND
~30% SILT
~8% CLAY

THIS SHOULD EQUATE TO A SPECIFIC YIELD OR EFFECTIVE POROSITY OF ~20%

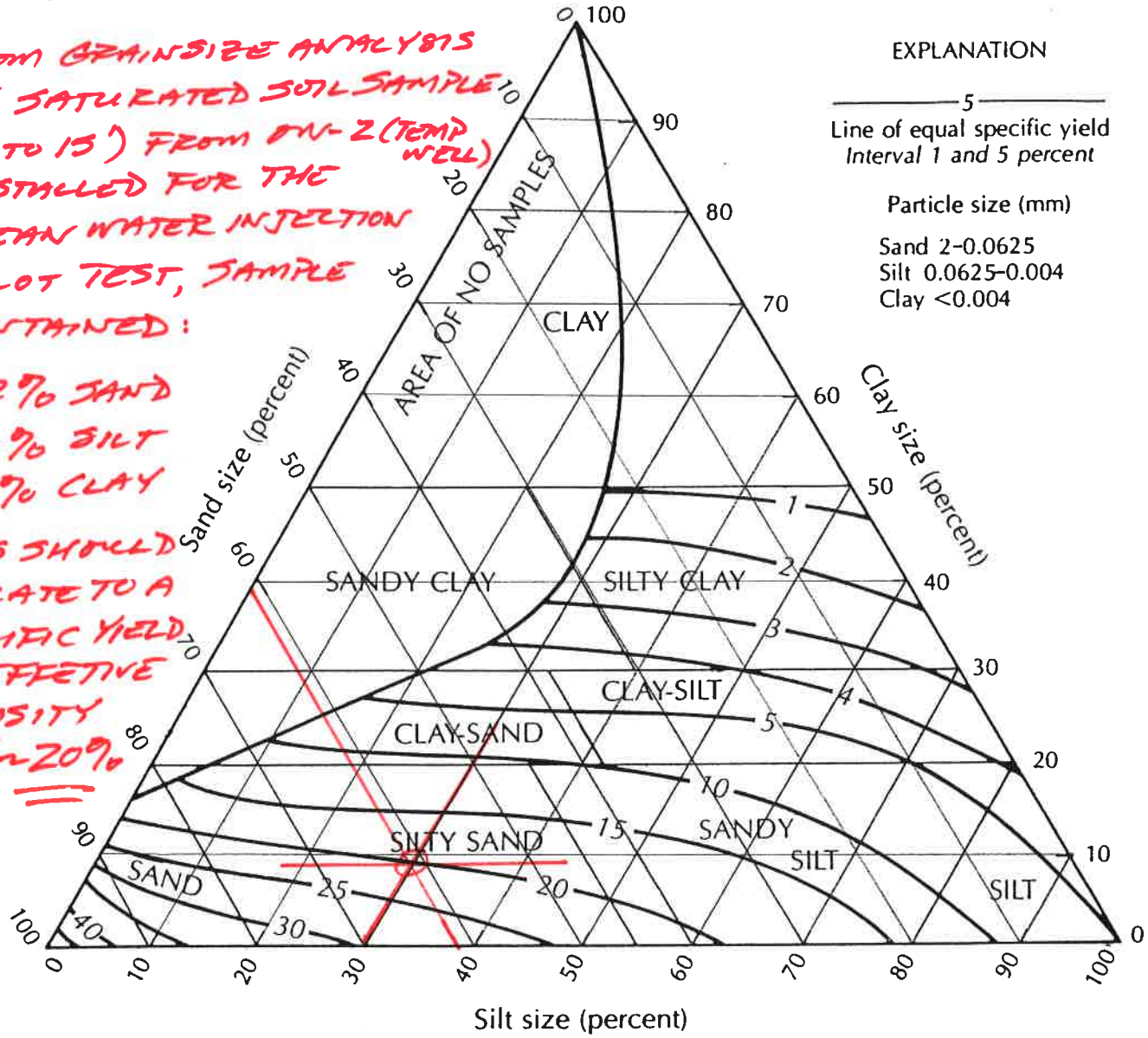



**FIGURE 4.8.** Textural classification triangle for unconsolidated materials showing the relation between particle size and specific yield. SOURCE: A. I. Johnson, U.S. Geological Survey Water Supply Paper 1662-D, 1967.


JOHNSON, A. I. *Specific Yield—Compilation of Specific Yields for Various Materials.* U.S. Geological Survey Water Supply Paper 1662-D, 1967, 74 pp.


Source: Fetter, C.W., Jr., 1980, Applied Hydrogeology, Charles E. Merril Publishing Company, Columbus Ohio, 488p.

## 1.1 Groundwater Flow Direction and Gradient

According to the groundwater elevation contours for the shallower portion of the surficial aquifer shown in Figure 4 of Attachment 2A, the direction of groundwater flow is to the north and northwest, towards Little Sugar Creek. The horizontal hydraulic gradient between the south side of the Trex Property and Little Sugar Creek is approximately 0.01 ft/ft (5 ft of groundwater elevation change over an approximately 500 ft flow path).

## 1.2 Groundwater Flow Rate

According to Fetter, 1980 the groundwater seepage velocity or flow rate is equal to the hydraulic conductivity of the aquifer times the horizontal hydraulic gradient, divided by the effective porosity. Using an average hydraulic conductivity of 3 ft/day and an effective porosity of 0.20 (discussed in Attachment 2E), and a horizontal hydraulic gradient of 0.01 ft/ft, the groundwater flow rate within the surficial aquifer should be approximately 0.15 ft/day, or about 55 ft/yr.

# DISCHARGE MEASUREMENT FIELD DATA SHEET

WITHERS & RAVENEL

ENGINEERS | PLANNERS SURVEYORS

10185279 TRCX SITE

TYPE OF TEST CLEAN $H_2O$ INJECTION WELL NO. MW-5

FLOW METER TYPE AND I.D.: MASTER METER INITIAL FLOW METER READING 0000825.6 (GALLONS)

PRESSURE GAGE IDENTIFICATION NUMBER: ASHCROFT 0-100 psi

FINAL FLOW METER READING _____ (GALLONS)

| DATE | TIME | ELAPSED TIME (MIN.) | FLOW METER READING (GALLONS) | FLOW RATE (GPM) | DATA COLLECTED BY | GAGE PRESSURE |
|---|---|---|---|---|---|---|
| 3/9/16 | 1130 | 0 | 832.8 | ~2gpm | BAB | 2.5 |
| | 1135 | 5 | 843.5 | ~2gpm | | 6psi |
| | 1140 | 10 | 854.1 | ~2gpm | | 6psi |
| | 1145 | 15 | 864.9 | > 2gpm | | 6psi |
| | | END | 2 GPM | TEST | | |
| 3/9/16 | 1225 | 0 | 905.2 | ~5gpm | BAB | 40psi valve |
| | 1230 | 5 | 921.5 | ~3gpm | | ~20psi |
| | 1240 | 10 | 948.1 | ~3gpm | / | ~20psi valve daylighting |
| | | End | 3-5gp | | | |
| 3/9/16 | 1300 | 0 | ~~949.9~~ 949.3 | ~1.75 | BAB | 28psi Backpressure from valve |
| | 1305 | 5 | ~~957.8~~ 957.8 | ~1.75 | | 30psi |
| | 1310 | 10 | 967.3 | ~2 | | 30psi |
| | 1315 | 15 | 976.7 | ~1.75 | | 30 |
| | 1320 | 20 | 985.5 | ~1.80 | | 28 |
| | 1325 | 25 | 994.2 | 1.80 | | 29 |
| | 1330 | 30 | 1,002.9 | 1.80 | | 28 |

End of 1.75 gpm test

DATA CALCULATIONS CHECKED BY: _____

SITE MANAGER OR DESIGNATED REPRESENTATIVE REVIEW: _____ DATE: _____

# WITHERS & RAVENEL

ENGINEERS | PLANNERS | SURVEYORS

MW-5 SWL = 4.71 BTOC

INITIAL 4.79 BTOC

## WATER-LEVEL DRAWDOWN or RECOVERY TEST DATA FORM
(For Manual Readings)

Date: 3/9/16
Test Type (DD or REC):
Project Name:
Measured by:

Well ID: OW-1
Pre-Test Static WL BTOC: 4.80
Well Depth BTOC: ~~39'~~ 34'
Page: 1 of

| Clock Time (Military) | Elapsed Time (Hrs:Min:Sec) | Elapsed Time (If different) | WL (ft BTOC) | WL Change (WL-SWL) |
|---|---|---|---|---|
| 11:30:30 | Start of test | | 4.60 | |
| 11:35.00 | 0:00:15 | | 2.09 | |
| 11:39:15 | 0:00:30 | | 1.88 | |
| 11:44:30 ~~40:00~~ | 0:00:45 | | ~~2.18~~ 1.85 | ← End 2gpm |
| 4 | 0:01:00 | | ? | |
| 12.25:30 | 0:01:15 | | 2.00 | |
| ~~48:00~~ | 0:01:30 | | ~~4.92~~ | |
| 12:30:30 | 0:01:45 | | out | |
| 12:34:30 | 0:02:00 | | capped | |
| | 0:02:30 | | | ← End 1235 |
| | 0:03:00 | | | ← start @ 1300 (4.58) |
| 00:15 | 0:03:30 | | 4.29 | |
| 04:30 | 0:04:00 | | 0.690 | |
| 08:15 | 0:04:30 | | 0.88 | |
| 12:30 | 0:05:00 | | 0.50 | |
| 16:15 | 0:06:00 | | 0.46 | |
| 26:00 | 0:07:00 | | 0.72 | |
| 30:00 | 0:08:00 | | 0.83 | |
| | 0:09:00 | | | |
| | 0:10:00 | | | |
| | 0:12:00 | | | |
| | 0:14:00 | | | |
| | 0:16:00 | | | |
| | 0:18:00 | | | |
| | 0:20:00 | | | |
| | 0:25:00 | | | |
| | 0:30:00 | | | |
| | 0:40:00 | | | |
| | 0:50:00 | | | |
| | 1:00:00 | | | |
| | 2:00:00 | | | |
| | 3:00:00 | | | |
| | 4:00:00 | | | |
| | 5:00:00 | | | |
| | 6:00:00 | | | |

Test Type (DD or Rec):
Weather:

Notes: *Measure water level to nearest 1/100th foot below top of well casing (BTOC)*

**WITHERS & RAVENEL**

ENGINEERS | PLANNERS | SURVEYORS

***WATER-LEVEL DRAWDOWN or RECOVERY TEST DATA FORM***
***(For Manual Readings)***

Date:
Test Type (DD or REC):
Project Name:
Measured by:

Well ID: OW-2 INITIAL 4.65' BTOC
Pre-Test Static WL BTOC: 4.66
Well Depth BTOC: 39'
Page: 1 of

| Clock Time (Military) | Elapsed Time (Hrs:Min:Sec) | Elapsed Time (If different) | WL (ft BTOC) | WL Change (WL-SWL) |
|---|---|---|---|---|
| 11:31:15 | Start of test | | 3.18 | |
| 11:35:30 | 0:00:15 | | 2.31 | |
| 11:40:00 | 0:00:30 | | 2.15 | |
| 11:45:00 | 0:00:45 | | 2.15 | ← End 2gpm |
| 45 | 0:01:00 | | | |
| 12:26:00 | 0:01:15 | | Coming out to | |
| 12:31:00 | 0:01:30 | | few inches | |
| 12:34:45 | 0:01:45 | | TOC | |
| | 0:02:00 | | | ← End 12:35 |
| | 0:02:30 | | | ← start @ 1300 |
| 01:00 | 0:03:00 | | 3.27 | |
| 05:00 | 0:03:30 | | 0.94 | |
| 09:00 | 0:04:00 | | 0.92 | |
| 13:00 | 0:04:30 | | 0.91 | |
| 17:00 | 0:05:00 | | 0.78 | |
| 25:30 | 0:06:00 | | 2.03 | |
| 30:15 | 0:07:00 | | 2.10 | |
| | 0:08:00 | | | |
| | 0:09:00 | | | |
| | 0:10:00 | | | |
| | 0:12:00 | | | |
| | 0:14:00 | | | |
| | 0:16:00 | | | |
| | 0:18:00 | | | |
| | 0:20:00 | | | |
| | 0:25:00 | | | |
| | 0:30:00 | | | |
| | 0:40:00 | | | |
| | 0:50:00 | | | |
| | 1:00:00 | | | |
| | 2:00:00 | | | |
| | 3:00:00 | | | |
| | 4:00:00 | | | |
| | 5:00:00 | | | |
| | 6:00:00 | | | |

Test Type (DD or Rec):
Weather:

Notes: *Measure water level to nearest 1/100th foot below top of well casing (BTOC)*

# WITHERS & RAVENEL

ENGINEERS | PLANNERS | SURVEYORS

## *WATER-LEVEL DRAWDOWN or RECOVERY TEST DATA FORM*
*(For Manual Readings)*

Date:
Test Type (DD or REC):
Project Name:
Measured by:

Well ID: DW-3
Pre-Test Static WL BTOC: 4.60
Well Depth BTOC: 39'
Page: 1 of

INITIAL 4.58' BTOC

| Clock Time (Military) | Elapsed Time (Hrs:Min:Sec) | Elapsed Time (If different) | WL (ft BTOC) | WL Change (WL-SWL) |
|---|---|---|---|---|
| 11:32:00 | Start of test | | 4.29 | |
| 11:36:15 | 0:00:15 | | 3.65 | |
| 11:40:45 | 0:00:30 | | 3.85 | |
| 11:45:45 | 0:00:45 | | 3.83 | ← END 2gpm |
| ~~46:30~~ | 0:01:00 | | ~~3.58~~ | |
| 12:36:30 | 0:01:15 | | 3.88 | |
| 12:33:00 | 0:01:30 | | 3.30 | |
| 12:35:00 | 0:01:45 | | 3.14 | |
| | 0:02:00 | | | ← End 12:35 |
| | 0:02:30 | | | - start @ 1300 |
| 01:45 | 0:03:00 | | 4.17 | |
| 05:30 | 0:03:30 | | 3.77 | |
| 09:45 | 0:04:00 | | 3.69 | |
| 13:30 | 0:04:30 | | 3.63 | |
| 18:00 | 0:05:00 | | 3.58 | |
| 27:30 | 0:06:00 | | 3.59 | |
| 31:15 | 0:07:00 | | 3.60 | |
| | 0:08:00 | | | |
| | 0:09:00 | | | |
| | 0:10:00 | | | |
| | 0:12:00 | | | |
| | 0:14:00 | | | |
| | 0:16:00 | | | |
| | 0:18:00 | | | |
| | 0:20:00 | | | |
| | 0:25:00 | | | |
| | 0:30:00 | | | |
| | 0:40:00 | | | |
| | 0:50:00 | | | |
| | 1:00:00 | | | |
| | 2:00:00 | | | |
| | 3:00:00 | | | |
| | 4:00:00 | | | |
| | 5:00:00 | | | |
| | 6:00:00 | | | |

Test Type (DD or Rec):
Weather:

Notes: *Measure water level to nearest 1/100th foot below top of well casing (BTOC)*

# WITHERS & RAVENEL

ENGINEERS | PLANNERS | SURVEYORS

## *WATER-LEVEL DRAWDOWN or RECOVERY TEST DATA FORM*
*(For Manual Readings)*

Date:
Test Type (DD or REC):
Project Name:
Measured by:

Well ID: OW-4
Pre-Test Static WL BTOC: 4.80
Well Depth BTOC: 39'
Page: 1 of

INITIAL 4.85' BTOC

| Clock Time (Military) | Elapsed Time (Hrs:Min:Sec) | Elapsed Time (If different) | WL (ft BTOC) | WL Change (WL-SWL) |
|---|---|---|---|---|
| 11:38:30 | Start of test | | 4.68 | |
| 11:36:00 | 0:00:15 | | 4.47 | |
| 42:15 11:38 | 0:00:30 | | 3.85 | 4.35 |
| 11:46:15 | 0:00:45 | | 4.36 | ← END 26gpm |
| ~~28:00~~ | 0:01:00 | | | |
| 12:28:00 | 0:01:15 | | 4.32 | |
| 12:33:45 | 0:01:30 | | 4.03 | |
| 12:36:30 | 0:01:45 | | 3.89 | |
| | 0:02:00 | | | ← End 12:33 |
| | 0:02:30 | | | → start @ 1300 |
| 02:30 | 0:03:00 | | 4.53 | |
| 06:30 | 0:03:30 | | 4.32 | |
| 09:30 | 0:04:00 | | 4.23 | |
| 15:00 | 0:04:30 | | 4.15 | |
| 18:30 | 0:05:00 | | 4.10 | |
| 28:00 | 0:06:00 | | 4.08 | |
| 32:00 | 0:07:00 | | 4.09 | |
| | 0:08:00 | | | |
| | 0:09:00 | | | |
| | 0:10:00 | | | |
| | 0:12:00 | | | |
| | 0:14:00 | | | |
| | 0:16:00 | | | |
| | 0:18:00 | | | |
| | 0:20:00 | | | |
| | 0:25:00 | | | |
| | 0:30:00 | | | |
| | 0:40:00 | | | |
| | 0:50:00 | | | |
| | 1:00:00 | | | |
| | 2:00:00 | | | |
| | 3:00:00 | | | |
| | 4:00:00 | | | |
| | 5:00:00 | | | |
| | 6:00:00 | | | |

Test Type (DD or Rec):
Weather:

Notes: *Measure water level to nearest 1/100th foot below top of well casing (BTOC)*

**WITHERS & RAVENEL**

ENGINEERS | PLANNERS | SURVEYORS

***WATER-LEVEL DRAWDOWN or RECOVERY TEST DATA FORM***
***(For Manual Readings)***

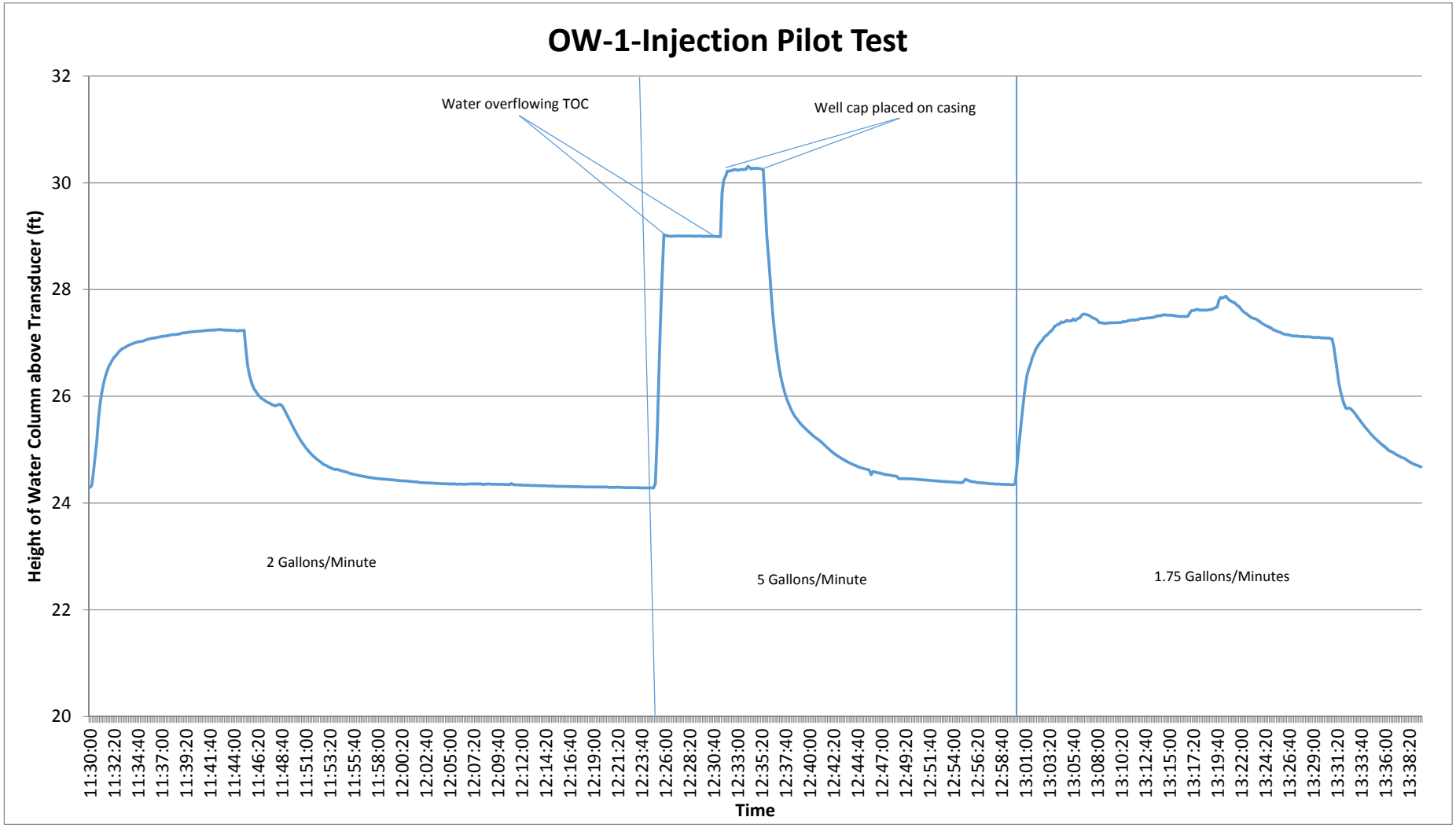
Date:
Test Type (DD or REC):
Project Name:
Measured by:

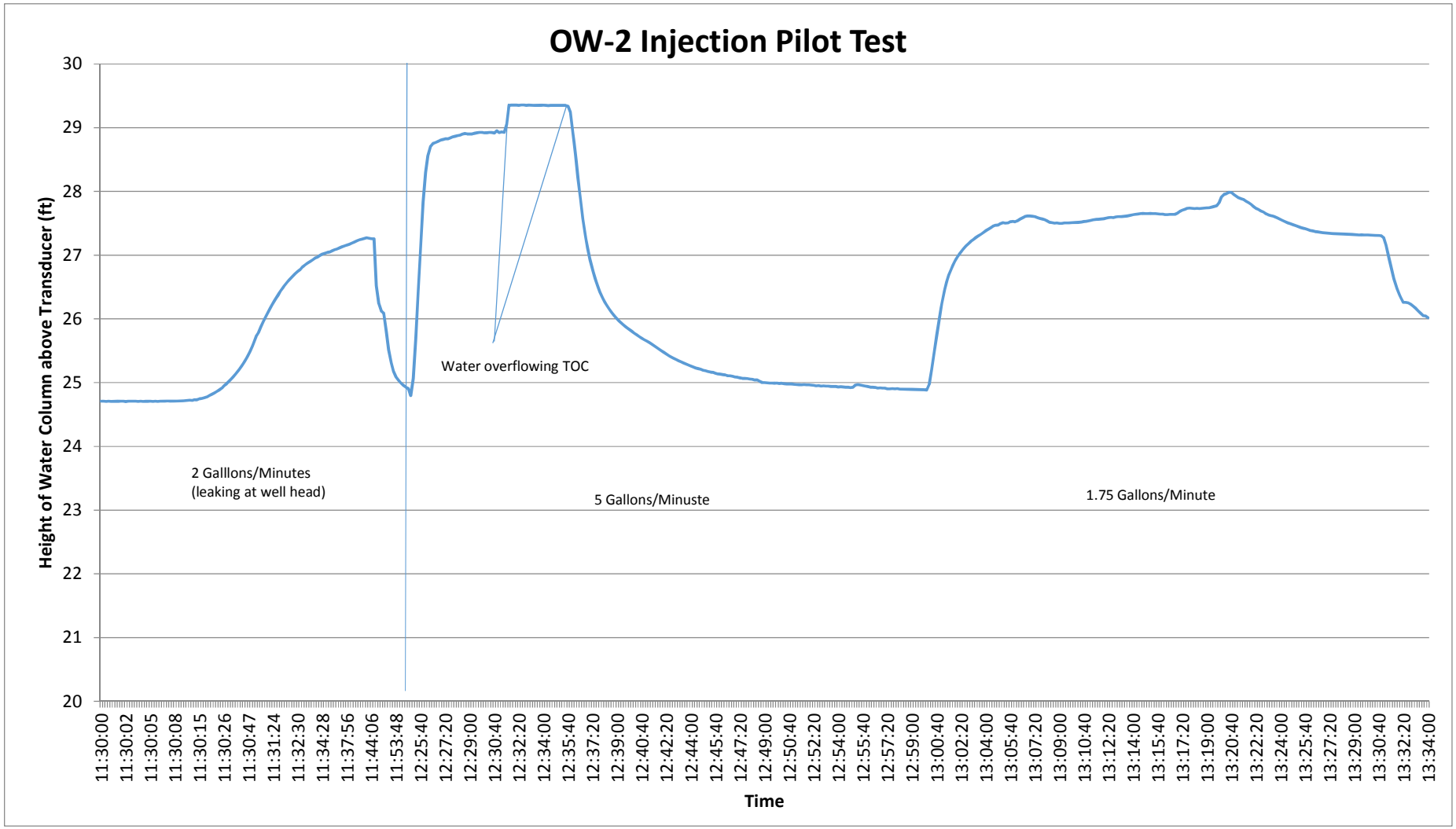
Well ID: MW-6 INITIAL 5.20' BTOC
Pre-Test Static WL BTOC: 5.24
Well Depth BTOC: 39'
Page: 1 of

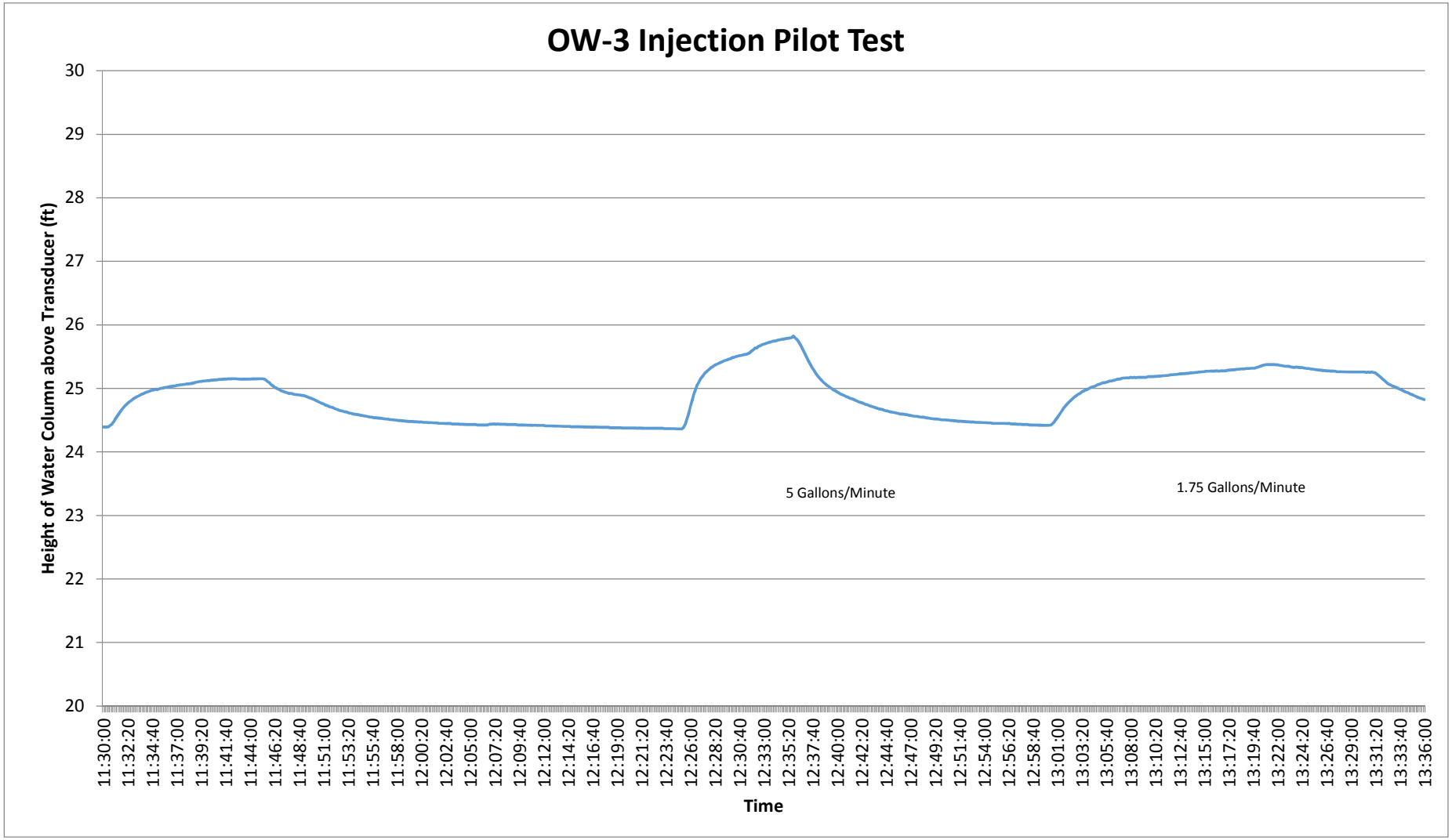
| Clock Time (Military) | Elapsed Time (Hrs:Min:Sec) | Elapsed Time (If different) | WL (ft BTOC) | WL Change (WL-SWL) |
|---|---|---|---|---|
| 11:35:30 | Start of test | | 5.27 | |
| 11:36:45 | 0:00:15 | | 5.24 | |
| 11:43:15 | 0:00:30 | | 5.23 | |
| 11:47:00 | 0:00:45 | | 5.21 | ← End 2gpm |
| | 0:01:00 | | | |
| 12:29:00 | 0:01:15 | | 5.21 | |
| 12:34:00 | 0:01:30 | | 5.18 | |
| 12:37:30 | 0:01:45 | | 5.14 | |
| | 0:02:00 | | | ← End 12:35 |
| | 0:02:30 | | | → Start @ 1300 |
| 03:30 | 0:03:00 | | 5.15 | |
| 07:15 | 0:03:30 | | 5.17 | |
| 10:00 | 0:04:00 | | 5.16 | |
| 15:00 | 0:04:30 | | 5.13 | |
| 19:30 | 0:05:00 | | 5.12 | |
| 29:00 | 0:06:00 | | 5.08 | |
| 32:30 | 0:07:00 | | 5.10 | |
| | 0:08:00 | | | |
| | 0:09:00 | | | |
| | 0:10:00 | | | |
| | 0:12:00 | | | |
| | 0:14:00 | | | |
| | 0:16:00 | | | |
| | 0:18:00 | | | |
| | 0:20:00 | | | |
| | 0:25:00 | | | |
| | 0:30:00 | | | |
| | 0:40:00 | | | |
| | 0:50:00 | | | |
| | 1:00:00 | | | |
| | 2:00:00 | | | |
| | 3:00:00 | | | |
| | 4:00:00 | | | |
| | 5:00:00 | | | |
| | 6:00:00 | | | |

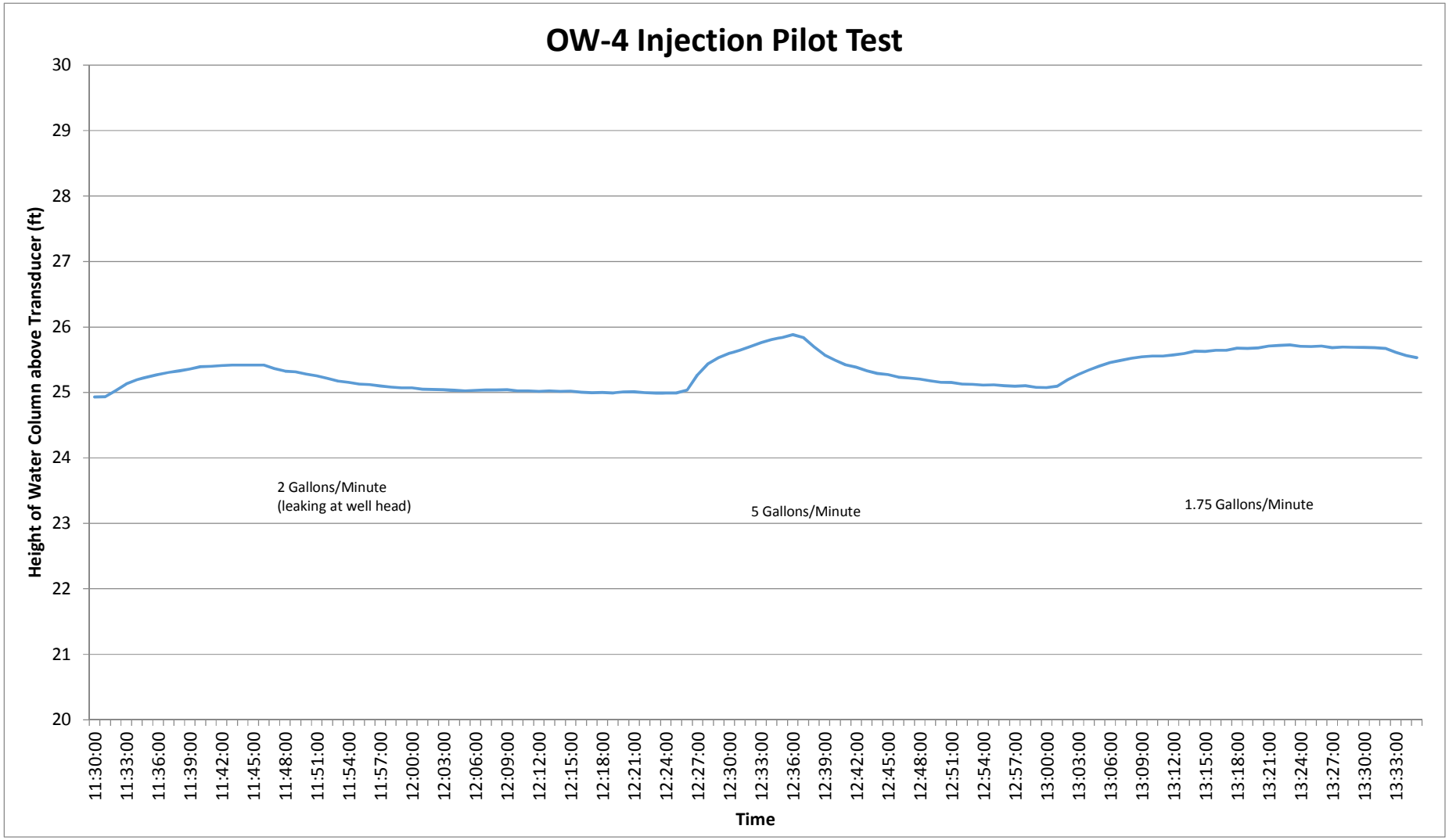
Test Type (DD or Rec):
Weather:

Notes: *Measure water level to nearest 1/100th foot below top of well casing (BTOC)*


OW-1-Injection Pilot Test
Height of Water Column above Transducer (ft)
32
30
28
26
24
22
20
Water overflowing TOC
Well cap placed on casing
2 Gallons/Minute
5 Gallons/Minute
1.75 Gallons/Minutes
11:30:00
11:32:20
11:34:40
11:37:00
11:39:20
11:41:40
11:44:00
11:46:20
11:48:40
11:51:00
11:53:20
11:55:40
11:58:00
12:00:20
12:02:40
12:05:00
12:07:20
12:09:40
12:12:00
12:14:20
12:16:40
12:19:00
12:21:20
12:23:40
12:26:00
12:28:20
12:30:40
12:33:00
12:35:20
12:37:40
12:40:00
12:42:20
12:44:40
12:47:00
12:49:20
12:51:40
12:54:00
12:56:20
12:58:40
13:01:00
13:03:20
13:05:40
13:08:00
13:10:20
13:12:40
13:15:00
13:17:20
13:19:40
13:22:00
13:24:20
13:26:40
13:29:00
13:31:20
13:33:40
13:36:00
13:38:20
Time

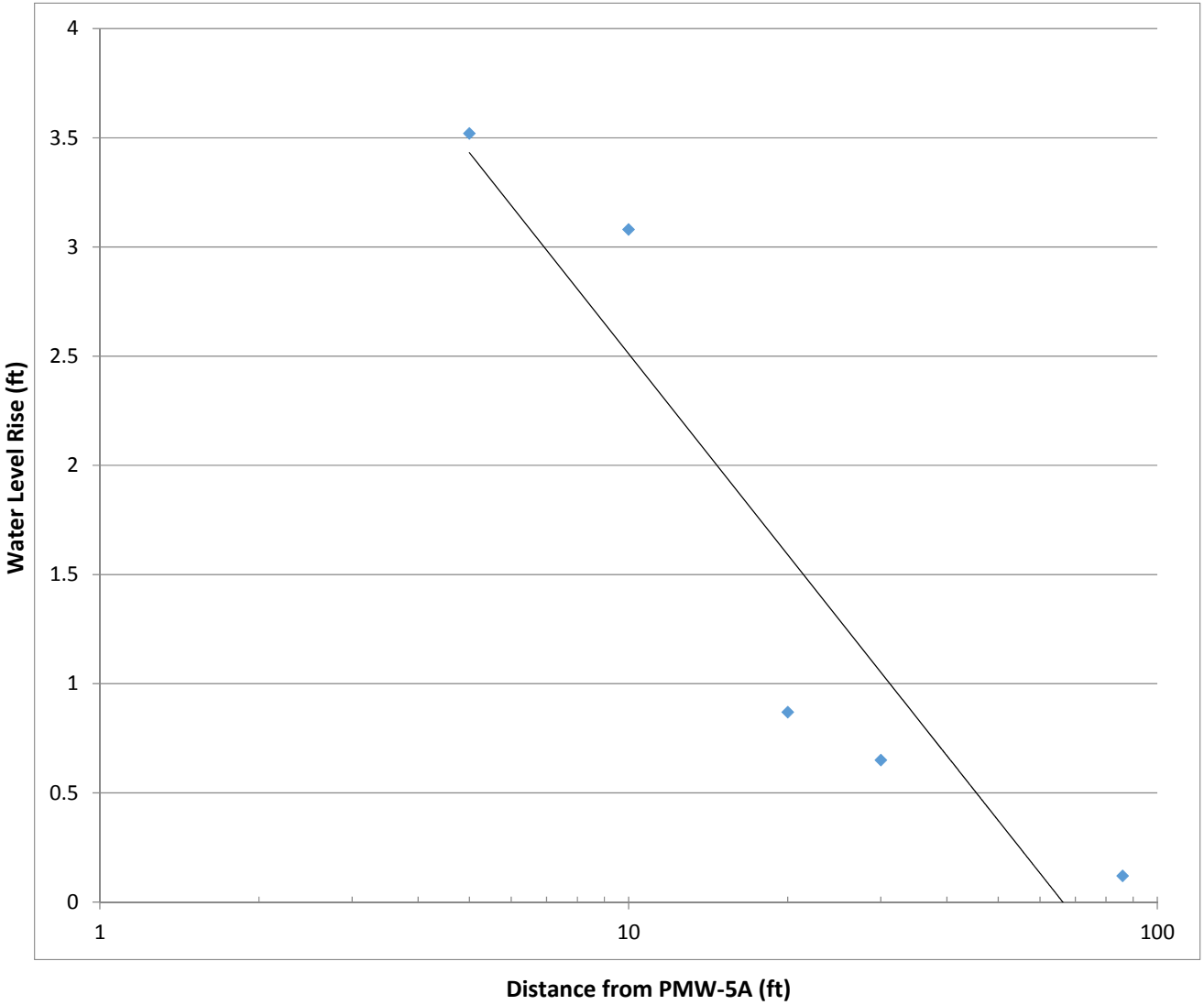

OW-2 Injection Pilot Test
Height of Water Column above Transducer (ft)
30
29
28
27
26
25
24
23
22
21
20
Water overflowing TOC
2 Galllons/Minutes
(leaking at well head)
5 Gallons/Minuste
1.75 Gallons/Minute
11:30:00
11:30:02
11:30:05
11:30:08
11:30:15
11:30:26
11:30:47
11:31:24
11:32:30
11:34:28
11:37:56
11:44:06
11:53:48
12:25:40
12:27:20
12:29:00
12:30:40
12:32:20
12:34:00
12:35:40
12:37:20
12:39:00
12:40:40
12:42:20
12:44:00
12:45:40
12:47:20
12:49:00
12:50:40
12:52:20
12:54:00
12:55:40
12:57:20
12:59:00
13:00:40
13:02:20
13:04:00
13:05:40
13:07:20
13:09:00
13:10:40
13:12:20
13:14:00
13:15:40
13:17:20
13:19:00
13:20:40
13:22:20
13:24:00
13:25:40
13:27:20
13:29:00
13:30:40
13:32:20
13:34:00
Time


OW-3 Injection Pilot Test
Height of Water Column above Transducer (ft)
30
29
28
27
26
25
24
23
22
21
20
5 Gallons/Minute
1.75 Gallons/Minute
11:30:00
11:32:20
11:34:40
11:37:00
11:39:20
11:41:40
11:44:00
11:46:20
11:48:40
11:51:00
11:53:20
11:55:40
11:58:00
12:00:20
12:02:40
12:05:00
12:07:20
12:09:40
12:12:00
12:14:20
12:16:40
12:19:00
12:21:20
12:23:40
12:26:00
12:28:20
12:30:40
12:33:00
12:35:20
12:37:40
12:40:00
12:42:20
12:44:40
12:47:00
12:49:20
12:51:40
12:54:00
12:56:20
12:58:40
13:01:00
13:03:20
13:05:40
13:08:00
13:10:20
13:12:40
13:15:00
13:17:20
13:19:40
13:22:00
13:24:20
13:26:40
13:29:00
13:31:20
13:33:40
13:36:00
Time


OW-4 Injection Pilot Test
Height of Water Column above Transducer (ft)
30
29
28
27
26
25
24
23
22
21
20
2 Gallons/Minute
(leaking at well head)
5 Gallons/Minute
1.75 Gallons/Minute
11:30:00
11:33:00
11:36:00
11:39:00
11:42:00
11:45:00
11:48:00
11:51:00
11:54:00
11:57:00
12:00:00
12:03:00
12:06:00
12:09:00
12:12:00
12:15:00
12:18:00
12:21:00
12:24:00
12:27:00
12:30:00
12:33:00
12:36:00
12:39:00
12:42:00
12:45:00
12:48:00
12:51:00
12:54:00
12:57:00
13:00:00
13:03:00
13:06:00
13:09:00
13:12:00
13:15:00
13:18:00
13:21:00
13:24:00
13:27:00
13:30:00
13:33:00
Time

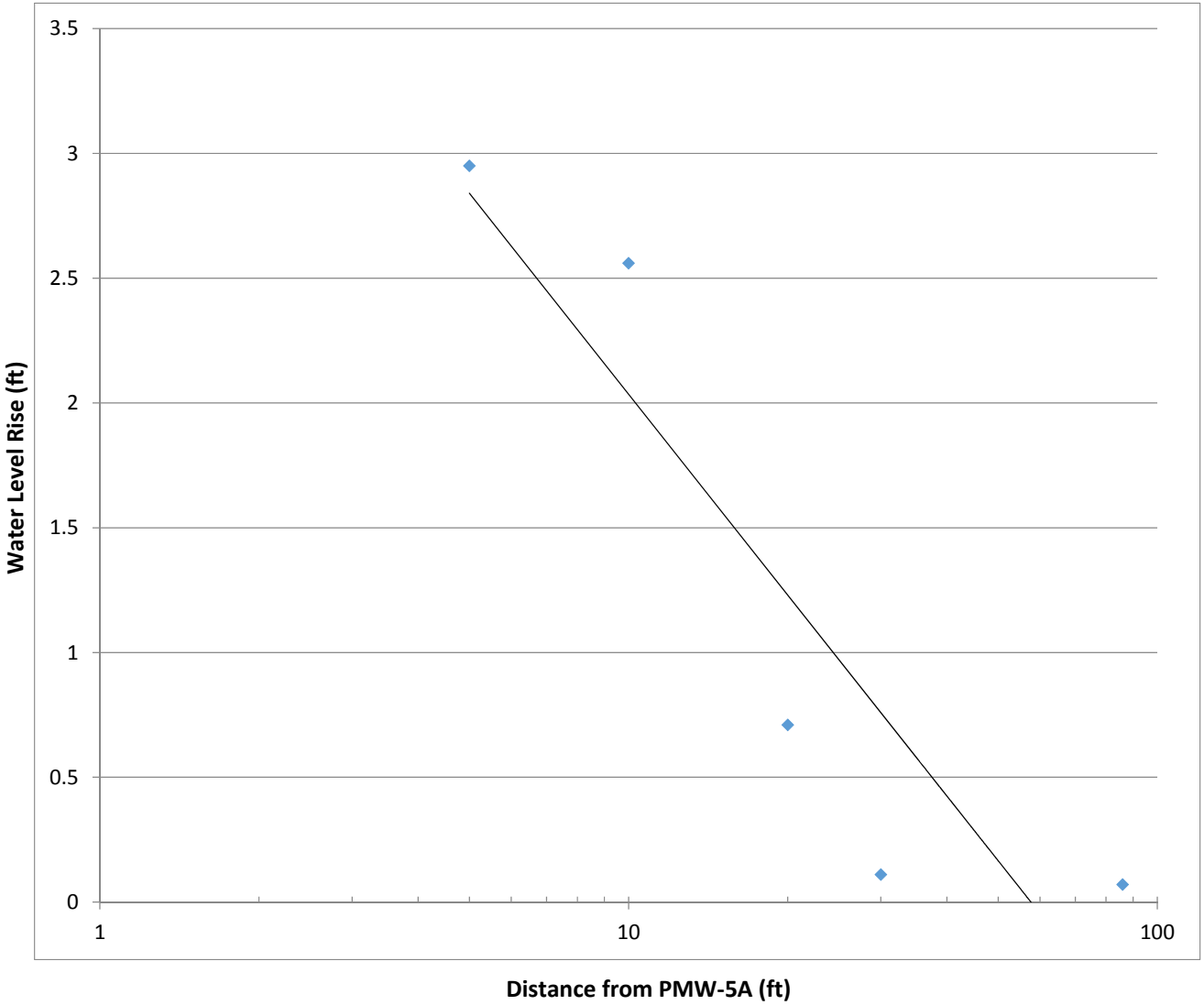
**Trex Properties: Clean Water Injection Pilot Test using PMW-5A - 1.75 gpm Injection Rate**

| | OW-1 | OW-2 | OW-3 | OW-4 | PMW-6A |
|---|---|---|---|---|---|
| **Max water level rise (ft)** | 3.52 | 3.08 | 0.87 | 0.65 | 0.12 |
| **Distance from PMW-5A (ft)** | 5 | 10 | 20 | 30 | 86 |



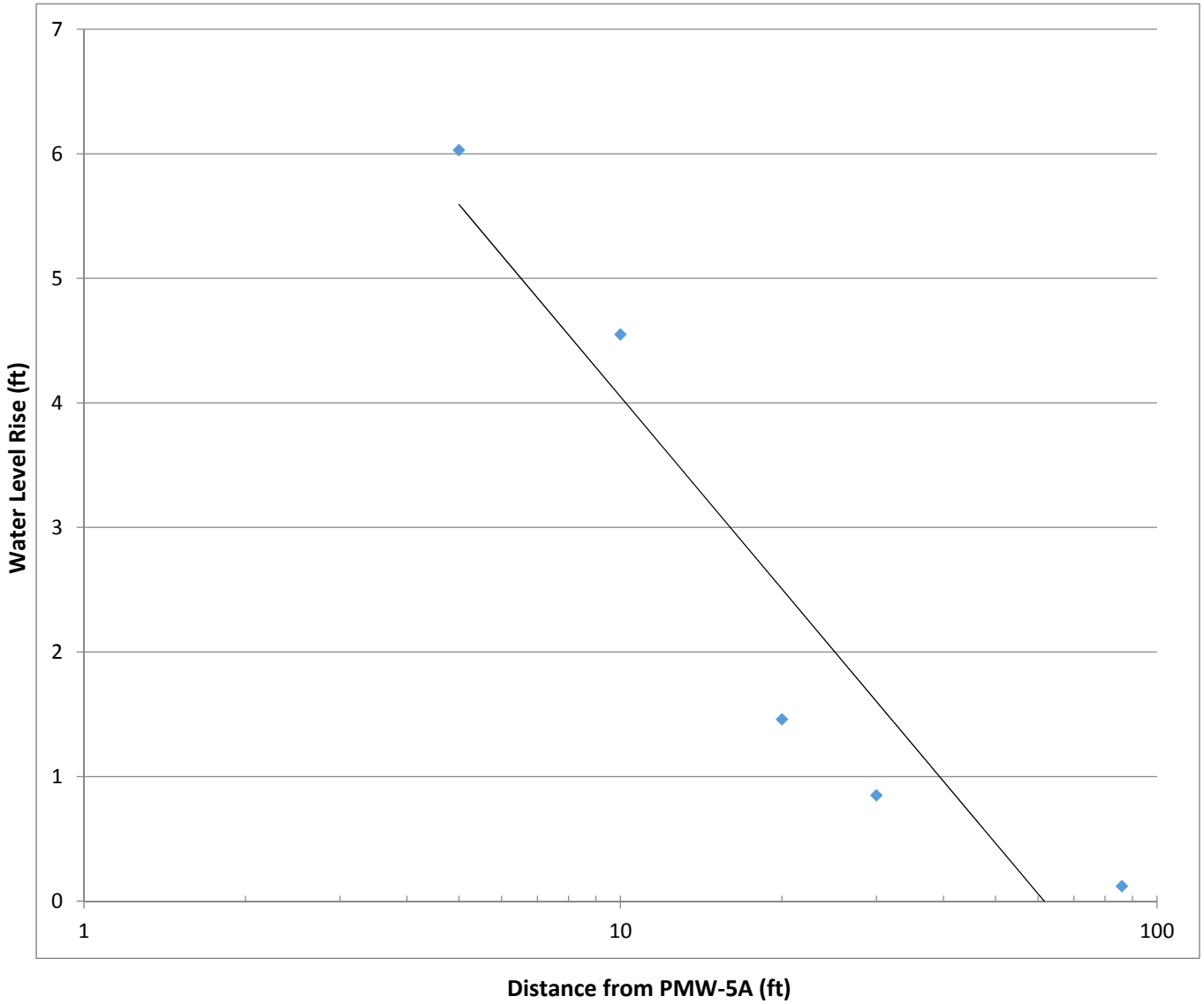
**Trex Properties: Clean Water Injection Pilot Test using PMW-5A -2 gpm Injection Rate**

| | OW-1 | OW-2 | OW-3 | OW-4 | PMW-6A |
|---|---|---|---|---|---|
| **Max water level rise (ft)** | 2.95 | 2.56 | 0.71 | 0.11 | 0.07 |
| **Distance from PMW-5A (ft)** | 5 | 10 | 20 | 30 | 86 |



**Trex Properties: Clean Water Injection Pilot Test using PMW-5A - 5 gpm Injection Rate**

| | OW-1 | OW-2 | OW-3 | OW-4 | PMW-6A |
|---|---|---|---|---|---|
| **Max water level rise (ft)** | 6.03 | 4.55 | 1.46 | 0.85 | 0.12 |
| **Distance from PMW-5A (ft)** | 5 | 10 | 20 | 30 | 86 |



# ATTACHMENT 3

# INJECTANT INFORMATION

# Trex Properties, Charlotte NC

# Klozur® Activated Persulfate Demand Calculations

6-May-2016

| | | | |
|---|---|---|---|
| **Customer:** | **Withers & Ravenal** | **Prepared by:** | |
| **Contact:** | **Brian Bellis** | **Pat Hicks PhD** | |
| **Site Location:** | **20% Porosity RCRA TSD Charlotte NC** | **1-919-280-7962** | |
| **Proposal Number:** | **OPP 19262** | **Patrick.Hicks@peroxychem.com** | |

## PRODUCT OVERVIEW

Klozur® Activated Persulfate has been delivered safely and cost effectively to treat a wide variety of common contaminants of concern with an unmatched combination of power and control. With proper activation, Klozur activated persulfate can generate oxidative, reductive and nucleophilic pathways, giving Klozur Persulfate the power to destroy the most recalcitrant of contaminants.

For more information on Klozur Activated Persulfate, please contact your PeroxyChem representative or www.klozur.com.

## SITE INFORMATION

| | Value | Unit | Note |
|---|---|---|---|
| Area of Treatment | 40,000 | ft2 | customer supplied |
| Treatment Zone Thickness | 20 | ft | customer supplied |
| Treatment Volume | 800,000 | ft3 | calculated value |
| Porosity | 20 | % | default value |
| Ground Water Volume | 1,196,724 | USG | calculated value |
| Soil Density | 90 | lbs/ft3 | default value |
| Soil Mass | 72,000,000 | lb | calculated value |
| Fraction Soil Mass Contacted* | 100 | % | default value |
| Base Buffering Capacity (Alkaline Activation only) | 3.54 | g 25 percent NaOH / kg soil | estimated value, it is recommend that this be analytically determined |
| Soil Oxidant Demand | 1.44 | g Klozur / kg soil | estimated value, it is recommend that this be analytically determined |

* Fraction soil mass contacted may be less for sites with contact limitations such as fractured bedrock or those with low permeable materials.

## CONTAMINANTS OF CONCERN* (COCs)

**Concentrations:**

The following are estimates of the contaminant concentration in soil and groundwater within the target area. The total COC mass was calculated including estimated COC mass in groundwater, soil and NAPL, if present, within the targeted area.

| Constituent | GW (mg/L) | Soil (mg/kg) | NAPL (lbs) | Total COC Mass** (lb) |
|---|---|---|---|---|
| PCE | 50.5 | 66.4 | 0.0 | 5285.8 |
| TCE | 128.0 | 68.5 | 0.0 | 6209.3 |
| DCE | 12.24 | 4 | 0 | 387 |
| TCA | 1.968 | 2 | 0 | 149 |
| 1,2-DCA | 0.0109 | 0 | 0 | 1 |
| DCM | 0.063 | 0 | 0 | 1 |
| 1,4-dioxane | 0.63 | 0 | 0 | 7 |

**Remedial Goals and Target Mass Reductions:**

The target demand is determined by also accounting for remedial goals for each contaminant and represents the estimated mass reductions targeted for each constituent.

| Constituent | GW (mg/L) | Soil (mg/kg) | NAPL (lbs) | Total COC Mass Targeted*** (lbs) |
|---|---|---|---|---|
| PCE | 0 | 0 | 0 | 5,285.8 |
| TCE | 0 | 0 | 0 | 6,209.3 |
| DCE | 0 | 0 | 0 | 387 |
| TCA | 0 | 0 | 0 | 149 |
| 1,2-DCA | 0 | 0 | 0 | 1 |
| DCM | 0 | 0 | 0 | 1 |
| 1,4-dioxane | 0 | 0 | 0 | 7 |

*Unless provided, sorbed concentrations were roughly estimated based on expected groundwater concentrations, foc and Koc values. For a more refined estimate, it is recommended that actual values be verified via direct sampling of the targeted treatment interval.

** Includes estimated contaminant mass in soil, groundwater, and NAPL (if provided) at the site.

*** Includes estimated contaminant mass in soil, groundwater, and NAPL (if provided) at the site with the remedial goals subtracted from the total mass onsite.

## KLOZUR PERSULFATE DEMAND

The estimated mass of Klozur accounts for target demand with the COCs, non-target demand associated with the soils (SOD) and a safety factor applied to each. The safety factor is intended to account for potential variability in the COC and SOD estimates and any other uncertainties associated with the application or site.

**The demand from COCs was estimated using:** **Stoichiometric Calculations**

| | Persulfate Demand | Safety Factor | Persulfate Demand with Factor | |
|---|---|---|---|---|
| Demand from COCs | 54,013 | 1.0 | 54,013 | lb |
| Demand from SOD | 103,680 | 1.0 | 103,680 | lb |

**Total Klozur Persulfate Demand:** **157,693** **lb**

## KLOZUR PERSULFATE PACKAGING OPTIONS AND PRICING

Klozur Persulfate can be delivered to your site in a variety of packages including in bags, or two sizes of super sacks for your handling convenience.

| Available Packaging Types | # of packages / pallet | lb Klozur® / pallet | # of packages needed |
|---|---|---|---|
| 55.1 # bags | 42 | 2,314 | 2,862 |
| 1,102 # super sacks | 2 | 2,204 | 144 |
| 2,204 # super sacks | 1 | 2,204 | 72 |

| Available Packaging Types | Unit Rate ($ / lb) | Total Mass (lbs) | Cost in USD (FOB Tonawanda, NY) |
|---|---|---|---|
| 55.1 # bags | 1.43 | 157,696 | $225,506 |
| 1,102 # super sacks | 1.43 | 158,688 | $226,924 |
| 2,204 # super sacks | 1.41 | 158,688 | $223,750 |

1) Number of packages needed is rounded up to nearest whole unit.

2) Price valid for 90 days from date at top of document. Terms: net 30 days.

3) Any applicable taxes not included. Please provide a copy of your tax exempt certificate or resale tax number when placing your order. In accordance with the law, applicable state and local taxes will be applied at the time of invoicing if PeroxyChem has not been presented with your fully executed tax exemption documentation.

4) Shipping not included. Freight rates from Tonawanda NY available upon request. Standard delivery time can vary from 1-3 weeks from time of order, depending upon volume. Expedited transport can be arranged at extra cost.

5) Return Policy: Within 90 days after sale, following approval by PeroxyChem, products in their unopened containers, which by analysis meet the original specifications under which they were shipped, will be accepted for return at invoiced price, less 25% handling charge and return freight, excluding original freight paid by buyer. Products made to order or custom blended are non-returnable.

**6) All sales are per PeroxyChem's Terms and Conditions.**

**Disclaimer:**

**The estimated dosage and recommended application methodology described in this document are based on the site information provided to PeroxyChem, but are not meant to constitute a guaranty of performance or a predictor of the speed at which a given site is remediated. Klozur® persulfate and activator demand calculations do not take into account the kinetics, speed of the reaction, or ability to establish contact between the reagents and contamination in the subsurface. These calculations represent the minimum anticipated amount needed to treat the constituents of concern (COCs). As a result, these calculations should be used as a general approximation for purposes of an initial economic assessment. PeroxyChem recommends that oxidant demand and treatability testing be performed to verify the quantities of oxidant needed.**

## KLOZUR ACTIVATION CHEMISTRIES

Klozur Persulfate activation chemistries are used to convert Klozur Persulfate into the highly reactive radicals. Choosing the right activator chemistry for your contaminants of concern is important in obtaining a successful site remediation. The choice of activator will be dependent upon the target contaminants, site lithology and hydrogeology, and other site conditions. While activator demand quantities for all methods are given, not all activation methods are recommended for your given contaminant or site conditions. Please consult with an PeroxyChem Environmental Solutions technologist for proper selection of activation chemistry.

Note: Only one type of activator is typically needed.

| **Recommended methods to activate Klozur Persulfate:** | **FeEDTA** | **high pH** | **hydrogen peroxide** |
|---|---|---|---|

***PeroxyChem LLC is the owner or licensee under various patent applications relating to the use of activation chemistries**

**Calculation for FeEDTA demand:**

| | | |
|---|---|---|
| Recommended concentration of Fe available in the groundwater | 200 | ppm |
| Calculated FeEDTA demand based on gw volume | 15,246 | lb |
| # of bags of FeEDTA needed (55.1 lb / 25 kg bags) | 277 | bags |
| Pricing | $4.00 | $ / lb |
| Cost in USD (FOB Tonawanda, NY) | $61,050.80 | |

**Calculation for NaOH (high pH) demand:**

NaOH demand = NaOH to neutralize generate HSO4 from persulfate decomposition + amount needed to raise ground water / soil to a pH > 10.5

| | | |
|---|---|---|
| NaOH demand for HSO4 neutralization | 52,984 | lb @ 100% basis |
| Soil buffering amount | 63,720 | lb @ 100% basis |
| Total NaOH demand | 116,704 | lb @ 100% basis |

PeroxyChem recommends using a 25 wt% or less NaOH concentration **

| | | | | |
|---|---|---|---|---|
| Amount of | 25 | wt% solution needed | 44,033 | gal |
| | | | 466,816 | lb |

25% NaOH Solution is available from PeroxyChem directly for convenience or from a third party:

| | | | |
|---|---|---|---|
| **Estimated Pricing from Third Party^:** | | | |
| 25% NaOH Solution Price Estimate | 0.255 | $/lb | in drums |
| (^Please contact PeroxyChem for updated estimate at time of order) | 0.235 | $/lb | in totes |
| | 0.145 | $/lb | in tankers |
| **Klozur Caustic provided directly from PeroxyChem:** | | | |
| Klozur Caustic Pricing (25% NaOH solution) | 0.390 | $/lb | in 560 # drums |
| FOB, Tonawanda, NY. Freight quote upon request | 0.520 | $/lb | in 2800 # totes |

** note: the addition of concentrated NaOH to water is very exothermic. Add NaOH slowly to water, and allow for excess heat to dissipate.

## KLOZUR ACTIVATION CHEMISTRIES (continued)

**Calculation for Hydrogen Peroxide demand:**

| | | |
|---|---|---|
| demand based on the recommended peroxide to Klozur persulfate mole ratio of: | 5 : 1 | |
| Hydrogen Peroxide demand | 112,590.9 | lb @ 100% basis |

PeroxyChem recommends using a 17.5 wt% or less H2O2 concentration

| | | | | |
|---|---|---|---|---|
| Amount of | 17.5 | wt% solution needed | 72,780.1 | gal |

| | Drum | Bulk |
|---|---|---|
| # of containers | 1,446 | |
| total gallons | 72,791 | 72,780 |
| total lb | 643,470 | 643,376 |
| Pricing in $/lb* | 0.28 | 0.1208 |
| Cost in USD $* | 180,171.60 | 77,719.87 |

* for drums, pricing is FOB Tonawanda, NY, bulk pricing is FOB Bayport, TX, and does not include delivery charge or fuel surcharge.

# MATERIAL SAFETY DATA SHEET

**Klozür™**

**MSDS Ref. No.:** 7775-27-1-12
**Date Approved:** 02/22/2005
**Revision No.:** 1

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the Canada's Workplace Hazardous Materials Information System (WHMIS) and, the EC Directive, 2001/58/EC.

## 1. PRODUCT AND COMPANY IDENTIFICATION

| | |
|---|---|
| **PRODUCT NAME:** | Klozür™ |
| **SYNONYMS:** | Sodium Persulfate, Sodium Peroxydisulfate; Disodium Peroxydisulfate |
| **GENERAL USE:** | In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications. |

### MANUFACTURER

FMC CORPORATION
Active Oxidants Division
1735 Market Street
Philadelphia, PA 19103
(215) 299-6000 (General Information)

### EMERGENCY TELEPHONE NUMBERS

(800) 424-9300 (CHEMTREC - U.S.)
(303) 595-9048 (Medical - Call Collect)

## 2. HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW:

- White, odorless, crystals
- Oxidizer.
- Decomposes in storage under conditions of moisture (water/water vapor) and/or excessive heat causing release of oxides of sulfur and oxygen that supports combustion. Decomposition could form a high temperature melt. See Section 10 ("Stability and Reactivity").

**POTENTIAL HEALTH EFFECTS:** Airborne persulfate dust may be irritating to eyes, nose, lungs, throat and skin upon contact. Exposure to high levels of persulfate dust may cause difficulty in breathing in sensitive persons.

# 3. COMPOSITION / INFORMATION ON INGREDIENTS

| Chemical Name | CAS# | Wt.% | EC No. | EC Class |
|---|---|---|---|---|
| Sodium Persulfate | 7775-27-1 | >99 | 231-892-1 | Not classified as hazardous |

# 4. FIRST AID MEASURES

**EYES:** Flush with plenty of water. Get medical attention if irritation occurs and persists.

**SKIN:** Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

**INGESTION:** Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

**INHALATION:** Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

**NOTES TO MEDICAL DOCTOR:** This product has low oral toxicity and is not irritating to the eyes and skin. Flooding of exposed areas with water is suggested, but gastric lavage or emesis induction for ingestions must consider possible aggravation of esophageal injury and the expected absence of system effects. Treatment is controlled removal of exposure followed by symptomatic and supportive care.

# 5. FIRE FIGHTING MEASURES

**EXTINGUISHING MEDIA:** Deluge with water.

**FIRE / EXPLOSION HAZARDS:** Product is non-combustible. On decomposition releases oxygen which may intensify fire. Presence of water accelerates decomposition.

**FIRE FIGHTING PROCEDURES:** Do not use carbon dioxide or other gas filled fire extinguishers; they will have no effect on decomposing persulfates. Wear full protective clothing and self-contained breathing apparatus.

**FLAMMABLE LIMITS:** Non-combustible

**SENSITIVITY TO IMPACT:** No data available

**SENSITIVITY TO STATIC DISCHARGE:** Not available

# 6. ACCIDENTAL RELEASE MEASURES

**RELEASE NOTES:** Spilled material should be collected and put in approved DOT container and isolated for disposal. Isolated material should be monitored for signs of decomposition (fuming/smoking). If spilled material is wet, dissolve with large quantity of water and dispose as a hazardous waste. All disposals should be carried out according to regulatory agencies procedures.

# 7. HANDLING AND STORAGE

**HANDLING:** Use adequate ventilation when transferring product from bags or drums. Wear respiratory protection if ventilation is inadequate or not available. Use eye and skin protection. Use clean plastic or stainless steel scoops only.

**STORAGE:** Store (unopened) in a cool, clean, dry place away from point sources of heat, e.g. radiant heaters or steam pipes. Use first in, first out storage system. Avoid contamination of opened product. In case of fire or decomposition (fuming/smoking) deluge with plenty of water to control decomposition. For storage, refer to NFPA Bulletin 430 on storage of liquid and solid oxidizing materials.

**COMMENTS:** VENTILATION: Provide mechanical general and/or local exhaust ventilation to prevent release of dust into work environment. Spills should be collected into suitable containers to prevent dispersion into the air.

# 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

## EXPOSURE LIMITS

| Chemical Name | ACGIH | OSHA | Supplier |
|---|---|---|---|
| Sodium Persulfate | 0.1 $mg/m^3$ (TWA) | | |

**ENGINEERING CONTROLS:** Provide mechanical local general room ventilation to prevent release of dust into the work environment. Remove contaminated clothing immediately and wash before reuse.

## PERSONAL PROTECTIVE EQUIPMENT

**EYES AND FACE:** Use cup type chemical goggles. Full face shield may be used.

**RESPIRATORY:** Use approved dust respirator when airborne dust is expected.

**PROTECTIVE CLOTHING:** Normal work clothes. Rubber or neoprene footwear.

**GLOVES:** Rubber or neoprene gloves. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

# 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| **ODOR:** | None |
| **APPEARANCE:** | White crystals |
| **AUTOIGNITION TEMPERATURE:** | Not applicable. No evidence of combustion up to 800°C. Decomposition will occur upon heating. |
| **BOILING POINT:** | Not applicable |
| **COEFFICIENT OF OIL / WATER:** | Not applicable |
| **DENSITY / WEIGHT PER VOLUME:** | Not available |
| **EVAPORATION RATE:** | Not applicable (Butyl Acetate = 1) |
| **FLASH POINT:** | Non-combustible |
| **MELTING POINT:** | Decomposes |
| **ODOR THRESHOLD:** | Not applicable |
| **OXIDIZING PROPERTIES:** | Oxidizer |
| **PERCENT VOLATILE:** | Not applicable |
| **pH:** | typically 5.0 - 7.0 @ 25 °C (1% solution) |
| **SOLUBILITY IN WATER:** | 73 % @ 25 °C (by wt.) |
| **SPECIFIC GRAVITY:** | 2.6 ($H_2O$=1) |
| **VAPOR DENSITY:** | Not applicable (Air = 1) |
| **VAPOR PRESSURE:** | Not applicable |

# 10. STABILITY AND REACTIVITY

| | |
|---|---|
| **CONDITIONS TO AVOID:** | Heat, moisture and contamination. |
| **STABILITY:** | Stable (becomes unstable in presence of heat, moisture and/or contamination). |
| **POLYMERIZATION:** | Will not occur |
| **INCOMPATIBLE MATERIALS:** | Acids, alkalis, halides (fluorides, chlorides, bromides and iodides), combustible materials, most metals and heavy metals, oxidizable materials, other oxidizers, reducing agents, cleaners, and organic or carbon containing compounds. Contact |

with incompatible materials can result in a material decomposition or other uncontrolled reactions.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Oxygen that supports combustion and oxides of sulfur.

**COMMENTS:** PRECAUTIONARY STATEMENT: Pumping and transport of Klozür persulfate requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

---

# 11. TOXICOLOGICAL INFORMATION

**EYE EFFECTS:** Non-irritating (rabbit) [FMC Study Number: ICG/T-79.029]

**SKIN EFFECTS:** Non-irritating (rabbit) [FMC Study Number: ICG/T-79.029]

**DERMAL $LD_{50}$:** > 10 g/kg [FMC Study Number: ICG/T-79.029]

**ORAL $LD_{50}$:** 895 mg/kg (rat) [FMC Study Number: ICG/T-79.029]

**INHALATION $LC_{50}$:** 5.1 mg/l (rat) [FMC I95-2017]

**SENSITIZATION:** May be sensitizing to allergic persons. [FMC Study Number: ICG/T-79.029]

**TARGET ORGANS:** Eyes, skin, respiratory passages

**ACUTE EFFECTS FROM OVEREXPOSURE:** Dust may be harmful and irritating. May be harmful if swallowed.

**CHRONIC EFFECTS FROM OVEREXPOSURE:** Sensitive persons may develop dermatitis and asthma [Respiration 38:144, 1979]. Groups of male and female rats were fed 0, 300 or 3000 ppm sodium persulfate in the diet for 13 weeks, followed by 5000 ppm for 5 weeks. Microscopic examination of tissues revealed some injury to the gastrointestinal tract at the high dose (3000 ppm) only. This effect is not unexpected for an oxidizer at high concentrations. [Ref. FMC I90-1151, Toxicologist 1:149, 1981].

### CARCINOGENICITY:

| | |
|---|---|
| **NTP:** | Not listed |
| **IARC:** | Not listed |
| **OSHA:** | Not listed |
| **OTHER:** | ACGIH: Not listed |

# 12. ECOLOGICAL INFORMATION

## ECOTOXICOLOGICAL INFORMATION:

Bluegill sunfish, 96-hour $LC_{50}$ = 771 mg/L [FMC Study I92-1250]
Rainbow trout, 96-hour $LC_{50}$ = 163 mg/L [FMC Study I92-1251]
Daphnia, 48-hour $LC_{50}$ = 133 mg/L [FMC Study I92-1252]
Grass shrimp, 96-hour $LC_{50}$ = 519 mg/L [FMC Study I92-1253]

**CHEMICAL FATE INFORMATION:** Biodegradability does not apply to inorganic substances.

# 13. DISPOSAL CONSIDERATIONS

**DISPOSAL METHOD:** Dispose as a hazardous waste in accordance with local, state and federal regulatory agencies.

# 14. TRANSPORT INFORMATION

## U.S. DEPARTMENT OF TRANSPORTATION (DOT)

| | |
|---|---|
| **PROPER SHIPPING NAME:** | Sodium Persulfate |
| **PRIMARY HAZARD CLASS / DIVISION:** | 5.1 (Oxidizer) |
| **UN/NA NUMBER:** | UN 1505 |
| **PACKING GROUP:** | III |
| **LABEL(S):** | 5.1 (Oxidizer) |
| **PLACARD(S):** | 5.1 (Oxidizer) |
| **MARKING(S):** | Sodium Persulfate, UN 1505 |
| **ADDITIONAL INFORMATION:** | Hazardous Substance/RQ: Not applicable |

49 STCC Number: 4918733

This material is shipped in 225 lb. fiber drums, 55 lb. poly bags and 1000 - 2200 lb. IBC's (supersacks).

## INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

**PROPER SHIPPING NAME:** Sodium Persulfate

## INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

**PROPER SHIPPING NAME:** Sodium Persulfate

## OTHER INFORMATION:

Protect from physical damage. Do not store near acids, moisture or heat.

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# 15. REGULATORY INFORMATION

## UNITED STATES

### SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

**SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):**
Not applicable

**SECTION 311 HAZARD CATEGORIES (40 CFR 370):**
Fire Hazard, Immediate (Acute) Health Hazard

**SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):**
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.: None

**SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):**
Not listed

### CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

**CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):**
Unlisted, RQ = 100 lbs., Ignitability

### TSCA (TOXIC SUBSTANCE CONTROL ACT)

**TSCA INVENTORY STATUS (40 CFR 710):**

Listed

**RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)**
**RCRA IDENTIFICATION OF HAZARDOUS WASTE (40 CFR 261):**
Waste Number: D001

## CANADA

**WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):**

Product Identification Number: 1505
Hazard Classification / Division: Class C (Oxidizer), Class D, Div. 2, Subdiv. B. (Toxic)
Ingredient Disclosure List: Listed

## INTERNATIONAL LISTINGS

Sodium persulfate:
Australia (AICS): Listed
China: Listed
Japan (ENCS): (1)-1131
Korea: KE-12369
Philippines (PICCS): Listed

## HAZARD, RISK AND SAFETY PHRASE DESCRIPTIONS:

EC Symbols: (Not classified as hazardous)

EC Risk Phrases: (Not classified as hazardous)

EC Safety Phrases: (Not classified as hazardous)

# 16. OTHER INFORMATION

**HMIS**

| | |
|---|---|
| Health | 1 |
| Flammability | 0 |
| Physical Hazard | 1 |
| Personal Protection (PPE) | J |

Protection = J (Safety goggles, gloves, apron & combination dust & vapor respirator)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe

3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

**NFPA**

| | |
|---|---|
| Health | 1 |
| Flammability | 0 |
| Reactivity | 1 |
| Special | OX |

SPECIAL = OX (Oxidizer)

NFPA = National Fire Protection Association

Degree of Hazard Code:
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

**REVISION SUMMARY:**
New MSDS

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# EDTA Iron(III) sodium salt

## sc-207611

**Material Safety Data Sheet**

| Hazard Alert Code Key: | EXTREME | HIGH | MODERATE | LOW |
|---|---|---|---|---|

## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT NAME
EDTA Iron(III) sodium salt

### STATEMENT OF HAZARDOUS NATURE
**CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.**

### NFPA

### SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800
**EMERGENCY:**
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

### SYNONYMS
C10-H12-N2-O8-Na-Fe, "iron sodium ethylene diamine tetraacetic acid", "EDTA, iron (III) derivative, sodium salt", "acetic acid, (ethylenedinitrilo)tetra-, sodium salt, iron complex", "ferrate(1-), ((ethylenedinitrilo)tetraacetato)-, sodium", "edathamil monosodium ferric salt", "ferric sodium EDTA", "ferric sodium edetate", "monosodium ferric EDTA", "sodium ferric EDTA", "sodium iron EDTA", "sodium feredetate", Calmosine, Ferisan, "Sequestrene NaFe iron chelate", Rexene, "NaFe EDTA", "EDTA chelate", "fertiliser trace element", Sytron, 37407

## Section 2 - HAZARDS IDENTIFICATION

### CHEMWATCH HAZARD RATINGS

| | | Min | Max |
|---|---|---|---|
| Flammability: | 1 | | |
| Toxicity: | 0 | | |
| Body Contact: | 2 | | |
| Reactivity: | 1 | | |
| Chronic: | 2 | | |

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

### CANADIAN WHMIS SYMBOLS

**EMERGENCY OVERVIEW**

**RISK**

May cause SENSITISATION by skin contact.
Irritating to eyes, respiratory system and skin.

**POTENTIAL HEALTH EFFECTS**

**ACUTE HEALTH EFFECTS**

**SWALLOWED**

■ The material has NOT been classified as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.
<\p>.

**EYE**

■ This material can cause eye irritation and damage in some persons.

**SKIN**

■ This material can cause inflammation of the skin oncontact in some persons.
■ The material may accentuate any pre-existing dermatitis condition.
■ Skin contact is not thought to have harmful health effects, however the material may still produce health damage following entry through wounds, lesions or abrasions.
■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

**INHALED**

■ The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

**CHRONIC HEALTH EFFECTS**

■ Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.
<\p>.
Chelates are occasionally used in therapies for various forms of poisoning. A systemic reaction known as the "excessive chelation syndrome" consists mainly of general unwellness, fatigue, thirst, followed by chills and fever.
<\p>.
Injection of EDTA and it salts can cause severe kidney damage with tissue death and internal bleeding, bone marrow depression and critically low levels of calcium.
Chronic excessive intake of iron have been associated with damage to the liver and pancreas. People with a genetic disposition to poor control over iron are at an increased risk.
<\p>.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| NAME | CAS RN | % |
|---|---|---|
| EDTA iron sodium salt | 15708-41-5 | 100 |

## Section 4 - FIRST AID MEASURES

**SWALLOWED**

· Immediately give a glass of water. · First aid is not generally required. If in doubt, contact a Poisons Information Center or a doctor.

**EYE**

■ If this product comes in contact with the eyes: · Wash out immediately with fresh running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

**SKIN**

■ If skin contact occurs: · Immediately remove all contaminated clothing, including footwear · Flush skin and hair with running water (and soap if available).

**INHALED**

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

### NOTES TO PHYSICIAN

■ Treat symptomatically.
For acute or short term repeated exposures to iron and its derivatives:
· Always treat symptoms rather than history.
· In general, however, toxic doses exceed 20mg/kg of ingested material (as elemental iron) with lethal doses exceeding 180 mg/kg.

## Section 5 - FIRE FIGHTING MEASURES

| | |
|---|---|
| Vapour Pressure (mmHG): | Not applicable. |
| Upper Explosive Limit (%): | Not Available |
| Specific Gravity (water=1): | 1.0 |
| Lower Explosive Limit (%): | Not Available |

### EXTINGUISHING MEDIA

· Water spray or fog.
· Foam.

### FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.
· Wear breathing apparatus plus protective gloves.

### GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Combustible solid which burns but propagates flame with difficulty.
· Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
Combustion products include: carbon monoxide (CO), carbon dioxide (CO2), nitrogen oxides (NOx), metal oxides, other pyrolysis products typical of burning organic material.
May emit poisonous fumes.
May emit corrosive fumes.

### FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

### PERSONAL PROTECTION

Glasses:
Chemical goggles.
Gloves:
Respirator:
Particulate

## Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
· Clean up all spills immediately.
· Avoid breathing dust and contact with skin and eyes.
MAJOR SPILLS
■ Moderate hazard.
· CAUTION: Advise personnel in area.
· Alert Emergency Responders and tell them location and nature of hazard.

## Section 7 - HANDLING AND STORAGE

### PROCEDURE FOR HANDLING

· Avoid all personal contact, including inhalation.
· Wear protective clothing when risk of exposure occurs.
Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.
· Do NOT cut, drill, grind or weld such containers.
· In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

### RECOMMENDED STORAGE METHODS

· Polyethylene or polypropylene container.
· Check all containers are clearly labelled and free from leaks.

### STORAGE REQUIREMENTS

· Store in original containers.
· Keep containers securely sealed.

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE CONTROLS

| Source | Material | TWA ppm | TWA mg/m³ | STEL ppm | STEL mg/m³ | Notes |
|---|---|---|---|---|---|---|
| Canada - British Columbia Occupational Exposure Limits | EDTA iron sodium salt (Iron salts - soluble, as Fe) | | 1 | | 2 | |
| Canada - Ontario Occupational Exposure Limits | EDTA iron sodium salt (Iron salts, water-soluble (as iron)) | | 1 | | | |
| Canada - Alberta Occupational Exposure Limits | EDTA iron sodium salt (Iron salts, soluble, as Fe) | | 1 | | | |
| US ACGIH Threshold Limit Values (TLV) | EDTA iron sodium salt (Iron salts - soluble (as Fe)) | | 1 | | | TLV Basis: upper respiratory tract & skin irritation |
| US NIOSH Recommended Exposure Limits (RELs) | EDTA iron sodium salt (Iron salts (soluble, as Fe)) | | 1 | | | |
| US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants | EDTA iron sodium salt (Iron salts (soluble) (as Fe)) | | 1 | | | |
| US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants | EDTA iron sodium salt (Iron salts (soluble) (as Fe)) | | 1 | | | |
| US - Minnesota Permissible Exposure Limits (PELs) | EDTA iron sodium salt (Iron salts (soluble)(as Fe)) | | 1 | | | |
| US - California Permissible Exposure Limits for Chemical Contaminants | EDTA iron sodium salt (Iron salts, soluble, as Fe) | | 1 | | | |
| Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English) | EDTA iron sodium salt (Iron salts, soluble (as Fe)) | | 1 | | | |
| US - Hawaii Air Contaminant Limits | EDTA iron sodium salt (Iron salts (soluble) (as Fe)) | | 1 | | 2 | (CAS (Varies with compound)) |
| US - Alaska Limits for Air Contaminants | EDTA iron sodium salt (Iron salts (soluble) (as Fe)) | | 1 | | | |
| Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits | EDTA iron sodium salt (Iron salts, soluble, (as Fe)) | | 1 | | 3 | |
| Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances | EDTA iron sodium salt (Iron salts, soluble (as Fe)) | - | 1 | - | 2 | |
| US - Washington Permissible exposure limits of air contaminants | EDTA iron sodium salt (Iron salts, soluble (as Fe)) | | 1 | | 3 | |
| Canada - Nova Scotia Occupational Exposure Limits | EDTA iron sodium salt (Iron salts - soluble (as Fe)) | | 1 | | | TLV Basis: upper respiratory tract & skin irritation |
| Canada - Prince Edward Island Occupational Exposure Limits | EDTA iron sodium salt (Iron salts - soluble (as Fe)) | | 1 | | | TLV Basis: upper respiratory tract & skin irritation |

| | | | | |
|---|---|---|---|---|
| Canada - Northwest Territories Occupational Exposure Limits (English) | EDTA iron sodium salt (Iron salts, soluble (as Fe)) | 1 | 2 | |
| US - Michigan Exposure Limits for Air Contaminants | EDTA iron sodium salt (Iron salts (soluble) (as Fe)) | 1 | | |
| US - Oregon Permissible Exposure Limits (Z-1) | EDTA iron sodium salt (Iron salts, soluble, as Fe) | 1 | | * |

ENDOELTABLE

### PERSONAL PROTECTION

### RESPIRATOR

Particulate
Consult your EHS staff for recommendations

### EYE

· Safety glasses with side shields.
· Chemical goggles.

### HANDS/FEET

■ NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
· Contaminated gloves should be replaced.
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.
· polychloroprene
· nitrile rubber
· butyl rubber
· fluorocaoutchouc
· polyvinyl chloride
Gloves should be examined for wear and/ or degradation constantly.

### OTHER

· Overalls.
· P.V.C. apron.
· Barrier cream.
· Skin cleansing cream.
· Eye wash unit.

### ENGINEERING CONTROLS

· Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
· Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### PHYSICAL PROPERTIES

Solid.
Mixes with water.

| | | | |
|---|---|---|---|
| State | Divided solid | Molecular Weight | 367.05 |

| | | | |
|---|---|---|---|
| Melting Range (°F) | Not available. | Viscosity | Not Applicable |
| Boiling Range (°F) | Not available. | Solubility in water (g/L) | Miscible |
| Flash Point (°F) | Not Available | pH (1% solution) | 5-8 |
| Decomposition Temp (°F) | Not available. | pH (as supplied) | Not applicable |
| Autoignition Temp (°F) | Not Available | Vapour Pressure (mmHG) | Not applicable. |
| Upper Explosive Limit (%) | Not Available | Specific Gravity (water=1) | 1.0 |
| Lower Explosive Limit (%) | Not Available | Relative Vapor Density (air=1) | Not applicable |
| Volatile Component (%vol) | Not applicable. | Evaporation Rate | Not applicable |

### APPEARANCE
Odourless brown powder; soluble in water (75g/litre @ 20 deg.C).

## Section 10 - CHEMICAL STABILITY

### CONDITIONS CONTRIBUTING TO INSTABILITY
· Presence of incompatible materials.
· Product is considered stable.

### STORAGE INCOMPATIBILITY
■ Salts of ethylenediaminetetraacetic acid (EDTA):
· should not come into contact with strong oxidisers
· are incompatible with metals such as zinc, aluminum, carbon steel, copper, copper alloys, galvanized metals and nickel.
· in contact with metals, such as aluminum, may generate flammable hydrogen gas
· in contact with bases, may evolve hydrogen and oxygen.

For incompatible materials - refer to Section 7 - Handling and Storage.

## Section 11 - TOXICOLOGICAL INFORMATION

EDTA IRON SODIUM SALT

### TOXICITY AND IRRITATION
■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

| TOXICITY | IRRITATION |
|---|---|
| Oral (rat) LD50: 5000 mg/kg | Nil Reported |

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.
Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.
<\p>.

### For ethylenediaminetetraacetic acid (EDTA) and its salts:
EDTA is a strong organic acid (approximately 1000 times stronger than acetic acid). It has a high affinity for alkaline-earth ions (for example, calcium and magnesium) and heavy-metal ions (for example, lead and mercury). This affinity generally results in the formation of highly stable and soluble hexadentate chelate complexes. EDTA's ability to complex is used commercially to either promote or inhibit chemical reactions, depending on application
EDTA and its salts are expected to be absorbed the lungs and gastrointestinal tract; absorption through the skin is unlikely.
In general, EDTA and its salts are mild skin irritants but considered severe eye irritants. The greatest risk in the human body will occur when the EDTA attempts to scavenge the trace metals used and required by the body
The binding of divalent and trivalent cations by EDTA can cause mineral deficiencies, which seem to be responsible for all of the known pharmacological effects. Sensitivity to the toxic effects of EDTA is, at least in part, related to the deficiency of zinc.
Several short term studies, reported no adverse effects from administering doses up to 5% of EDTA and its salts to lab rodents daily and for several weeks. Only diarrhoea and lowered food consumption were reported in animals given 5% disodium EDTA. However, abnormal effects were seen in animals that were fed mineral deficient diets. Abnormal symptoms were observed in male and female rats fed a low mineral diet (0.54% Ca and 0.013%Fe) with the addition of 0%, 0.5%, or 1% disodium EDTA for 205 days. Rats fed a low percent of disodium EDTA in the diet for short term studies with adequate minerals showed no signs of toxicity. Rats fed 0.5% disodium EDTA for 44-52 weeks were without deleterious effects on weight gain, appetite, activity and appearance. Rats fed 1% disodium EDTA with adequate mineral diet for 220 days showed no evidence of dental erosion.
EDTA and its salts are eliminated from the body, 95% via the kidneys and 5% by the bile, along with the metals and free ionic calcium which was bound in transit through the circulatory system

Trisodium EDTA was tested in a bioassay for carcinogenicity by the National Cancer Institute. Trisodium EDTA administered to male and female rats at low (3,750 ppm) or high (7,500 ppm) concentrations for 103 weeks produced no compound-related signs of chemical toxicity, and tumor incidence was not related to treatment .
EDTA and its salts should not pose a teratogenic concern based on previous studies in lab rodents. Study results indicate no teratogenic effects are likely in lab rodents at doses up to 1000 mg/kg . Adequate minerals in the diet and administration of tap water prevented possible teratogenic effects of EDTA during pregnancy. Teratogenic effects observed in lab rodents were likely due to animals maintained on deionised water and a semi-purified diet, and housed in nonmetallic caging. Infants and children will unlikely be exposed to high concentrations as in lab rodents.
Rats given 1250 mg/kg or 1500 mg/kg by gavage exhibited more maternal toxicity than the diet group, but produced only 21% malformations in the offspring at the lower dose. The subcutaneously administration of 375 mg/kg was also maternally toxic, but did not result in malformations in the offspring. Differences in toxicity and teratogenicity are probably related to absorption differences and interaction with metals . Disodium EDTA ingested during pregnancy is teratogenic in rats at 2% in the diet and greater.
The maximum human consumption of EDTA and its salts in foods was reported to be on the order of 0.4 mg/kg/day . Infants and children also generally drink tap water instead of deionised or distilled water. Even if young infants were to be fed some solid food, given the characteristics of EDTA and its salts, residues are not likely to be present at concentrations for potential sensitivity.

## Section 12 - ECOLOGICAL INFORMATION

No data

### Ecotoxicity

| Ingredient | Persistence: Water/Soil | Persistence: Air | Bioaccumulation | Mobility |
|---|---|---|---|---|
| EDTA iron sodium salt | HIGH | | LOW | MED |

## Section 13 - DISPOSAL CONSIDERATIONS

### Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
¦ Puncture containers to prevent re-use and bury at an authorized landfill.
Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:
· Reduction
· Reuse
· Recycling
· Disposal (if all else fails)
This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.
· Recycle wherever possible.
· Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

## Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

## Section 15 - REGULATORY INFORMATION

### REGULATIONS

**EDTA iron sodium salt (CAS: 15708-41-5,15708-42-6,149022-26-4) is found on the following regulatory lists;**
"Canada Domestic Substances List (DSL)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","International Council of Chemical Associations (ICCA) - High Production Volume List","OECD Representative List of High Production Volume (HPV) Chemicals","US EPA High Production Volume Program Chemical List","US Toxic Substances Control Act (TSCA) - Inventory"

## Section 16 - OTHER INFORMATION

**LIMITED EVIDENCE**

■ Cumulative effects may result following exposure*.

* (limited evidence).

**Ingredients with multiple CAS Nos**

Ingredient Name CAS EDTA iron sodium salt 15708-41-5, 15708-42-6, 149022-26-4

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■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Issue Date: Nov-23-2008

Print Date:Oct-22-2010

**Klozur® Persulfate Demand Test and Base Buffering Capacity test**

**Client:** WithersRavenel
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Wilmington, NC 28403
Brian Bellis
Phone: 910 – 256 – 9277
Email: bbellis@writhersravenel.com

**Performing Lab:** PeroxyChem Environmental Solutions USA
Tonawanda, New York

**Date** May 4, 2016

## I. Background

Klozur® activated persulfate is a strong oxidant capable of mineralizing a wide range of contaminants, including chlorinated solvents, petroleum hydrocarbons, polyaromatic hydrocarbons, gasoline additives, pesticides, and many others. Activation of the persulfate anion generates the sulfate radical, the primary species that drives the rapid destruction of the contaminants of concern. Activation can be accomplished by several methods[1]: heat, transition metals, addition of hydrogen peroxide, or utilizing high pH. Choice of the activation method will depend on the contaminant of concern and site characteristics.

A chemical oxidant is not specific as to what it will oxidize. As a result, activated persulfate will not only mineralize the contaminant of concern, but a portion of the oxidant will be used in oxidizing soil organics, reduced metals, and organic species that are not of concern. In addition, activated persulfate will undergo auto-decomposition, which will be a function of temperature, concentration and activation method. The demand upon the activated persulfate from all of these components is captured in a coarse screening test termed, "Klozur Demand Test". It is dependent upon the site characteristics, such as the organic content of the soil, the mineral loading, and soil type and collectively must be considered for estimating the magnitude of oxidant dosing during field application.

[1] PeroxyChem is the owner of licensee under various patents relating to the use of activation chemistries

The Klozur® Persulfate KDT test measures the loss of persulfate in the presence of soil, groundwater and activator over a period of 48 and 168 hours. The resulting KDT values can then be used as a guide to develop appropriate persulfate dosing for subsequent treatability testing and field applications.

When high pH is chosen as a means of activation, a Base Buffering Capacity (BBC) test is recommended. The goal of a BBC test is to determine the amount of sodium hydroxide (NaOH) needed to raise the pH of a soil to pH 10.5, which is necessary for Klozur persulfate activation. This report contains the results and observations from both a KDT and BBC test.

## II. Sample Handling

Client Sample Identification

Site Identification: Trex Charlotte, NC
Soil ID: MW-5
GW ID: MW-22

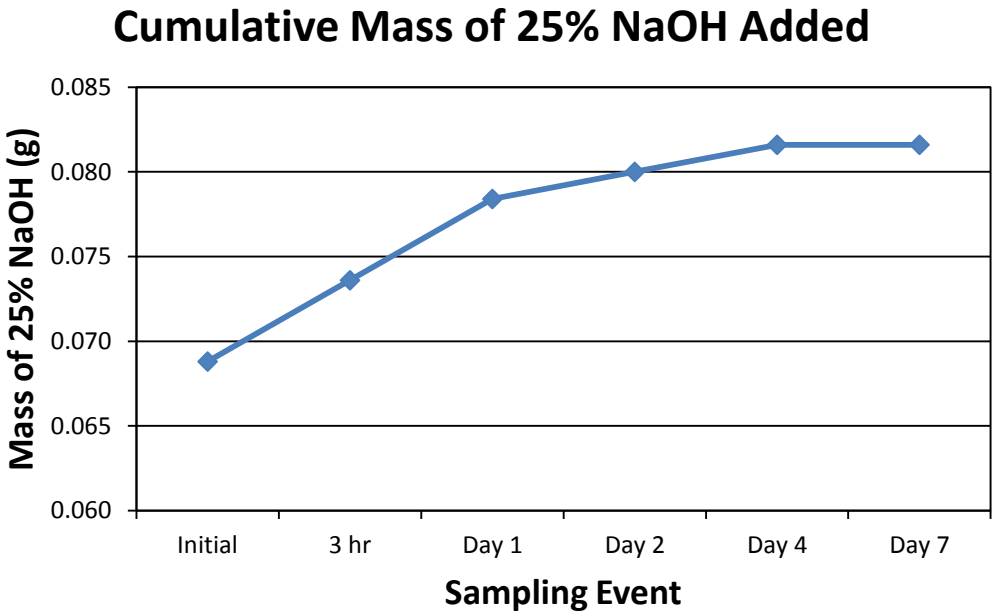
Handling Procedures

- The samples were received on April 21, 2016. Soil was transferred into a stainless steel bowl and mixed well. Soil was tan-brown clay and very sticky. Soil contained several large rocks and dense clumps of soil.
- The remaining soil was put into its original container and stored at ambient lab temperature.
- On April 25, 2016, the tubes were prepared according to the PeroxyChem Tonawanda KDT protocol using the provided soil and groundwater. Additional tubes were prepared according to the PeroxyChem Tonawanda BBC protocol using the provided soil and groundwater.
- The experimental samples were stored at room temperature and each sample was inverted several times once per day.
- The unused soil will be disposed of responsibly after about one month.

## III. Results

| Sample ID | Trial Activator | Soil Wt. (g) | Water Vol. (mL) | Klozur Dosage (g/Kg Soil) t=0 hrs. | Slurry pH | Klozur Consumption (g persulfate / kg dry soil) | |
|---|---|---|---|---|---|---|---|
| | | | | | | t=48hr | t=168 hr |
| Soil: MW-5<br>GW: MW-22 | High pH 25% NaOH | 10 | 30 | 15 | 11.25 – 11.77 | 1.04 | 1.44 |

| Sample ID | pH | Initial Dosing | 7 days | Total mass of 25% NaOH added over 7 days (g) | BBC (g 25% NaOH / kg dry soil) |
|---|---|---|---|---|---|
| Soil: MW-5<br>GW: MW-22 | **Initial pH** | 6.64 | 10.50 | 0.082 | 3.54 |
| | **Final pH** | 10.71 | -- | | |



## IV. Conclusions

The Klozur® Persulfate demand with high pH activation for the MW-5 soil sample ranges from approximately 1.04 g persulfate / kg dry soil after 48 hours and 1.44 g persulfate / kg dry soil after 168 hours. The BBC for your soil and groundwater was 3.54 g 25% NaOH / kg dry soil.

## V. Appendix – Photos from BBC test

**Photo 1:** Day 0, before initial dosing. From left to right: Tube #1, #2, and #3.

**Photo 2:** Day 7. From left to right: Tube #1, #2, and #3.

## VI. Authorizing Signatures

This report contains the results as determined by PeroxyChem laboratory protocol and are accurately represented herein.

Jessica Powell
Soil and Groundwater Laboratory Technician

Note: 1. PeroxyChem recommends performing suitable treatability testing and field pilot demonstration to determine the effectiveness of Klozur® activated persulfate on the contaminants of concern. KDT testing provides only an indication of the minimum amount of oxidant required to overcome the demands of soil, groundwater and other secondary species that contribute to the usage of the oxidant. The KDT results do not imply a guarantee of efficacy of the activated persulfate in actual field situations. 2. ANY SUCH QUANTITY OR WARRANTY IS EXPRESSLY DISCLAIMED.

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(C) A description of the rationale for selecting the injectants and concentrations proposed for injection, including an explanation or calculations of how the proposed injectant volumes and concentrations were determined;

Klozur SP (sodium persulfate) activated with iron-chelate (Fe-EDTA) was selected as the oxidant as it has been well documented to treat the site contaminants of concern (COCs) and has been safely applied at thousands of sites. The mass of Klozur SP was determined by combining two factors: 1) applying the site specific laboratory derived estimate of non-target demand of 1.44 g sodium persulfate per Kg soil to the entire site and 2) applying stoichiometric ratios of the amount of sodium persulfate required to treat the mass of contaminant estimated to be at the site. The mass of Fe-EDTA was based off of supplying enough iron into the subsurface to have 200 mg/L of Fe in the aquifer to activate the Klozur SP.

The target concentration of the KlozurSP solution to be injected is 20%, and this will be diluted in the aquifer immediately following injection. Use of iron to activate Klozur SP is very effective for the remediation of chlorinated ethenes, BTEX, chlorinated benzenes, 1,4 – dioxane, MTBE and low molecular weight polyaromatic hydrocarbons (PAHs). The use of a chelating agent, such as EDTA or citrate, helps to maintain iron solubility and transportability at elevated pH's. Determination of the amount of iron needed is straightforward and dependent upon the volume of groundwater to be treated. Chelated iron provides efficient activation while maintaining persulfate longevity within the subsurface.

(D) A description of the reactions between the injectants and the contaminants present including specific breakdown products or intermediate compounds that may be formed by the injection;

The KlozurSP activated persulfate will directly oxidize the dissolved contaminants. Intermediate products are not typically observed. Complete mineralization would be to carbon dioxide, water and chlorine. Any short-lived breakdown products or intermediate compounds are expected to be oxidized. Treatment does often result in levels of acetone. This is readily biodegraded.

(E) A summary of results if modeling or testing was performed to investigate the injectant's potential or susceptibility for biological, chemical, or physical change in the subsurface; and

The site specific soil oxidant demand (SOD) was quantified in the laboratory using soil from the site. The SOD was determined to be 1.44 g of KlozurSP / kg of soil. A copy of the analytical report is provided in this attachment.

(F) An evaluation concerning the development of byproducts of the injection process, including increases in the concentrations of naturally occurring substances. Such an evaluation shall include the identification of the specific

byproducts of the injection process, projected concentrations of byproducts, and areas of migration as determined through modeling or other predictive calculations.

The anticipated byproducts from the KlozurSP injection include carbon dioxide, oxygen, water, chlorine, sodium, iron, and sulfate. At some sites, acetone is observed shortly after an injection but does not typically persist as it is biodegradable. The chlorine and sulfate have many potential reaction (fate) pathways in the aquifer, both chemical and biological. The final end products will depend on site geochemical conditions. Use of iron EDTA as an activator will also potentially result in elevated soluble iron and lower pH for a period of time. Over time, site geochemical conditions are expected to normalize.

| WithersRavenel Engineers \| Planners \| Surveyors | Project TREX | Project No. 03130430.06 |
|---|---|---|
| | Subject INJECTION QUANTITIES | |
| | Date 7/7/16 By EJB | Sheet No. 1 OF 1 |

PEROXYCHEM ACTIVATED PERSULFATE RECIPE

- FROM MAY 6, 2016 PEROXYCHEM ACTIVATED PERSULFATE DEMAND CALCULATIONS USING HIGHEST VOC CONCENTRATIONS DETECTED IN THE INJECTION AREA:

  POUNDS OF PERSULFATE NEEDED = 158,700 lb

- TO PRODUCE A 30% SOLUTION OF SODIUM PERSULFATE MIX 310.5 lb KLOZUR PERSULFATE W/ 86.9 gal $H_2O$ TO MAKE 100 gal OF 30% SOLUTION

  ∴ 158,700 lb ÷ 310.5 lb/100 gal mix = 511 100 gal mixes

  TOTAL VOLUME = 511 × 100 ≅ 51,100 gal

- FE EDTA ACTIVATOR: TO PRODUCE A RECOMMENDED CONCENTRATION OF 200 ppm OF AVAILABLE IRON IN GROUNDWATER MIX EACH POUND OF FE EDTA W/ 0.75 gal $H_2O$

- ACCORDING TO PEROXYCHEM, 15,245 lb FE EDTA WILL BE NEEDED BASED ON STOICHIOMETRIC CALCULATIONS.

  ∴ 15,245 lb FE EDTA × 0.75 gal/lb ≅ 11,450 gal 200 ppm solution

- TOTAL INJECTANT VOLUME

  51,100 gal 30% KLOZUR + 11,450 gal 200 ppm FE EDTA = 62,550 gal.

- INJECTANT VOLUME PER WELL

  PEROXYCHEM RECIPE DESIGNED FOR AREA NORTH OF 3114 CALLMAN AVE BLDG WHERE 18 INJECTION WELLS WILL BE INSTALLED

  ∴ TOTAL INJECTANT VOL/WELL = 62,550 gal/18 wells

  = 3,475 gal/WELL

# ATTACHMENT 4

# INJECTION PROCEDURE

# Trex Properties, Charlotte NC

## Table 3: Summary of Proposed Injection Procedure and Schedule
### Trex Properties: 3114 and 3124 Cullman Avenue, Charlotte, NC
### W&R Project No. 03130430.06

| Well ID | Total Depth of Well Casing (ft bgs) | Screened Interval (ft bgs) | Screened Material | Quantity of Injectant (gal) | Average Max Injection Pressure (psi)[4] | Injection Schedule (Sequential Day) | Proposed Average Daily Rate of Injection (gpd) |
|---|---|---|---|---|---|---|---|
| IW-1 | 26 | 6-26 | Saprolite/PWR | 3,475 | 20-40 | 1-2 | Inject into wells IW-1 and IW-2 at ~5 gpm each for ~12 hours: (~6,950 gpd) |
| IW-2 | 26 | 6-26 | Saprolite/PWR | 3,475 | 20-40 | 1-2 | |
| IW-3 | 31 | 11-31 | Saprolite/PWR | 3,475 | 20-40 | 2-3 | Inject into wells IW-3, IW-4, IW-5 and IW-6 at ~5 gpm each for ~12 hours: (~6,950 gpd) |
| IW-4 | 39 | 19-39 | Saprolite/PWR | 3,475 | 20-40 | 2-3 | |
| IW-5 | 39 | 19-39 | SaprolitePWR | 3,475 | 20-40 | 2-3 | |
| IW-6 | 39 | 19-39 | SaprolitePWR | 3,475 | 20-40 | 2-3 | |
| IW-7 | 39 | 19-39 | Saprolite/PWR | 3,475 | 20-40 | 4-5 | Inject into wells IW-7, IW-8, IW-9 and IW-10 at ~5 gpm each for ~12 hours: (~6,950 gpd) |
| IW-8 | 47 | 27-47 | Saprolite/PWR | 3,475 | 20-40 | 4-5 | |
| IW-9 | 51 | 31-51 | Saprolite/PWR | 3,475 | 20-40 | 4-5 | |
| IW-10 | 51 | 31-51 | Saprolite/PWR | 3,475 | 20-40 | 4-5 | |
| IW-11 | 51 | 31-51 | Saprolite/PWR | 3,475 | 20-40 | 6-7 | Inject into wells IW-11, IW-12, IW-13 and IW-14 at ~5 gpm each for ~12 hours: (~6,950 gpd) |
| IW-12 | 64 | 44-64 | PWR | 3,475 | 40-80 | 6-7 | |
| IW-13 | 64 | 44-64 | PWR | 3,475 | 40-80 | 6-7 | |
| IW-14 | 73 | 53-73 | PWR | 3,475 | 40-80 | 6-7 | |
| IW-15 | 73 | 53-73 | PWR | 3,475 | 40-80 | 8-9 | Inject into wells IW-15, IW-16, IW-17 and IW-18 at ~5 gpm each for ~12 hours: (~6,950 gpd) |
| IW-16 | 73 | 53-73 | PWR | 3,475 | 40-80 | 8-9 | |
| IW-17 | 73 | 53-73 | PWR | 3,475 | 40-80 | 8-9 | |
| IW-18 | 73 | 53-73 | PWR | 3,475 | 40-80 | 8-9 | |
| IW-19 | 73 | 53-73 | PWR | 3,475 | 40-80 | 10-11 | Inject into wells IW-19 and IW-20 at ~5 gpm each for ~12 hours: (~6,950 gpd) |
| IW-20 | 73 | 53-73 | PWR | 3,475 | 40-80 | 10-11 | |

***Total quantity to be injected:*** 69,500 *gallons*

**Notes:**

1. ft bgs = Feet below ground surface
2. PWR = Partially Weathered Rock.
3. gal = gallons gpd = gallons per day
4. psi = pounds per square inch. During injections, the persulfate solution will be manifolded to multiple locations to maximize efficiencies in the field. For well injections, contractor will utilize a threaded PVC well cap equipped with a pressure gauge and pressure relief valve. Contractor will inject at up to four well locations simultaneously.

## Technical Approach to Activated Persulfate Injection: Trex Properties

At the initiation of the injection field activities, contractor will accept delivery of the sodium persulfate and FeEDTA before CLIENTS mobilization. Contractor will be equipped with an all-terrain forklift to manage reagents and will store persulfate inside a large secondary containment berm near the work area. At the beginning of each injection day, contractor will park our custom-built injection vehicle (photos included) near the injection area. Persulfate will be brought to the area and stored adjacent to the injection vehicle.

When injecting FeEDTA activated persulfate we simultaneously feed caustic and the persulfate at the same time. This provides for the best mixing of activator and oxidant. During injection all injection rates and pressures are recorded with pressure gauges and custom built digital turbine flow meters. Depending on expected flow rates, the appropriate size flow meter is selected. To also maintain consistent flows and pressures, a pressure relief valve ensure design injection pressures are not exceeded. The persulfate will be mixed in 500 gallons batches using 2000 lb super sacks and contractor's Bulk Mixing ISCO trailer (see photo below).

Due to the corrosively of FeEDTA and persulfate all injection and mixing equipment will be either stainless steel, PVC or plastic tanks. PVC injection hose is also used due to its compatibility with caustic and persulfate and is usually pressure rated at < 250 PSI.

During injection there is always a safety shower and eye wash available and PPE includes Tyvek, Respirator when mixing, goggles and a face shield. All injection equipment is kept in secondary containment, and if it rains prior to discharge of rain water it is tested for pH to ensure it hasn't been impacted by the persulfate or caustic.

After injection distribution can be assessed through electrical conductivity loggings or sampling nearby wells for DO, ORP, pH, Conductivity, and persulfate concentration (test kit). Depending on the amount of contaminant mass in solid and groundwater, multiple injection events may be required to meet remediation expectations

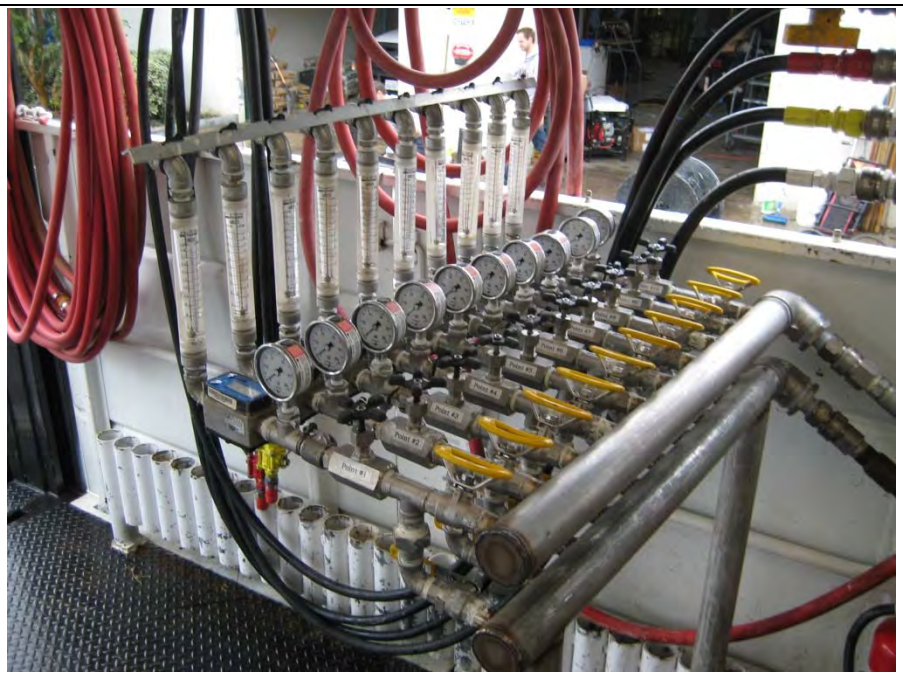
During injections, the persulfate solution will be manifolded to multiple locations to maximize efficiencies in the field. For well injections, contractor will utilize a PVC well cap fixed with a threaded cap to each location. Each well cap will be equipped with a pressure gauge and pressure relief valve. contractor will inject at up to four well locations simultaneously. CLIENTS estimates a flow rate per point of 5 gallons per minute (gpm) at less than 40 pounds per square inch (PSI) per well. Contractor assumes that all points will accept persulfate at these flows and pressures. If flows cannot be established or pressures cannot be maintained below 40 PSI resulting in additional time on site, this will be managed through a change order.

Following set up, CTS will obtain water from a nearby fire hydrant using a backflow preventer and supply the bulk mixture. The City water will then be utilized as mix water in the persulfate injections.

## Equipment Photos

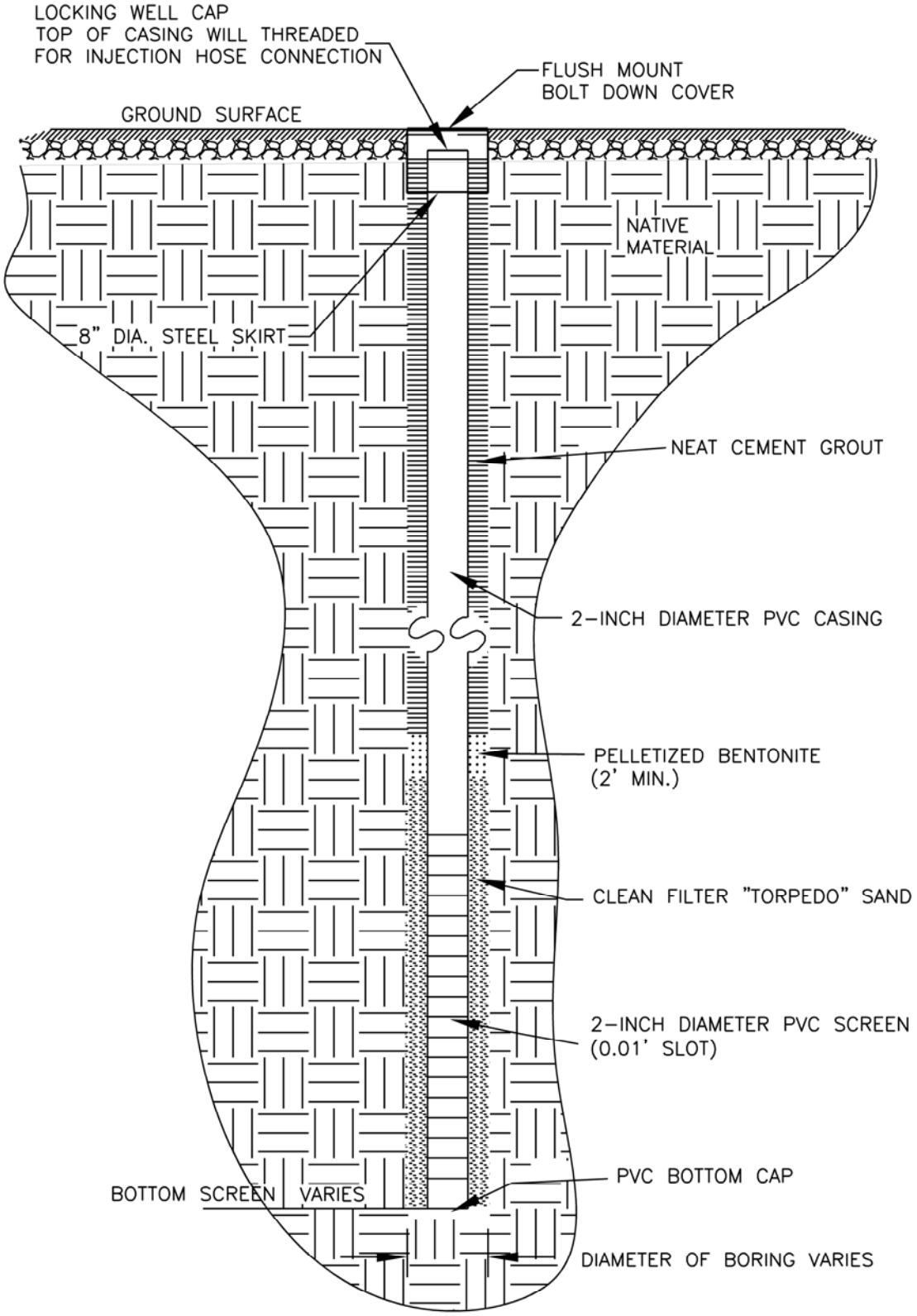
**Vironex Custom-built Injection Rig**

**Interior of Vironex Custom-built injection rig with progressive cavity pump on right (red) and mixing tanks (black).**



**Vironex 10-point manifold system, similar to what would be used for sodium persulfate**

INJECTION WELL CONSTRUCTION
(TYPICAL)




NOTE: INJECTION WELL INTERVALS VARY DEPENDING ANALYTICAL RESULTS FOR THE EXISTING GROUNDWATER MONITORING WELLS. PLEASE REFER TO TABLE 2 FOR SPECIFIC WELL CONSTRUCTION DETAILS.

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**TREX PROPERTIES, CHARLOTTE, NC**
3144 AND 3124 CULLMAN AVE.
CHARLOTTE, MECKLENBURG COUNTY, NC

**NESTED INJECTION WELL CONSTRUCTION**

| DRAWN BY: | SCALE: | FIGURE NO.: |
|---|---|---|
| CF | NTS | 1 |
| APPROVED BY: | DATE: | PROJECT NO.: |
| BB | 3/21/2016 | 03130430 |

W:\13\13-0430\130430.06-Trex Pilot Testing & Design\CAD\injection well fig.dwg- July 11, 2016 - FAY, CHRISTOPHER

# ATTACHMENT 7

# MONITORING PLAN

# Trex Properties, Charlotte NC

## Post Injection Groundwater Monitoring Plan

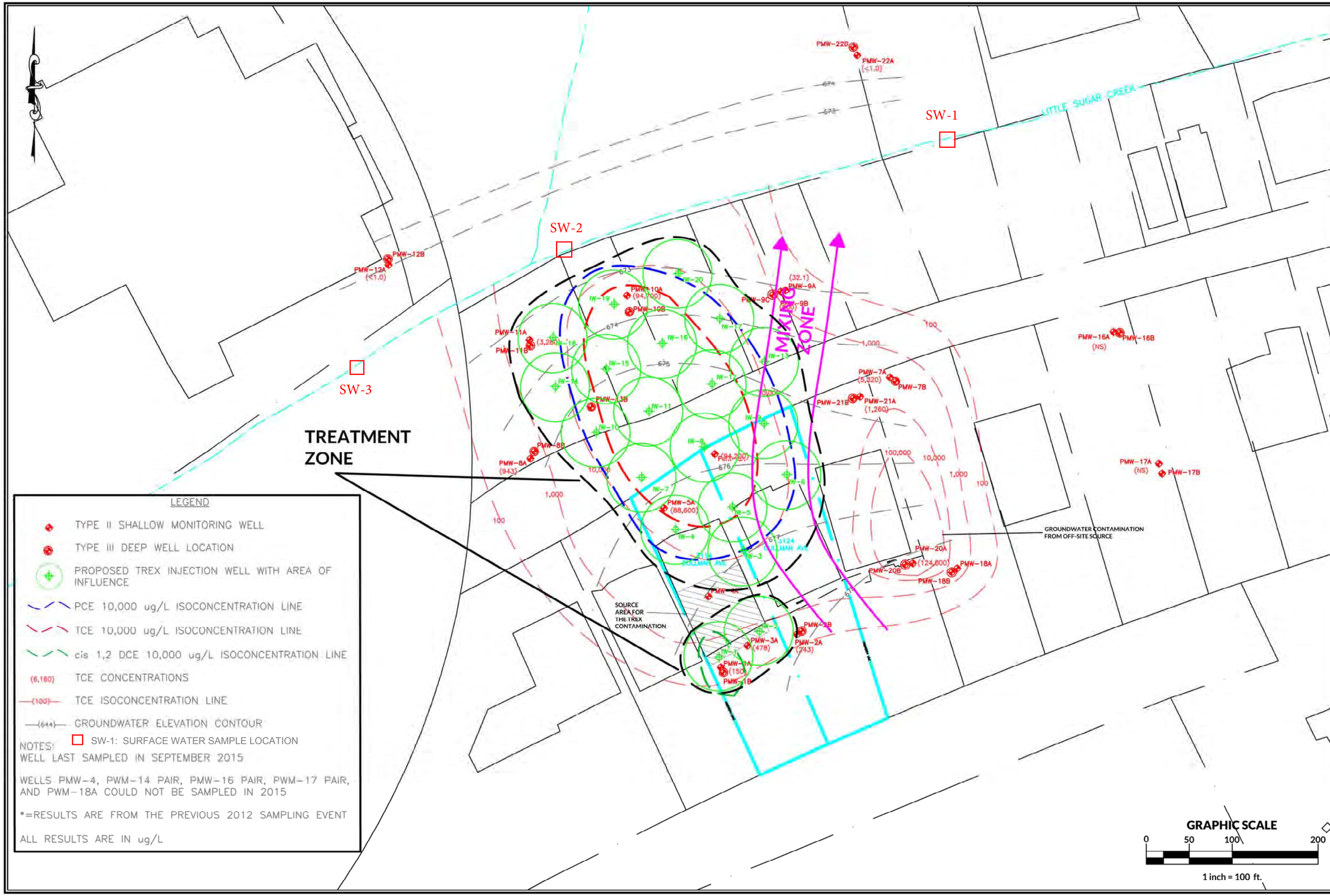
Following completion of the full scale injection groundwater samples will be collected from the following monitoring wells on a semi-annual basis for the first year and annually thereafter to evaluate the effectiveness of the activated persulfate injection. The locations of these wells are shown in relation to the proposed injection activities on the attached Figure 3.

| Well ID | Screened Interval (ft bgs) | ~ Depth of Groundwater (ft TOC) |
|---|---|---|
| PMW-1A | 7-12 | 9.5 |
| PMW-1B | 49-54 | 9.6 |
| PMW-2A | 20-30 | 9.7 |
| PMW-2B | 50-55 | 9.7 |
| PMW-3A | 15-25 | 9.5 |
| PMW-4A | 2-12 | 10.0 |
| PMW-5A | 29-39 | 7.5 |
| PMW-6A | 28-38 | 7.7 |
| PMW-7A | 28-38 | 9.4 |
| PMW-7B | 50-55 | 9.5 |
| PMW-8A | 32-42 | 10.8 |
| PMW-8B | 53-58 | 10.2 |
| PMW-9A | 9-19 | 10.3 |
| PMW-9B | 24-34 | 10.3 |
| PMW-9C | 45-50 | 10.3 |
| PMW-10A | 53-63 | 9.1 |
| PMW-10B | 68-73 | 9.3 |
| PMW-11A | 53-63 | 9.3 |
| PMW-11B | 73-78 | 9.3 |
| PMW-20A | 34-39 | 7.8 |
| PMW-20B | 55-60 | 8.5 |
| PMW-21A | 30-35 | 8.9 |
| PMW-21B | 62-67 | 8.7 |

Groundwater samples from each of the above wells will be collected prior to the full scale injection, and within one-month following completion of the injection. The next set of groundwater samples will be collected approximately six months following completion of the injection. Subsequent sets of groundwater samples will be collected on an annual basis. Groundwater samples from the wells listed will be analyzed for volatile organic compounds (VOCs), persulfate, total organic carbon (TOC), sulfate, chloride, and ethenes. Additionally, the samples will be tested in the field for temperature, pH, specific conductance, dissolved oxygen and redox potential.

Monitoring will also include collection and testing of three surface water samples from the stream adjacent to the site as well as background surface water sampling (see attached Figure 3). These samples will be collected on the same schedule as the groundwater samples. The surface water samples will be analyzed for VOCs by an EPA-certified laboratory. Additionally, the samples will be tested in the field for temperature, pH, specific conductance, dissolved oxygen and redox potential.

Laboratory analytical results for groundwater samples obtained from the site in 2012, 2014 and 2015 indicate that the VOCs tetrachloroethene (PCE), trichloroethene (TCE), cis 1,2 dichloroethene (DCE), 1,1 DCE, and 1,4 dioxane are present at the most groundwater monitoring locations at concentrations that exceed their North Carolina groundwater standards established in Title 15A of the North Carolina Administrative Code Subchapter 2L (2L Standards). For this reason, these five VOCs are considered to be the primary contaminants of concern present in groundwater in the vicinity of the site. Maps that show the horizontal distribution of these VOCs in groundwater are provided in **Attachment 9**. Cross-sections which show the vertical distribution of these VOCs are included in **Attachment 1**.




LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- PROPOSED TREX INJECTION WELL WITH AREA OF INFLUENCE
- PCE 10,000 ug/L ISOCONCENTRATION LINE
- TCE 10,000 ug/L ISOCONCENTRATION LINE
- cis 1,2 DCE 10,000 ug/L ISOCONCENTRATION LINE
- (6,160) TCE CONCENTRATIONS
- (100) TCE ISOCONCENTRATION LINE
- (644) GROUNDWATER ELEVATION CONTOUR
- SW-1: SURFACE WATER SAMPLE LOCATION

NOTES:
WELL LAST SAMPLED IN SEPTEMBER 2015

WELLS PMW-4, PWM-14 PAIR, PMW-16 PAIR, PWM-17 PAIR, AND PWM-18A COULD NOT BE SAMPLED IN 2015

*=RESULTS ARE FROM THE PREVIOUS 2012 SAMPLING EVENT

ALL RESULTS ARE IN ug/L

| | | | |
|---|---|---|---|
| DRAWN BY: CF | SCALE: 1"=100' | FIGURE NO.: 3 | |
| APPROVED BY: BB | DATE: 3/17/2016 | PROJECT NO.: 03130490.06 | |

# CONCEPTUAL INJECTION STRATEGY

**TREX PROPERTIES, CHARLOTTE, NC**
3144 AND 3124 CULLMAN AVE.
CHARLOTTE, MECKLENBURG COUNTY, NC

WithersRavenel
Engineers | Planners | Surveyors
115 MacKenan Drive | Cary, NC 27511 | 919.469.3340 | license #: C-0832 | www.withersravenel.com

# ATTACHMENT 8

# WELL DATA TABULATION

# Trex Properties, Charlotte NC

## Table 1: Summary of Exsisting Monitoring Well Construction Information

**Trex Properties: 3114 and 3124 Cullman Avenue, Charlotte, NC**

**W&R Project No. 03130430.01**

| Well ID | Date Installed | Decimal Latitude | Decimal Longitude | Well Type | Total Depth of Well Casing (ft bgs) | Total Depth of Outer Casing (ft bgs) | Screened Interval (ft bgs) | Screened Material | Height of Top of Casing (ft ags) | Ground Surface Elevation (ft msl) | Top of Casing Elevation (ft msl) | Depth to PWR (ft bgs) | Top of PWR Elevation (ft msl) | Depth to Bedrock (ft bgs) | Top of Bedrock Elevation (ft msl) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PMW-1A | 09/14/12 | N 35.248662 | W 80.809590 | Type II | 12 | -- | 7-12 | Saprolite | 3.33 | 683.62 | 686.95 | 10 | 673.62 | -- | -- |
| PMW-1B | 09/13/12 | N 35.248650 | W 80.809583 | Type III | 54 | 44 | 49-54 | PWR | 3.75 | 683.12 | 686.87 | 10 | 673.12 | 55 | 628.12 |
| PMW-2A | 09/14/12 | N 35.248775 | W 80.809296 | Type II | 30 | -- | 20-30 | Saprolite | 3.58 | 683.76 | 687.34 | 30 | 653.76 | -- | -- |
| PMW-2B | 09/13/12 | N 35.248784 | W 80.809282 | Type III | 55 | 37 | 50-55 | PWR | 3.56 | 683.42 | 686.98 | 30 | 653.42 | 55 | 628.42 |
| PMW-3A | 09/14/12 | N 35.248720 | W 80.809485 | Type II | 25 | -- | 15-25 | Saprolite | 3.58 | 683.42 | 687.00 | 25 | 658.42 | -- | -- |
| PMW-4A | 06/14/12 | N 35.248890 | W 80.809644 | Type II | 12 | -- | 2-12 | Saprolite | 3.41 | 687.45 | 690.86 | -- | -- | -- | -- |
| PMW-5A | 06/13/12 | N 35.249154 | W 80.809816 | Type II | 39 | -- | 29-39 | PWR | -0.28 | 683.88 | 683.60 | 25 | 658.88 | -- | -- |
| PMW-6A | 06/12/12 | N 35.249330 | W 80.809620 | Type II | 38 | -- | 28-38 | PWR | -0.31 | 684.07 | 683.76 | 30 | 654.07 | -- | -- |
| PMW-7A | 06/12/12 | N 35.249592 | W 80.808951 | Type II | 38 | -- | 28-38 | PWR | -0.25 | 683.92 | 683.67 | 30 | 653.92 | -- | -- |
| PMW-7B | 06/25/12 | N 35.249583 | W 80.808930 | Type III | 55 | 40 | 50-55 | PWR | -0.30 | 684.34 | 684.04 | 30 | 654.34 | -- | -- |
| PMW-8A | 06/11/12 | N 35.249319 | W 80.810339 | Type II | 42 | -- | 32-42 | PWR | -0.34 | 685.10 | 684.76 | 35 | 650.10 | -- | -- |
| PMW-8B | 06/21/12 | N 35.249342 | W 80.810325 | Type III | 58 | 43 | 53-58 | PWR | -0.33 | 685.31 | 684.98 | 35 | 650.31 | -- | -- |
| PMW-9A | 06/08/12 | N 35.249864 | W 80.809364 | Type II | 19 | -- | 9-19 | Saprolite | -0.29 | 683.61 | 683.32 | -- | -- | -- | -- |
| PMW-9B | 06/13/12 | N 35.249860 | W 80.809382 | Type II | 34 | -- | 24-34 | Saprolite | -0.25 | 683.66 | 683.41 | 30 | 653.66 | -- | -- |
| PMW-9C | 06/21/12 | N 35.249852 | W 80.809409 | Type III | 50 | 35 | 45-50 | PWR | -0.26 | 683.83 | 683.57 | 30 | 653.83 | -- | -- |
| PMW-10A | 06/11/12 | N 35.249839 | W 80.809968 | Type II | 63 | -- | 53-63 | PWR | -0.31 | 683.25 | 682.94 | 55 | 628.25 | -- | -- |
| PMW-10B | 06/21/12 | N 35.249789 | W 80.809963 | Type III | 73 | 64 | 68-73 | PWR | -0.32 | 683.49 | 683.17 | 55 | 628.49 | 73 | 610.49 |
| PMW-11A | 06/12/12 | N 35.249696 | W 80.810347 | Type II | 63 | -- | 53-63 | PWR | -0.29 | 682.91 | 682.62 | 55 | 627.91 | -- | -- |
| PMW-11B | 06/21/12 | N 35.249676 | W 80.810344 | Type III | 78 | 63 | 73-78 | PWR | -0.30 | 683.11 | 682.81 | 55 | 628.11 | 78 | 605.11 |
| PMW-12A | 06/25/12 | N 35.249935 | W 80.810901 | Type II | 40 | -- | 30-40 | PWR | -0.32 | 681.89 | 681.57 | 20 | 661.89 | -- | -- |
| PMW-12B | 06/25/12 | N 35.249943 | W 80.810893 | Type III | 49 | 42 | 44-49 | PWR | -0.31 | 682.01 | 681.70 | 20 | 662.01 | 49 | 633.01 |
| PMW-13B | 07/12/12 | N 35.249474 | W 80.810109 | Type III | 103 | 88 | 98-103 | Bedrock | -0.28 | 685.55 | 685.27 | 50 | 635.55 | 88 | 597.55 |
| PMW-14A | 09/19/12 | N 35.249161 | W 80.811296 | Type II | 30 | -- | 20-30 | Saprolite | 2.89 | 678.25 | 681.14 | 25 | 653.25 | -- | -- |
| PMW-14B | 09/19/12 | N 35.249159 | W 80.811280 | Type III | 50 | 32 | 45-50 | PWR | 2.85 | 678.15 | 681.00 | 25 | 653.15 | -- | -- |
| PMW-16A | 09/19/12 | N 35.249751 | W 80.808092 | Type II | 22 | -- | 12-22 | PWR | -0.28 | 683.54 | 683.26 | 5 | 678.54 | -- | -- |
| PMW-16B | 09/19/12 | N 35.249751 | W 80.808074 | Type III | 55 | 24 | 50-55 | PWR | -0.30 | 683.67 | 683.37 | 5 | 678.67 | 55 | 628.67 |
| PMW-17A | 09/19/12 | N 35.249333 | W 80.807911 | Type II | 22 | -- | 12-22 | PWR | -0.31 | 686.53 | 686.22 | 5.5 | 681.03 | -- | -- |
| PMW-17B | 09/12/12 | N 35.249305 | W 80.807897 | Type II | 50 | -- | 45-50 | PWR | -0.29 | 686.40 | 686.11 | 5.5 | 680.90 | 55 | 631.40 |
| PMW-18A | 09/14/12 | N 35.248972 | W 80.808679 | Type II | 22 | -- | 12-22 | Saprolite | 3.58 | 682.69 | 686.27 | 22 | 660.69 | -- | -- |
| PMW-18B | 09/14/12 | N 35.248965 | W 80.808696 | Type III | 43 | 22 | 38-43 | PWR | 3.50 | 682.90 | 686.40 | 22 | 660.90 | 43 | 639.90 |
| PMW-20A | 12/11/14 | N 35.248998 | W 80.808867 | Type II | 39 | -- | 34-39 | Saprolite | 2.75 | 683.28 | 686.03 | 39 | -- | -- | 643.98 |
| PMW-20B | 12/09/14 | N 35.248990 | W 80.808881 | Type III | 60 | 45 | 55-60 | Rock | 3.32 | 683.32 | 686.64 | -- | -- | 39 | 644.02 |
| PMW-21A | 12/02/14 | N 35.249524 | W 80.809077 | Type II | 35 | -- | 30-35 | Saprolite | -0.41 | 683.62 | 683.21 | 35 | 648.31 | -- | -- |
| PMW-21B | 12/03/14 | N 35.249520 | W 80.809094 | Type III | 67 | 40 | 62-67 | PWR | -0.31 | 683.57 | 683.26 | 35 | 648.27 | 67 | 616.27 |
| PMW-22A | 12/08/14 | N 35.250615 | W 80.809111 | Type II | 63 | -- | 58-63 | Saprolite | 3.10 | 683.93 | 687.03 | 63 | 620.81 | -- | -- |
| PMW-22B | 12/09/14 | N 35.250636 | W 80.809114 | Type III | 86 | 70 | 81-86 | PWR | 2.64 | 684.24 | 686.88 | 63 | 621.15 | 85 | 599.15 |

**Notes:**

1. ft bgs = Feet below ground surface
2. ft toc = Feet below top of casing
3. ft ags  Feet above ground surface
4. ft msl  Feet above mean sea level
5. PWR = Partially Weathered Rock.
6. -- = Not Applicable

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) 2000 4000 6000 8000 10000 / ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 0 | Gravel<br>Tan/brown clayey SILT (ML). | | 683.8 | | | Lab Sample | ★ 3480 ★ 8930 |
| | | | | SS | | 5-10-19 | ● 29 |
| 5 | Brown clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | | 678.8 | SS | | 12-27-29 | ● 50 |
| 10 | PARTIALLY WEATHERED ROCK | | 673.8 | SS | | 29-39-50/3" | ● 100 |
| | Auger Refusal | | | | | | |
| 15 | | | 668.8 | | | | |
| 20 | | | 663.8 | | | | |
| 25 | | | 658.8 | | | | |
| 30 | | | 653.8 | | | | |
| 35 | | | 648.8 | | | | |
| 40 | | | 643.8 | | | | |
| 45 | | | 638.8 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MDP 6/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 1A
**COORD N:** 35.2486
**COORD E:** -80.8096
**DRILLED:** September 14, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) | ● SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Gravel | 683.8 | | | | | |
| | Tan/brown clayey SILT (ML) | | | | Lab Sample | 3480 | |
| | | | | | | 8930 | |
| | | | SS | | 5-10-19 | | 29 |
| 5 | Brown clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | 678.8 | | | | | |
| | | | SS | | 12-27-29 | | 56 |
| 10 | PARTIALLY WEATHERED ROCK | 673.8 | | | | | |
| | Auger Refusal | | SS | | 29-39-50/3" | | 100 |
| | Tan/Brown PARTIALLY WEATHERED ROCK with intermittent layers of SILT | | | | | | |
| 15 | Harder Drilling | 668.8 | | | | | |
| | Softer Drilling | | | | | | |
| 20 | | 663.8 | | | | | |
| | Harder Drilling | | | | | | |
| 25 | | 658.8 | | | | | |
| | Softer Drilling | | | | | | |
| | Brown clayey SILT (ML) | | | | | | |
| 30 | | 653.8 | | | | | |
| | Tan PARTIALLY WEATHERED ROCK with intermittent layers of SILT | | | | | | |
| 35 | | 648.8 | | | | | |
| | Slightly Harder Drilling | | | | | | |
| 40 | | 643.8 | | | | | |
| 45 | | 638.8 | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with outer 6" casing set at 44 feet bgs
PREPARED BY: MOP 9/26/12
CHECKED BY: [illegible] 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 1B
**COORD N:** 35.2486
**COORD E:** -80.8096
**DRILLED:** September 13, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE** 1 **OF** 2

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) 2000 4000 6000 8000 10000 ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 45 | | | 638.8 | | | | |
| 50 | | | 633.8 | | | | |
| 55 | Boring Terminated at 55 feet on gray to black competent rock based on drilling observations | | 628.8 | | | | |
| 60 | | | 623.8 | | | | |
| 65 | | | 618.8 | | | | |
| 70 | | | 613.8 | | | | |
| 75 | | | 608.8 | | | | |
| 80 | | | 603.8 | | | | |
| 85 | | | 598.8 | | | | |
| 90 | | | 593.8 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with outer 6" casing set at 44 feet bgs
PREPARED BY: MDP 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 1B
**COORD N:** 35.2486
**COORD E:** -80.8096
**DRILLED:** September 13, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) | ● SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Gravel | 682.1 | | | | | |
| | Brown clayey SILT (ML). | | | | Lab Sample | ★ 3.1<br>★ 1.4 | |
| | | | SS | | 3-2-3 | | 5 |
| 5 | Brown/tan clayey SILT (ML). | 677.1 | | | | | |
| | | | SS | | 6-7-12 | | 19 |
| 10 | | 672.1 | | | | | |
| | | | SS | | 8-10-12 | | 22 |
| 15 | Brown with mottled white, clayey SILT (ML). | 667.1 | | | | | |
| | | | SS | | 4-10-10 | | 20 |
| 20 | | 662.1 | | | | | |
| | | | SS | | 14-14-15 | | 29 |
| 25 | Brown with mottled white, clayey SILT (ML), with PARTIALLY WEATHERED ROCK FRAGMENTS. | 657.1 | | | | | |
| | | | SS | | 13-26-39 | | 65 |
| 30 | Auger Refusal | 652.1 | | | | | |
| | | | SS | | 20-35-50/4" | | 100 |
| 35 | | 647.1 | | | | | |
| 40 | | 642.1 | | | | | |
| 45 | | 637.1 | | | | | |

LEGEND

★ OVA (ppm): 2000, 4000, 6000, 8000, 10000

● SPT (bpf): 10 20 30 40 50 60 70 80 90 100

SOIL LOG 4 BLOWS FOR EDIT SOIL BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MDP 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 2A
**COORD N:** 35.2488
**COORD E:** -80.8091
**DRILLED:** September 14, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) | ● SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Gravel | 682.1 | | | | | |
| | Brown clayey SILT (ML). | | | | Lab Sample | 3.1 | |
| | | | | | | 1.4 | |
| | | | SS | | 3-2-3 | | 5 |
| 5 | Brown/tan clayey SILT (ML). | 677.1 | | | | | |
| | | | SS | | 6-7-12 | | 9 |
| 10 | | 672.1 | | | | | |
| | | | SS | | 8-10-12 | | 22 |
| 15 | Brown with mottled white, clayey SILT (ML). | 667.1 | | | | | |
| | | | SS | | 4-10-10 | | 20 |
| 20 | | 662.1 | | | | | |
| | | | SS | | 14-14-15 | | 29 |
| 25 | Brown with mottled white, clayey SILT (ML), with PARTIALLY WEATHERED ROCK FRAGMENTS. | 657.1 | | | | | |
| | | | SS | | 13-26-39 | | 65 |
| 30 | | 652.1 | | | | | |
| | | | SS | | 20-35-50/4" | | 100 |
| | PARTIALLY WEATHERED ROCK with intermittent layers of SILT | | | | | | |
| | Auger Refusal | | | | | | |
| 35 | | 647.1 | | | | | |
| | Brown | | | | | | |
| 40 | Softer Drilling | 642.1 | | | | | |
| | Tan<br>Harder Drilling | | | | | | |
| | Softer Drilling | | | | | | |
| 45 | | 637.1 | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8 5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 37 feet bgs
PREPARED BY: MDF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Dotrex **BORING NO.:** PMW- 2B
**COORD N:** 35.2488
**COORD E:** -80.8091
**DRILLED:** September 13, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | SAMPLES TYPE | SAMPLES N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) 2000 4000 6000 8000 10000 / ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 45 | | | 637.1 | | | | |
| | Gray PARTIALLY WEATHERED ROCK with intermittent layers of SILT<br>Slightly Harder Drilling | | | | | | |
| 50 | | | 632.1 | | | | |
| 55 | Boring Terminated at 55 feet on gray competent rock based upon drilling observations | | 627.1 | | | | |
| 60 | | | 622.1 | | | | |
| 65 | | | 617.1 | | | | |
| 70 | | | 612.1 | | | | |
| 75 | | | 607.1 | | | | |
| 80 | | | 602.1 | | | | |
| 85 | | | 597.1 | | | | |
| 90 | | | 592.1 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 37 feet bgs
PREPARED BY: RDF 9/26/12
CHECKED BY: AMC 10/3/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 2B
**COORD N:** 35.2488
**COORD E:** -80.8091
**DRILLED:** September 13, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | OVA (ppm) / SPT (bpf) |
|---|---|---|---|---|---|---|
| 0 | Gravel | 682.7 | | | | |
| | Brown clayey SILT (ML). | | | | Lab Sample | 9324, 10000 |
| | | | SS | X | 3-3-3 | 6 |
| 5 | | 677.7 | | | | |
| | | | SS | X | 5-5-7 | 12 |
| 10 | Brown and mottled white clayey SILT (ML). | 672.7 | | | | |
| | | | SS | X | 5-6-6 | 12 |
| 15 | | 667.7 | | | | |
| | | | SS | X | 8-10-16 | 26 |
| 20 | | 662.7 | | | | |
| | | | SS | X | 6-16-28 | 44 |
| 25 | Auger Refusal | 657.7 | | | | |
| | | | SS | X | 9-26-38 | 64 |
| 30 | | 652.7 | | | | |
| 35 | | 647.7 | | | | |
| 40 | | 642.7 | | | | |
| 45 | | 637.7 | | | | |

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

LEGEND

OVA (ppm): 2000, 4000, 6000, 8000, 10000

SPT (bpf): 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MDF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 3A
**COORD N:** 35.2487
**COORD E:** -80.8095
**DRILLED:** September 14, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE** 1 **OF** 1

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) | ● SPT (bpf) |
|---|---|---|---|---|---|---|---|---|
| 0 | CONCRETE | | 686.1 | | | | | |
| | GRAVEL sub-base. | | | | | | | |
| | Rock/Brick FILL. | | | | | | | |
| | Red, clayey SILT (ML). | | | | | Lab Sample | | |
| 5 | | | 681.1 | | | | ★ 743 | |
| | | | | | | | ★ 648 | |
| | | | | | | | ★ 729 | |
| | | | | | | | ★ 587 | |
| | Tan clayey SILT (ML) with black mottling and PARTIALLY WEATHERED ROCK FRAGMENTS. | | | | | | ★ 492 | |
| | | | | | | Lab Sample | ★ 384 | |
| 10 | | | 676.1 | | | | ★ 563 | |
| | Auger Refusal | | | | | | | |
| 15 | | | 671.1 | | | | | |
| 20 | | | 666.1 | | | | | |
| 25 | | | 661.1 | | | | | |
| 30 | | | 656.1 | | | | | |
| 35 | | | 651.1 | | | | | |
| 40 | | | 646.1 | | | | | |
| 45 | | | 641.1 | | | | | |

OVA (ppm): 2000, 4000, 6000, 8000, 10000

SPT (bpf): 10 20 30 40 50 60 70 80 90 100

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MJF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 4A
**COORD N:** 35.2489
**COORD E:** -80.8096
**DRILLED:** June 14, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLE IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | OVA (ppm) | SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Asphalt | 682.8 | | | | | |
| | Tan, clayey SILT (ML) with intermittent PARTIALLY WEATHERED ROCK FRAGMENTS. | | | | Lab Sample | 0.5<br>1.3 | |
| 5 | | 677.8 | SS-1 | | 11-24-21 | | 45 |
| 10 | Tan, clayey SILT (ML) with black and white mottling. | 672.8 | SS-2 | | 4-8-13 | | 21 |
| 15 | Tan, clayey SILT (ML) with black and white mottling, with some pieces of PARTIALLY WEATHERED ROCK FRAGMENTS. | 667.8 | SS-3 | | 12-23-26 | | 49 |
| 20 | | 662.8 | SS-4 | | 15-36-32 | | 68 |
| 25 | PARTIALLY WEATHERED ROCK, sampled as gray, SILT (ML) with rock fragments | 657.8 | SS-5 | | 30-25-50/5" | | |
| 30 | | 652.8 | SS-6 | | 13-42-50/3" | | 100 |
| 35 | | 647.8 | | | | | |
| | Auger Refusal | | | | | | |
| 40 | | 642.8 | | | | | |
| 45 | | 637.8 | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

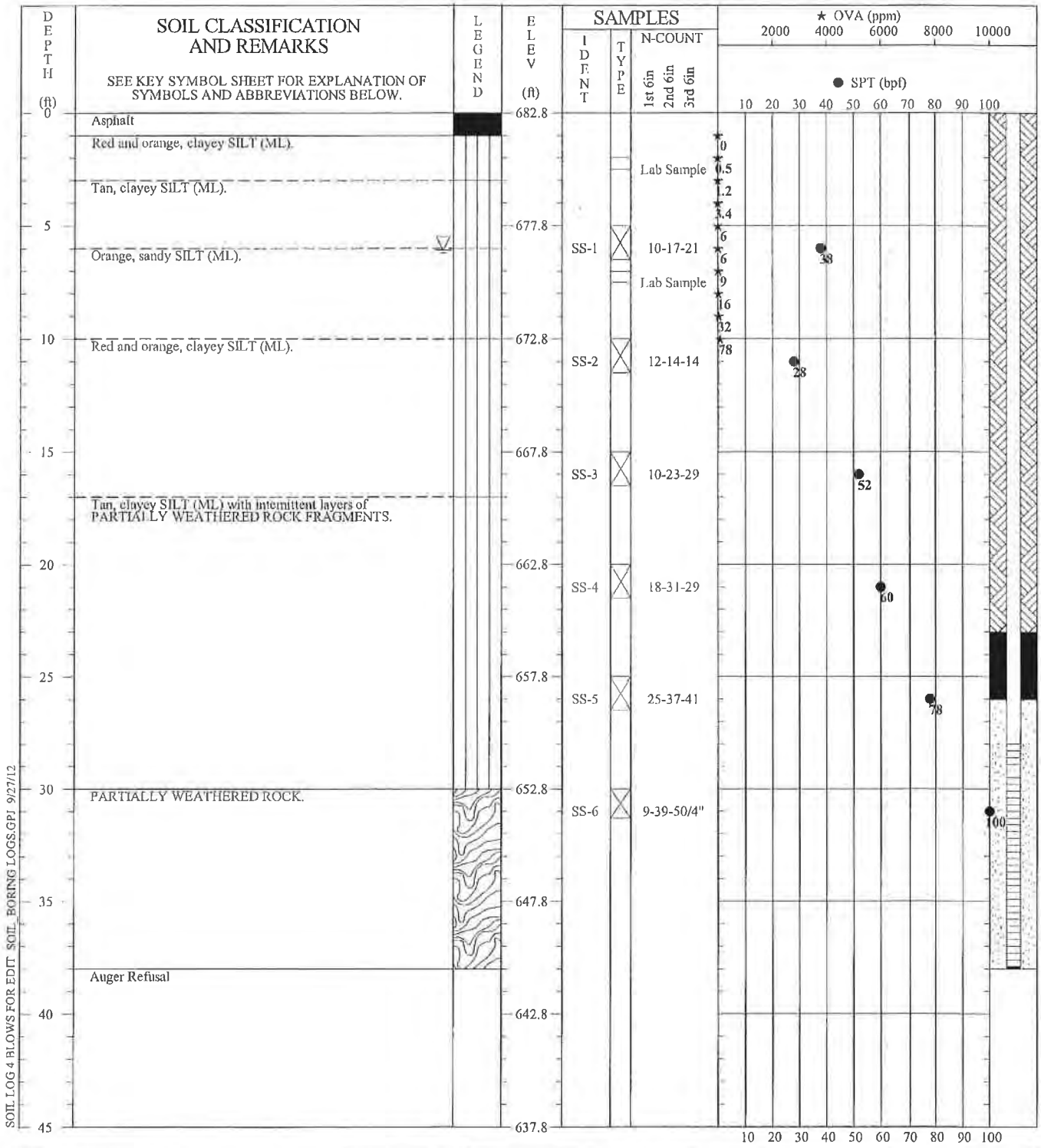
PREPARED BY: MDF 9/26/12
CHECKED BY: AMK 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 5A
**COORD N:** 35.2491
**COORD E:** -80.8098
**DRILLED:** June 13, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.




| | |
|---|---|
| DRILLER: | Geologic Exploration |
| EQUIPMENT: | D120 |
| METHOD: | Hollow Stem Auger |
| HOLE DIA.: | 8.5-inch |
| REMARKS: | |
| PREPARED BY: | MDF 9/26/12 |
| CHECKED BY: | AMC 10/5/12 |

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

| | | | |
|---|---|---|---|
| **PROJECT:** | Detrex | **BORING NO.:** | PMW- 6A |
| **COORD N:** | 35.2493 | | |
| **COORD E:** | -80.8097 | | |
| **DRILLED:** | June 12, 2012 | | |
| **PROJ. NO.:** | 6228-07-4329 | **PAGE** | 1 **OF** 1 |

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) | ● SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Tan, clayey SILT (ML). | 682.3 | | | | | |
| | Red, clayey SILT (ML). | | | | Lab Sample | 0.3, 1.2, 0.8, 0.4 | |
| | Tan, clayey SILT (ML). | | | | | | |
| 5 | Tan/Orange, clayey SILT (ML). | 677.3 | SS | | Lab Sample 9-14-20 | 0.5, 0.3, 0.5, 0.3, 0.1 | 34 |
| 10 | Tan, sandy SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | 672.3 | SS | | 11-16-19 | 0, 0 | 35 |
| 15 | Orange and tan, clayey SILT (ML). | 667.3 | SS | | 13-22-26 | | 48 |
| 20 | Tan clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | 662.3 | SS | | 16-27-30 | | 57 |
| | Gray, sandy SILT (ML). | | | | | | |
| 25 | Gray, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | 657.3 | SS | | 12-31-39 | | 70 |
| 30 | PARTIALLY WEATHERED ROCK with gray clayey SILT | 652.3 | SS | | 18-32-50/5" | | 100 |
| 35 | | 647.3 | | | | | |
| | Auger Refusal | | | | | | |
| 40 | | 642.3 | | | | | |
| 45 | | 637.3 | | | | | |

LEGEND

★ OVA (ppm): 2000, 4000, 6000, 8000, 10000

● SPT (bpf): 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MOF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 7A
**COORD N:** 35.2496
**COORD E:** -80.8090
**DRILLED:** June 12, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) | ● SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Tan, clayey SILT (ML). | 682.3 | | | | | |
| | Red, clayey SILT (ML). | | | | Lab Sample | 0.3, 1.2, 0.8, 0.4 | |
| | Tan, clayey SILT (ML). | | | | | | |
| 5 | Tan/Orange, clayey SILT (ML). | 677.3 | SS | | Lab Sample 9-14-20 | 0.5, 0.3, 0.5, 0.3, 0.1 | 34 |
| 10 | Tan, sandy SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | 672.3 | SS | | 11-16-19 | 0, 0 | 35 |
| 15 | Orange and tan, clayey SILT (ML). | 667.3 | SS | | 13-22-26 | | 48 |
| 20 | Tan clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | 662.3 | SS | | 16-27-30 | | 57 |
| | Gray, sandy SILT (ML). | | | | | | |
| 25 | Gray, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | 657.3 | SS | | 12-31-39 | | 70 |
| 30 | PARTIALLY WEATHERED ROCK with gray clayey SILT | 652.3 | SS | | 18-32-50/5" | | 100 |
| 35 | | 647.3 | | | | | |
| 40 | PARTIALLY WEATHERED ROCK with intermittent layers of SILT | 642.3 | | | | | |
| 45 | | 637.3 | | | | | |

LEGEND

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 40 feet bgs
PREPARED BY: MDP 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 7B
**COORD N:** 35.2496
**COORD E:** -80.8090
**DRILLED:** June 25, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES: IDENT | TYPE | N-COUNT 1st 6in | 2nd 6in | 3rd 6in | ★ OVA (ppm) 2000 4000 6000 8000 10000 / ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|---|---|
| 45 | | | 637.3 | | | | | | |
| 50 | | | 632.3 | | | | | | |
| 55 | Boring Terminated at 55 feet | | 627.3 | | | | | | |
| 60 | | | 622.3 | | | | | | |
| 65 | | | 617.3 | | | | | | |
| 70 | | | 612.3 | | | | | | |
| 75 | | | 607.3 | | | | | | |
| 80 | | | 602.3 | | | | | | |
| 85 | | | 597.3 | | | | | | |
| 90 | | | 592.3 | | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 40 feet bgs
PREPARED BY: MDG 9/26/12
CHECKED BY: AVE 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 7B
**COORD N:** 35.2496
**COORD E:** -80.8090
**DRILLED:** June 25, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) | ● SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Tan/red, clayey SILT (ML). | 683.1 | | | | | |
| | | | | | Lab Sample | 0<br>0.3<br>0.5<br>0.3 | |
| | Tan/brown, clayey SILT (ML). | | | | | | |
| 5 | | 678.1 | SS | | 7-8-12 | 0.3<br>0.5<br>0.7<br>0.5 | 20 |
| | | | | | Lab Sample | 1.4 | |
| 10 | Gray, clayey SILT (ML). | 673.1 | SS | | 10-8-13 | | 21 |
| 15 | Gray, sandy SILT (ML). | 668.1 | SS | | 12-17-23 | | 40 |
| 20 | Gray, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | 663.1 | SS | | 13-22-24 | | 46 |
| 25 | | 658.1 | SS | | 10-24-32 | | 56 |
| 30 | | 653.1 | SS | | 9-27-35 | | 62 |
| 35 | PARTIALLY WEATHERED ROCK with intermittent layers of SILT | 648.1 | SS | | 11-36-50/3" | | 100 |
| 40 | | 643.1 | | | | | |
| | Auger Refusal | | | | | | |
| 45 | | 638.1 | | | | | |

LEGEND

SOIL LOG 4 BLOWS FOR EDIT SOIL BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MOF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 8A
**COORD N:** 35.2493
**COORD E:** -80.8104
**DRILLED:** June 11, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.) | ELEV (ft) | IDENT | TYPE | N-COUNT (1st 6in – 2nd 6in – 3rd 6in) | OVA (ppm) | SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Tan/red, clayey SILT (ML). | 683.1 | | | | | |
| | | | | | Lab Sample | 0 | |
| | | | | | | 0.3 | |
| | | | | | | 0.5 | |
| | | | | | | 0.3 | |
| 5 | Tan/brown, clayey SILT (ML). | 678.1 | | | | 0.3 | |
| | | | SS | | 7-8-12 | 0.5 | 20 |
| | | | | | | 0.7 | |
| | | | | | | 0.5 | |
| | | | | | Lab Sample | 1.4 | |
| 10 | Gray, clayey SILT (ML). | 673.1 | SS | | 10-8-13 | | 21 |
| 15 | Gray, sandy SILT (ML). | 668.1 | SS | | 12-17-23 | | 40 |
| 20 | Gray, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | 663.1 | SS | | 13-22-24 | | 46 |
| 25 | | 658.1 | SS | | 10-24-32 | | 56 |
| 30 | | 653.1 | SS | | 9-27-35 | | 62 |
| 35 | PARTIALLY WEATHERED ROCK with intermittent layers of SILT | 648.1 | SS | | 11-36-50/3" | | 100 |
| 40 | | 643.1 | | | | | |
| 45 | | 638.1 | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

| | |
|---|---|
| DRILLER: | Geologic Exploration |
| EQUIPMENT: | D120/7728 |
| METHOD: | Hollow Stem Auger and Air Rotary |
| HOLE DIA.: | 8.5-inch |
| REMARKS: | Type III Monitoring Well installed with 6" outer casing set at 43 feet bgs |
| PREPARED BY: | MOF 9/26/12 |
| CHECKED BY: | AMZ 10/5/12 |

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

| | | | |
|---|---|---|---|
| **PROJECT:** | Detrex | **BORING NO.:** | PMW- 8B |
| **COORD N:** | 35.2493 | | |
| **COORD E:** | -80.8104 | | |
| **DRILLED:** | June 21, 2012 | | |
| **PROJ. NO.:** | 6228-07-4329 | | **PAGE 1 OF 2** |

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in | 2nd 6in | 3rd 6in | ★ OVA (ppm) 2000 4000 6000 8000 10000 ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|---|---|
| 45 | | | 638.1 | | | | | | |
| 50 | | | 633.1 | | | | | | |
| 55 | | | 628.1 | | | | | | |
| | Boring Terminated at 58 feet | | | | | | | | |
| 60 | | | 623.1 | | | | | | |
| 65 | | | 618.1 | | | | | | |
| 70 | | | 613.1 | | | | | | |
| 75 | | | 608.1 | | | | | | |
| 80 | | | 603.1 | | | | | | |
| 85 | | | 598.1 | | | | | | |
| 90 | | | 593.1 | | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 43 feet bgs
PREPARED BY: MOF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 8B
**COORD N:** 35.2493
**COORD E:** -80.8104
**DRILLED:** June 21, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | OVA (ppm) | SPT (bpf) |
|---|---|---|---|---|---|---|---|---|
| 0 | Brown and tan, clayey SILT (ML). | | 681.6 | | | | | |
| | | | | | Lab Sample | | 1.1, 1.9, 1.8, 3 | |
| 5 | Gray, clayey, sandy SILT (ML). | | 676.6 | SS | | 6-7-11 | 3.2, 1.7, 2.9, 3.4 | 18 |
| | | | | | Lab Sample | | 3.8 | |
| 10 | Tan, clayey SILT (ML). | | 671.6 | SS | | 11-10-16 | 2.3 | 26 |
| 15 | | | 666.6 | | | | | |
| 20 | Auger Refusal | | 661.6 | | | | | |
| 25 | | | 656.6 | | | | | |
| 30 | | | 651.6 | | | | | |
| 35 | | | 646.6 | | | | | |
| 40 | | | 641.6 | | | | | |
| 45 | | | 636.6 | | | | | |

OVA (ppm): 2000, 4000, 6000, 8000, 10000

SPT (bpf): 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MOF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 9A
**COORD N:** 35.2499
**COORD E:** -80.8093
**DRILLED:** June 8, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE** 1 **OF** 1

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) | ● SPT (bpf) |
|---|---|---|---|---|---|---|---|---|
| 0 | Brown and tan, clayey SILT (ML). | | 681.6 | | | | | |
| | | | | | | Lab Sample | .1<br>.9<br>.8<br>3 | |
| 5 | Gray, clayey, sandy SILT (ML). | | 676.6 | SS | | 6-7-11 | 3.2<br>.7<br>2.9<br>.4 | 18 |
| | | | | | | Lab Sample | .8 | |
| 10 | Tan, clayey SILT (ML). | | 671.6 | SS | | 11-10-16 | 2.3 | 26 |
| 15 | | | 666.6 | | | | | |
| 20 | Tan, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | | 661.6 | SS | | 12-17-23 | | 40 |
| 25 | | | 656.6 | SS | | 14-24-29 | | 53 |
| 30 | PARTIALLY WEATHERED ROCK with intermittent layers of SILT | | 651.6 | SS | | 14-38-50/5" | | 100 |
| | Auger Refusal | | | | | | | |
| 35 | | | 646.6 | | | | | |
| 40 | | | 641.6 | | | | | |
| 45 | | | 636.6 | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MOF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 9B
**COORD N:** 35.2499
**COORD E:** -80.8093
**DRILLED:** June 13, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE** 1 **OF** 1

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | OVA (ppm) | SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Brown and tan, clayey SILT (ML). | 681.6 | | | | | |
| | | | | | Lab Sample | 1.1, 1.9, 1.8, 3 | |
| 5 | Gray, clayey, sandy SILT (ML). | 676.6 | SS | | 6-7-11 | 3.2, 1.7, 2.9, 3.4 | 18 |
| | | | | | Lab Sample | 3.8 | |
| 10 | Tan, clayey SILT (ML). | 671.6 | SS | | 11-10-16 | 2.3 | 26 |
| 15 | | 666.6 | | | | | |
| 20 | Tan, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | 661.6 | SS | | 12-17-23 | | 40 |
| 25 | | 656.6 | SS | | 14-24-29 | | 53 |
| 30 | PARTIALLY WEATHERED ROCK with intermittent layers of SILT | 651.6 | SS | | 14-38-50/5" | | 100 |
| 35 | Auger Refusal | 646.6 | | | | | |
| 40 | | 641.6 | | | | | |
| 45 | | 636.6 | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 35 feet bgs
PREPARED BY: MDP 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 9C
**COORD N:** 35.2499
**COORD E:** -80.8093
**DRILLED:** June 21, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) 2000 4000 6000 8000 10000 ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 45 | | | 636.6 | | | | |
| 50 | Boring Terminated at 50 feet | | 631.6 | | | | |
| 55 | | | 626.6 | | | | |
| 60 | | | 621.6 | | | | |
| 65 | | | 616.6 | | | | |
| 70 | | | 611.6 | | | | |
| 75 | | | 606.6 | | | | |
| 80 | | | 601.6 | | | | |
| 85 | | | 596.6 | | | | |
| 90 | | | 591.6 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 35 feet bgs
PREPARED BY: MOA 9/26/12
CHECKED BY: AM 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW- 9C
**COORD N:** 35.2499
**COORD E:** -80.8093
**DRILLED:** June 21, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.) | ELEV (ft) | IDENT | TYPE | N-COUNT (1st 6in, 2nd 6in, 3rd 6in) | OVA (ppm) | SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Brown, clayey SILT (ML). | 678.9 | | | | | |
| | | | | | Lab Sample | 0.8, 0.7, .4, .8 | |
| | Red, clayey SILT (ML). | | | | | | |
| 5 | Tan and orange, clayey SILT (ML). | 673.9 | SS-1 | | 2-2-2 | 4, 2.4 | |
| | | | | | Lab Sample | | |
| | Gray, sandy SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS | | | | | .7 | |
| 10 | | 668.9 | SS-2 | | WOH | | |
| | Harder Drilling | | | | | | |
| 15 | Tan, sandy SILT (ML). | 663.9 | SS-3 | | 4-5-7 | | 12 |
| 20 | Tan, clayey SILT (ML). | 658.9 | SS-4 | | 7-8-9 | | 17 |
| 25 | | 653.9 | SS-5 | | 3-7-13 | | 20 |
| 30 | Gray, clayey SILT (ML). | 648.9 | SS-6 | | 6-9-12 | | 21 |
| 35 | | 643.9 | SS-7 | | 9-11-11 | | 22 |
| 40 | | 638.9 | SS-8 | | 12-19-23 | | 42 |
| 45 | | 633.9 | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MOF 9/26/12
CHECKED BY: [illegible] 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-10A
**COORD N:** 35.2499
**COORD E:** -80.8099
**DRILLED:** June 8, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) 2000 4000 6000 8000 10000 / ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 45 | Gray, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS | | 633.9 | SS-9 | | 12-27-38 | 65 |
| 50 | | | 628.9 | SS-10 | | 12-21-36 | 57 |
| 55 | PARTIALLY WEATHERED ROCK with gray, clayey SILT | | 623.9 | SS-11 | | 14-32-50/5" | 100 |
| 60 | | | 618.9 | | | | |
| | Auger Refusal | | | | | | |
| 65 | | | 613.9 | | | | |
| 70 | | | 608.9 | | | | |
| 75 | | | 603.9 | | | | |
| 80 | | | 598.9 | | | | |
| 85 | | | 593.9 | | | | |
| 90 | | | 588.9 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MOF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-10A
**COORD N:** 35.2499
**COORD E:** -80.8099
**DRILLED:** June 8, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) | ● SPT (bpf) |
|---|---|---|---|---|---|---|---|---|
| 0 | Brown, clayey SILT (ML). | | 678.9 | | | | | |
| | | | | | | Lab Sample | 0.8<br>0.7<br>1.4 | |
| | Red, clayey SILT (ML). | | | | | | | |
| 5 | Tan and orange, clayey SILT (ML). | | 673.9 | SS-1 | X | 2-2-2 | 1.8<br>1.4<br>2.4 | 4 |
| | Gray, sandy SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS ▽ | | | | | Lab Sample | | |
| | | | | | | | 4.7 | |
| 10 | | | 668.9 | SS-2 | X | WOH | | |
| 15 | Tan, sandy SILT (ML). | | 663.9 | SS-3 | X | 4-5-7 | | 12 |
| 20 | Tan, clayey SILT (ML). | | 658.9 | SS-4 | X | 7-8-9 | | 17 |
| 25 | | | 653.9 | SS-5 | X | 3-7-13 | | 20 |
| 30 | Gray, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS | | 648.9 | SS-6 | X | 6-9-12 | | 21 |
| 35 | | | 643.9 | SS-7 | X | 9-11-11 | | 22 |
| 40 | | | 638.9 | SS-8 | X | 12-19-23 | | 42 |
| 45 | | | 633.9 | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

| | |
|---|---|
| DRILLER: | Geologic Exploration |
| EQUIPMENT: | D120/7728 |
| METHOD: | Hollow Stem Auger and Air Rotary |
| HOLE DIA.: | 8.5-inch |
| REMARKS: | Type III Monitoring Well installed with 6" outer casing set at 64 feet bgs |
| PREPARED BY: | MOF 9/26/12 |
| CHECKED BY: | AMC 10/5/12 |

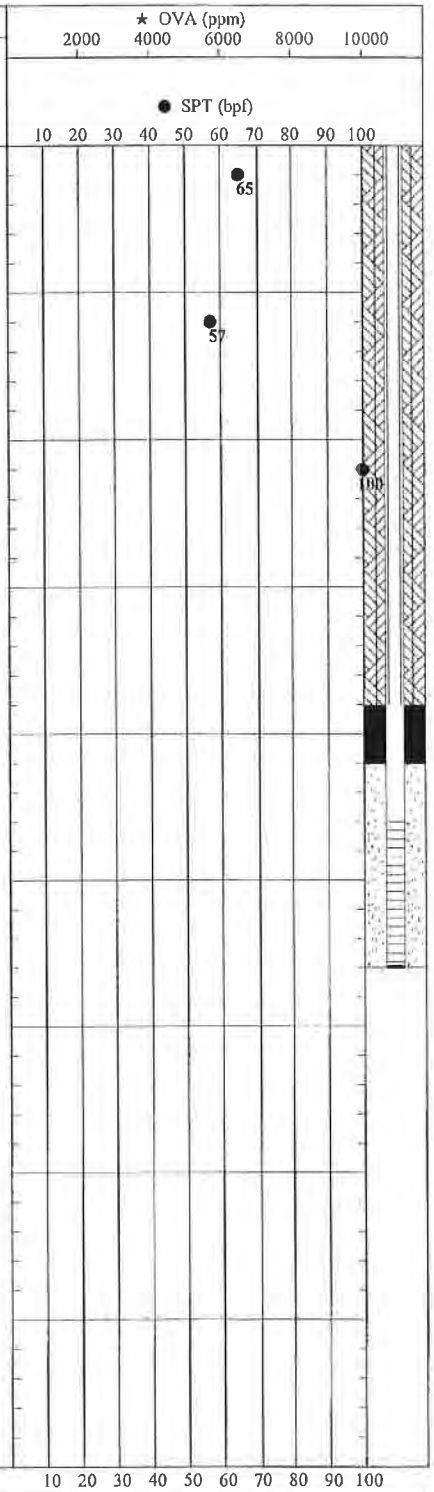
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

| | | | |
|---|---|---|---|
| **PROJECT:** | Detrex | **BORING NO.:** | PMW-10B |
| **COORD N:** | 35.2499 | | |
| **COORD E:** | -80.8099 | | |
| **DRILLED:** | June 21, 2012 | | |
| **PROJ. NO.:** | 6228-07-4329 | | **PAGE 1 OF 2** |

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) / ● SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 45 | | | 633.9 | SS-9 | X | 12-27-38 | ● 65 |
| 50 | | | 628.9 | SS-10 | X | 12-21-36 | ● 57 |
| 55 | PARTIALLY WEATHERED ROCK with gray, clayey SILT | | 623.9 | SS-11 | X | 14-32-50/5" | ● 100 |
| 60 | | | 618.9 | | | | |
| | PARTIALLY WEATHERED ROCK with intermittent layers of SILT | | | | | | |
| 65 | Auger Refusal | | 613.9 | | | | |
| 70 | | | 608.9 | | | | |
| | Boring Terminated at 73 feet on competent rock based on drilling observations | | | | | | |
| 75 | | | 603.9 | | | | |
| 80 | | | 598.9 | | | | |
| 85 | | | 593.9 | | | | |
| 90 | | | 588.9 | | | | |




SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 64 feet bgs
PREPARED BY: MAP 9/26/12
CHECKED BY: MMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-10B
**COORD N:** 35.2499
**COORD E:** -80.8099
**DRILLED:** June 21, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) | ● SPT (bpf) |
|---|---|---|---|---|---|---|---|---|
| 0 | Brown and tan, clayey SILT (ML). | | 679.2 | | | | ★ 0 | |
| | Red, clayey SILT (ML). | | | | | Lab Sample | ★ 0 | |
| | Tan, clayey SILT (ML). | | | | | | ★ 0.3 | |
| 5 | | | 674.2 | | | | ★ 0 | |
| | | | | SS | X | 3-2-3 Lab Sample | ★ 0.4 | ● 0.75 |
| | Gray, sandy SILT (ML). | | | | | | | |
| 10 | | | 669.2 | SS | X | 2-3-2 | | ● 5 |
| 15 | | | 664.2 | SS | X | 2-4-3 | | ● 7 |
| | Gray, clayey SILT (ML). | | | | | | | |
| 20 | | | 659.2 | SS | X | 4-7-9 | | ● 16 |
| 25 | Gray, sandy SILT (ML) with PARTIALY WEATHERED ROCK FRAGMENTS. | | 654.2 | SS | X | 4-8-12 | | ● 20 |
| 30 | | | 649.2 | SS | X | 5-7-11 | | ● 18 |
| 35 | Gray, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | | 644.2 | SS | X | 10-13-11 | | ● 24 |
| 40 | | | 639.2 | SS | X | 13-16-21 | | ● 37 |
| 45 | | | 634.2 | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MOF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-11A
**COORD N:** 35.2498
**COORD E:** -80.8104
**DRILLED:** June 12, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | OVA (ppm) 2000 4000 6000 8000 10000 / SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 45 | | | 634.2 | SS | X | 14-27-37 | 64 |
| 50 | | | 629.2 | SS | X | 14-31-38 | 69 |
| 55 | PARTIALLY WEATHERED ROCK with intermittent layers of SILT | | 624.2 | SS | X | 15-37-50/5" | 100 |
| 60 | | | 619.2 | | | | |
| | Auger Refusal | | | | | | |
| 65 | | | 614.2 | | | | |
| 70 | | | 609.2 | | | | |
| 75 | | | 604.2 | | | | |
| 80 | | | 599.2 | | | | |
| 85 | | | 594.2 | | | | |
| 90 | | | 589.2 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MDP 8/26/12
CHECKED BY: AEL 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-11A
**COORD N:** 35.2498
**COORD E:** -80.8104
**DRILLED:** June 12, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) | ● SPT (bpf) |
|---|---|---|---|---|---|---|---|---|
| 0 | Brown and tan, clayey SILT (ML). | | 679.2 | | | | ★ 0 | |
| | Red, clayey SILT (ML). | | | | | Lab Sample | ★ 0 | |
| | Tan, clayey SILT (ML). | | | | | | ★ 0.3 | |
| | | | | | | | ★ 0 | |
| 5 | | | 674.2 | SS | | 3-2-3 Lab Sample | ★ 0.4 ★ 0.75 | ● 5 |
| | Gray, sandy SILT (ML). | | | | | | | |
| 10 | | | 669.2 | SS | | 2-3-2 | | ● 5 |
| 15 | | | 664.2 | SS | | 2-4-3 | | ● 7 |
| | Gray, clayey SILT (ML). | | | | | | | |
| 20 | | | 659.2 | SS | | 4-7-9 | | ● 16 |
| 25 | Gray, sandy SILT (ML) with PARTIALY WEATHERED ROCK FRAGMENTS. | | 654.2 | SS | | 4-8-12 | | ● 20 |
| 30 | | | 649.2 | SS | | 5-7-11 | | ● 18 |
| 35 | Gray, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | | 644.2 | SS | | 10-13-11 | | ● 24 |
| 40 | | | 639.2 | SS | | 13-16-21 | | ● 37 |
| 45 | | | 634.2 | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 63 feet bgs
PREPARED BY: MOF 9/26/12
CHECKED BY: [illegible] 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-11B
**COORD N:** 35.2498
**COORD E:** -80.8104
**DRILLED:** June 21, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) 2000 4000 6000 8000 10000 / ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 45 | | | 634.2 | SS | X | 14-27-37 | ● 64 |
| 50 | | | 629.2 | SS | X | 14-31-38 | ● 69 |
| 55 | PARTIALLY WEATHERED ROCK with intermittent layers of SILT | | 624.2 | SS | X | 15-37-50/5" | ● 100 |
| 60 | | | 619.2 | | | | |
| | Auger Refusal | | | | | | |
| 65 | | | 614.2 | | | | |
| 70 | | | 609.2 | | | | |
| 75 | | | 604.2 | | | | |
| | Boring Terminated at 78 feet on competent rock based on drilling observations | | | | | | |
| 80 | | | 599.2 | | | | |
| 85 | | | 594.2 | | | | |
| 90 | | | 589.2 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 63 feet bgs
PREPARED BY: MOF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-11B
**COORD N:** 35.2498
**COORD E:** -80.8104
**DRILLED:** June 21, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | SPT (bpf) |
|---|---|---|---|---|---|---|
| 0 | Red, clayey SILT (ML). | 681.2 | | | | |
| | | | | | Lab Sample | |
| 5 | Gray, sandy SILT (ML). | 676.2 | SS-1 | | 3-3-5 | 8 |
| | | | | | Lab Sample | |
| 10 | Gray, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS | 671.2 | SS-2 | | 3-3-4 | 7 |
| 15 | | 666.2 | SS-3 | | 7-24-46 | 70 |
| 20 | PARTIALLY WEATHERED ROCK with gray, clayey SILT. | 661.2 | SS-4 | | 50/6" | 100 |
| 25 | | 656.2 | | | | |
| | PARTIALLY WEATHERED ROCK with intermittent layers of SILT | | | | | |
| 30 | | 651.2 | | | | |
| 35 | | 646.2 | | | | |
| 40 | Auger Refusal | 641.2 | | | | |
| 45 | | 636.2 | | | | |

SPT (bpf): 10 20 30 40 50 60 70 80 90 100

SOIL LOG 4 BLOWS FOR EDIT SOIL BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MDP 9/26/12
CHECKED BY: [illegible] 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-12A
**COORD N:** 35.2500
**COORD E:** -80.8109
**DRILLED:** June 25, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | SPT (bpf) |
|---|---|---|---|---|---|---|
| 0 | Red, clayey SILT (ML). | 681.2 | | | Lab Sample | |
| 5 | Gray, sandy SILT (ML). | 676.2 | SS-1 | | 3-3-5 | 8 |
| | | | | | Lab Sample | |
| 10 | Gray, clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS | 671.2 | SS-2 | | 3-3-4 | 7 |
| 15 | | 666.2 | SS-3 | | 7-24-46 | 70 |
| 20 | PARTIALLY WEATHERED ROCK with gray, clayey SILT. | 661.2 | SS-4 | | 50/6" | 100 |
| 25 | | 656.2 | | | | |
| | PARTIALLY WEATHERED ROCK with intermittent layers of SILT | | | | | |
| 30 | | 651.2 | | | | |
| 35 | | 646.2 | | | | |
| 40 | | 641.2 | | | | |
| | Auger Refusal | | | | | |
| 45 | | 636.2 | | | | |

SPT (bpf) scale: 10 20 30 40 50 60 70 80 90 100

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 42 feet bgs
PREPARED BY: MAP 9/26/12
CHECKED BY: TMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-12B
**COORD N:** 35.2500
**COORD E:** -80.8109
**DRILLED:** June 25, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES: IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 45 | | | 636.2 | | | | |
| | Boring Terminated at 49 feet on competent rock based on drilling observations | | | | | | |
| 50 | | | 631.2 | | | | |
| 55 | | | 626.2 | | | | |
| 60 | | | 621.2 | | | | |
| 65 | | | 616.2 | | | | |
| 70 | | | 611.2 | | | | |
| 75 | | | 606.2 | | | | |
| 80 | | | 601.2 | | | | |
| 85 | | | 596.2 | | | | |
| 90 | | | 591.2 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 42 feet bgs
PREPARED BY: MDF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-12B
**COORD N:** 35.2500
**COORD E:** -80.8109
**DRILLED:** June 25, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ★ OVA (ppm) 2000 4000 6000 8000 10000 / ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 0 | Tan, clayey SILT (ML). | | 683.4 | | | | |
| | | | | | | Lab Sample | ★ 0.3<br>★ 0.7<br>★ .1<br>★ 0.7 |
| 5 | Gray, clayey SILT (ML). | | 678.4 | | | | ★ 0.9<br>★ .3 |
| | Brown, clayey SILT (ML). | | | | | Lab Sample | ★ .7 |
| 10 | | ▽ | 673.4 | | | | |
| | Gray, clayey SILT (ML). | | | | | | |
| 15 | | | 668.4 | | | | |
| 20 | | | 663.4 | | | | |
| | Gray clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS. | | | | | | |
| 25 | | | 658.4 | | | | |
| 30 | | | 653.4 | | | | |
| 35 | | | 648.4 | | | | |
| 40 | | | 643.4 | | | | |
| 45 | | | 638.4 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger, Air Rotary, and HQ Core
HOLE DIA.: 8 5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 88 feet bgs
PREPARED BY: npa 9/26/12
CHECKED BY: tmc 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-13B
**COORD N:** 35.2495
**COORD E:** -80.8100
**DRILLED:** July 12, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 3**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in | 2nd 6in | 3rd 6in | ★ OVA (ppm) 2000 4000 6000 8000 10000 ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|---|---|
| 45 | | | 638.4 | | | | | | |
| 50 | Auger Refusal<br>PARTIALLY WEATHERED ROCK with intermittent layers of SILT | | 633.4 | | | | | | |
| 55 | | | 628.4 | | | | | | |
| 60 | | | 623.4 | | | | | | |
| 65 | | | 618.4 | | | | | | |
| 70 | | | 613.4 | | | | | | |
| 75 | | | 608.4 | | | | | | |
| 80 | | | 603.4 | | | | | | |
| 85 | | | 598.4 | | | | | | |
| | Begin Coring | | | | | | | | |
| 90 | META-QUARTZ DIORITE; very dark and greenish gray (Grey 1 2/1 5GY); strong; non-foliated; massive; slightly decomposed; slightly disintegrated; slightly to moderately | + + + + + + + + + + + + | 593.4 | | | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger, Air Rotary, and HQ Core
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 88 feet bgs
PREPARED BY: MPF 9/20/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-13B
**COORD N:** 35.2495
**COORD E:** -80.8100
**DRILLED:** July 12, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 3**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in | 2nd 6in | 3rd 6in |
|---|---|---|---|---|---|---|---|---|
| 90 | fractured<br>88-98 RUN 1 (RQD = 72%) (REC = 83%)<br>at around 90 feet - bedding plane fracture (BPF), 60 degrees, not healed, surface staining, wet<br>91 feet - BPF (60 degrees)<br>91.3 feet - Joint<br>92 feet - BPF<br>92.3-92.5 feet - Fracture zone | | 593.4 | | | | | |
| 95 | 97.9 - Partially healed BPF<br>98-103 RUN 2 (RQD = 75%) (REC = 100%)<br>99 - Joint | | 588.4 | | | | | |
| 100 | 100.1 - BPF with vugs<br>100.7 - BPF with vugs<br>101.3-102 Fracture zone<br>102.4 - Joint<br>102.7 - BPF<br>Boring Terminated | | 583.4 | | | | | |
| 105 | | | 578.4 | | | | | |
| 110 | | | 573.4 | | | | | |
| 115 | | | 568.4 | | | | | |
| 120 | | | 563.4 | | | | | |
| 125 | | | 558.4 | | | | | |
| 130 | | | 553.4 | | | | | |
| 135 | | | 548.4 | | | | | |

★ OVA (ppm): 2000, 4000, 6000, 8000, 10000

● SPT (bpf): 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger, Air Rotary, and HQ Core
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 88 feet bgs
PREPARED BY: MPF 9/26/12
CHECKED BY: [illegible] 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-13B
**COORD N:** 35.2495
**COORD E:** -80.8100
**DRILLED:** July 12, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 3 OF 3**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | SPT (bpf) |
|---|---|---|---|---|---|---|
| 0 | Brown clayey SILT (ML). | 677.5 | | | Lab Sample | |
| | | | SS | | 1-2-3 | 5 |
| 5 | Brown/tan and mottled gray clayey SILT (ML). | 672.5 | | | Lab Sample | |
| | | | SS | | 4-4-5 | 9 |
| 10 | Gray clayey SILT (ML). | 667.5 | | | | |
| | | | SS | | 3-5-6 | 11 |
| 15 | Gray sandy SILT (ML). | 662.5 | | | | |
| | | | SS | | 9-11-14 | 25 |
| 20 | Tan and mottled white clayey SILT (ML). | 657.5 | | | | |
| | | | SS | | 12-15-18 | 33 |
| 25 | Tan PARTIALLY WEATHERED ROCK sampled as tan and mottled white clayey SILT (ML). | 652.5 | | | | |
| | | | SS | | 18-30-50/4" | 100 |
| 30 | Auger Refusal | 647.5 | | | | |
| 35 | | 642.5 | | | | |
| 40 | | 637.5 | | | | |
| 45 | | 632.5 | | | | |

LEGEND

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MOF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-14A
**COORD N:** 35.2494
**COORD E:** -80.8111
**DRILLED:** September 19, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | SPT (bpf) |
|---|---|---|---|---|---|---|
| 0 | Brown clayey SILT (ML). | 677.5 | | | Lab Sample | |
| | | | SS | X | 1-2-3 | 5 |
| 5 | Brown/tan and mottled gray clayey SILT (ML). | 672.5 | | | Lab Sample | |
| | | | SS | X | 4-4-5 | 9 |
| 10 | Gray clayey SILT (ML). | 667.5 | | | | |
| | | | SS | X | 3-5-6 | 11 |
| 15 | Gray sandy SILT (ML). | 662.5 | | | | |
| | | | SS | X | 9-11-14 | 25 |
| 20 | Tan and mottled white clayey SILT (ML). | 657.5 | | | | |
| | | | SS | X | 12-15-18 | 33 |
| 25 | Tan PARTIALLY WEATHERED ROCK sampled as tan and mottled white clayey SILT (ML). | 652.5 | | | | |
| | | | SS | X | 18-30-50/4" | 100 |
| 30 | Auger Refusal | 647.5 | | | | |
| | Tan PARTIALLY WEATHERED ROCK with intermittent layers of SILT | | | | | |
| 35 | | 642.5 | | | | |
| 40 | Harder Drilling | 637.5 | | | | |
| | Harder Drilling | | | | | |
| 45 | Softer Drilling | 632.5 | | | | |

SPT (bpf) scale: 10 20 30 40 50 60 70 80 90 100

SOIL LOG + BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA : 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 32 feet bgs
PREPARED BY: MOF 9/26/12
CHECKED BY: AMR 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-14B
**COORD N:** 35.2494
**COORD E:** -80.8111
**DRILLED:** September 19, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 45 | | | 632.5 | | | | |
| | Harder Drilling | | | | | | |
| 50 | Slightly Harder Drilling<br>Boring Terminated at 50 feet on gray competent rock based on drilling observations | | 627.5 | | | | |
| 55 | | | 622.5 | | | | |
| 60 | | | 617.5 | | | | |
| 65 | | | 612.5 | | | | |
| 70 | | | 607.5 | | | | |
| 75 | | | 602.5 | | | | |
| 80 | | | 597.5 | | | | |
| 85 | | | 592.5 | | | | |
| 90 | | | 587.5 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 32 feet bgs
PREPARED BY: MOF 9/26/12
CHECKED BY: TRC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-14B
**COORD N:** 35.2494
**COORD E:** -80.8111
**DRILLED:** September 19, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Tan clayey SILT (ML). | | 681.8 | | | | |
| | Tan clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS | | | SS | X | 12-27-35 | 62 |
| 5 | Tan PARTIALLY WEATHERED ROCK with intermittent layers of SILT<br>Auger Refusal<br>Harder Drilling | | 676.8 | SS | X | 16-34-50/5" | 100 |
| | Softer Drilling | | | | | | |
| 10 | | | 671.8 | | | | |
| | Harder Drilling | | | | | | |
| 15 | | | 666.8 | | | | |
| 20 | | | 661.8 | | | | |
| | Boring Terminated | | | | | | |
| 25 | | | 656.8 | | | | |
| 30 | | | 651.8 | | | | |
| 35 | | | 646.8 | | | | |
| 40 | | | 641.8 | | | | |
| 45 | | | 636.8 | | | | |

SPT (bpf): 10 20 30 40 50 60 70 80 90 100

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: DF 9/26/12
CHECKED BY: 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-16A
**COORD N:** 35.2498
**COORD E:** -80.8082
**DRILLED:** September 19, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Tan clayey SILT (ML). | | 681.8 | | | | |
| | Tan clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS | | | SS | X | 12-27-35 | 62 |
| 5 | Tan PARTIALLY WEATHERED ROCK with intermittent layers of SILT<br>Auger Refusal<br>Harder Drilling | | 676.8 | SS | X | 16-34-50/5" | 100 |
| 10 | Softer Drilling | | 671.8 | | | | |
| | Harder Drilling | | | | | | |
| 15 | | | 666.8 | | | | |
| 20 | | | 661.8 | | | | |
| | Harder Drilling | | | | | | |
| 25 | | | 656.8 | | | | |
| | Softer Drilling | | | | | | |
| 30 | | | 651.8 | | | | |
| | Harder Drilling | | | | | | |
| 35 | | | 646.8 | | | | |
| 40 | | | 641.8 | | | | |
| 45 | | | 636.8 | | | | |

SPT (bpf) scale: 10 20 30 40 50 60 70 80 90 100

SOIL LOG 4 BLOWS FOR EDIT SOIL BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA : 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 24 feet bgs
PREPARED BY: MOF 9/26/12
CHECKED BY: AWE 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-16B
**COORD N:** 35.2498
**COORD E:** -80.8082
**DRILLED:** September 19, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | SAMPLES TYPE | SAMPLES N-COUNT 1st 6in 2nd 6in 3rd 6in | SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 45 | | | 636.8 | | | | |
| 50 | | | 631.8 | | | | |
| 55 | Boring Terminated at 55 feet on gray competent rock based on drilling observations | | 626.8 | | | | |
| 60 | | | 621.8 | | | | |
| 65 | | | 616.8 | | | | |
| 70 | | | 611.8 | | | | |
| 75 | | | 606.8 | | | | |
| 80 | | | 601.8 | | | | |
| 85 | | | 596.8 | | | | |
| 90 | | | 591.8 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 24 feet bgs
PREPARED BY: MQP 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-16B
**COORD N:** 35.2498
**COORD E:** -80.8082
**DRILLED:** September 19, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | SPT (bpf) |
|---|---|---|---|---|---|---|
| 0 | Tan clayey SILT (ML). | 682.9 | | | | |
| | Tan/brown clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS | | SS | | 21-31-43 | 74 |
| 5 | | 677.9 | SS | | 11-29-50/4" | 100 |
| | Auger Refusal. PARTIALLY WEATHERED ROCK with intermittent layers of SILT.<br>Harder Drilling<br>Softer Drilling | | | | | |
| 10 | | 672.9 | | | | |
| | Harder Drilling<br>Softer Drilling<br>Harder Drilling | | | | | |
| 15 | | 667.9 | | | | |
| 20 | | 662.9 | | | | |
| | Boring Terminated | | | | | |
| 25 | | 657.9 | | | | |
| 30 | | 652.9 | | | | |
| 35 | | 647.9 | | | | |
| 40 | | 642.9 | | | | |
| 45 | | 637.9 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MOF 9/26/12
CHECKED BY: AMK 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-17A
**COORD N:** 35.2492
**COORD E:** -80.8080
**DRILLED:** September 19, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES: IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 0 | Tan clayey SILT (ML). | | 682.9 | | | | |
| | Tan/brown clayey SILT (ML) with PARTIALLY WEATHERED ROCK FRAGMENTS | | | | | | |
| 5 | Auger Refusal. PARTIALLY WEATHERED ROCK with intermittent layers of SILT.<br>Harder Drilling<br>Softer Drilling | | 677.9 | | | | |
| 10 | Harder Drilling<br>Softer Drilling<br>Harder Drilling | | 672.9 | | | | |
| 15 | | | 667.9 | | | | |
| 20 | Boring Terminated | | 662.9 | | | | |
| 25 | | | 657.9 | | | | |
| 30 | | | 652.9 | | | | |
| 35 | | | 647.9 | | | | |
| 40 | | | 642.9 | | | | |
| 45 | | | 637.9 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MOF 9/26/12
CHECKED BY: MLL 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-17B
**COORD N:** 35.2492
**COORD E:** -80.8080
**DRILLED:** September 12, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | SAMPLES TYPE | SAMPLES N-COUNT 1st 6in 2nd 6in 3rd 6in | ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100 |
|---|---|---|---|---|---|---|---|
| 45 | | | 637.9 | | | | |
| 50 | | | 632.9 | | | | |
| 55 | Boring Terminated at 55 feet on gray competent rock based on drilling observations | | 627.9 | | | | |
| 60 | | | 622.9 | | | | |
| 65 | | | 617.9 | | | | |
| 70 | | | 612.9 | | | | |
| 75 | | | 607.9 | | | | |
| 80 | | | 602.9 | | | | |
| 85 | | | 597.9 | | | | |
| 90 | | | 592.9 | | | | |

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MDF 9/26/12
CHECKED BY: AMC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-17B
**COORD N:** 35.2492
**COORD E:** -80.8080
**DRILLED:** September 12, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 2 OF 2**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | LEGEND | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | SPT (bpf) |
|---|---|---|---|---|---|---|---|
| 0 | Brown clayey SILT (ML). | | 681.0 | | | Lab Sample | |
| | | | | SS | | 1-1-3 | 4 |
| 5 | Brown/orange clayey SILT (ML). | | 676.0 | SS | | 4-3-3 | 6 |
| 10 | | | 671.0 | SS | | 3-4-9 | 13 |
| 15 | Brown and mottled white clayey SILT (ML). | | 666.0 | SS | | 11-18-27 | 45 |
| 20 | Brown and mottled white clayey SILT (ML) and PARTIALLY WEATHERED ROCK FRAGMENTS. | | 661.0 | SS | | 11-28-47 | 75 |
| | Auger Refusal | | | | | | |
| 25 | | | 656.0 | | | | |
| 30 | | | 651.0 | | | | |
| 35 | | | 646.0 | | | | |
| 40 | | | 641.0 | | | | |
| 45 | | | 636.0 | | | | |

SPT (bpf): 10 20 30 40 50 60 70 80 90 100

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120
METHOD: Hollow Stem Auger
HOLE DIA.: 8.5-inch
REMARKS:

PREPARED BY: MOF 9/26/12
CHECKED BY: AVK 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-18A
**COORD N:** 35.2489
**COORD E:** -80.8088
**DRILLED:** September 14, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.

| DEPTH (ft) | SOIL CLASSIFICATION AND REMARKS<br>SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW. | ELEV (ft) | SAMPLES IDENT | TYPE | N-COUNT 1st 6in 2nd 6in 3rd 6in | SPT (bpf) |
|---|---|---|---|---|---|---|
| 0 | Brown clayey SILT (ML). | 681.0 | | | Lab Sample | |
| | | | SS | | 1-1-3 | 4 |
| 5 | Brown/orange clayey SILT (ML). | 676.0 | SS | | 4-3-3 | 6 |
| 10 | | 671.0 | SS | | 3-4-9 | 13 |
| 15 | Brown and mottled white clayey SILT (ML). | 666.0 | SS | | 11-18-27 | 45 |
| 20 | Brown and mottled white clayey SILT (ML) and PARTIALLY WEATHERED ROCK FRAGMENTS.<br>Auger Refusal<br>Harder Drilling | 661.0 | SS | | 11-28-47 | 75 |
| 25 | Softer Drilling | 656.0 | | | | |
| 30 | | 651.0 | | | | |
| 35 | | 646.0 | | | | |
| 40 | | 641.0 | | | | |
| 45 | Boring Terminated at 43 feet on gray competent bedrock based on drilling observations | 636.0 | | | | |

SPT (bpf) scale: 10 20 30 40 50 60 70 80 90 100

SOIL LOG 4 BLOWS FOR EDIT SOIL_BORING LOGS.GPJ 9/27/12

DRILLER: Geologic Exploration
EQUIPMENT: D120/7728
METHOD: Hollow Stem Auger and Air Rotary
HOLE DIA : 8.5-inch
REMARKS: Type III Monitoring Well installed with 6" outer casing set at 22 feet bgs
PREPARED BY: MDF 9/26/12
CHECKED BY: MVC 10/5/12

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

## SOIL BORING TEST RECORD

**PROJECT:** Detrex **BORING NO.:** PMW-18B
**COORD N:** 35.2489
**COORD E:** -80.8088
**DRILLED:** September 14, 2012
**PROJ. NO.:** 6228-07-4329 **PAGE 1 OF 1**

AMEC Environment & Infrastructure, Inc.

WITHERS & RAVENEL

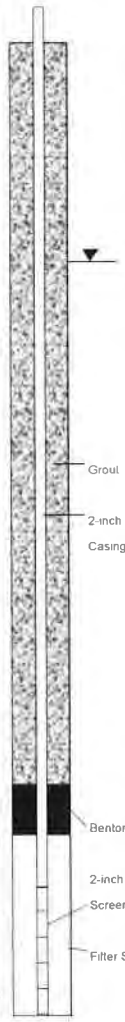
# LOG OF BORING PMW-20A

(page 1 of 1)

| | | | | | |
|---|---|---|---|---|---|
| Trex Property | Date Started | 12/11/2014 | Drilling Company | SAEDACCO |
| Groundwater Assessment | Date Completed | 12/11/2014 | Logged By | Chris Fay |
| Charlotte NC | Hole Diameter | 8 25" | Northing | 1459994 0908 |
| W&R Project No 0313430 01 | Drilling Method | Hollow Stem Augers | Easting | 550468 7336 |
| | Sampling Method | Split Spoon | | |

| Depth in Feet | FID Results (in ppm) | USCS | GRAPHIC | DESCRIPTION |
|---|---|---|---|---|
| 1 | ND | | | |
| 2 | ND | | | |
| 3 | | | | |
| 4 | ND | | | |
| 5 | | | | |
| 6 | 60 91 | | | |
| 7 | | | | |
| 8 | 19 06 | | | |
| 9 | | | | |
| 10 | 8 93 | | | |
| 11 | | | | |
| 12 | 9 04 | | | |
| 13 | | | | |
| 14 | 1 53 | | | |
| 15 | | | | |
| 16 | 9 07 | | | |
| 17 | | | | |
| 18 | 14 21 | ML/SM | | Sandy SILT (ML) gradational change to silty SAND (SM), Tan, fine to medium grains poorly sorted, moist, wet at 8 feet BGS firm to hard, weathered biotite and plagioclase feldspar present |
| 19 | | | | |
| 20 | 25 71 | | | |
| 21 | | | | |
| 22 | NR | | | |
| 23 | | | | |
| 24 | 51 5 | | | |
| 25 | | | | |
| 26 | 23 34 | | | |
| 27 | | | | |
| 28 | 55 2 | | | |
| 29 | | | | |
| 30 | 154 | | | |
| 31 | | | | |
| 32 | 210 | | | |
| 33 | | | | |
| 34 | 653 | | | |
| 35 | | | | |
| 36 | 1069 | | | |
| 37 | | ML | | Sandy SILT (ML), Olive green, fine grain sand, no plasticity, moist, hard, chlorinated odor present |
| 38 | 407 | | | |
| 39 | | ROCK | | Pegmatite Plagioclase feldspar |
| 40 | | | | |

Well PMW-20A
Elev 685 73




## Well Construction Information

WELL CONSTRUCTION

| | |
|---|---|
| Date Compl | 12/11/14 |
| Hole Dia | 8 25" |
| Drill Method | Hollow Stem Augers |

OUTER CASING

| | |
|---|---|
| Joints | NA |
| Material | NA |
| Diameter | NA |

INNER CASING

| | |
|---|---|
| Joints | Threaded |
| Material | PVC |
| Diameter | 2 in |

| | |
|---|---|
| WELL SCREEN | 0 010" Slotted<br>5 foot length |

NOTES

TYPE II WELL -
Monitoring well boring drilled using hollow stem augers
to a depth of 39 feet Signs of moisture at ~8 feet

5-foot length of well screen set at 34 ft to 39 ft
Filter sand installed from 32 ft to 39 ft
Bentonite pellet seal installed from 30 ft to 32 ft

Soil samples collected SB-20-0 5', SB-20-36', SB-20-38'

Completed with slick up type protective cover set in
2 by 2 ft concrete pad

ND=No Detection of VOCs
NR=No Return

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS

# LOG OF BORING PMW-20B

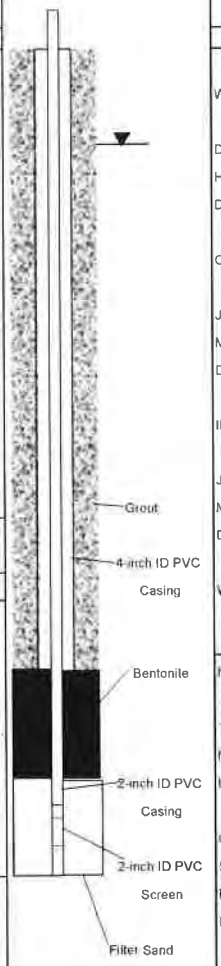


Trex Property
Groundwater Assessment
Charlotte, NC
W&R Project No 03130430 01

| | | | |
|---|---|---|---|
| Date Started | : 12/9/2014 | Drilling Company | : SAEDACCO |
| Date Completed | : 12/10/14 | Logged By | : Chris Fay |
| Hole Diameter | :8 25" (HSA) 3 5" (Air) | Northing | :1459985 3455 |
| Drilling Method | : Hollow Stem Auger/Air Rotary | Easting | : 550467 1483 |
| Sampling Method | Split Spoon | | |

| Depth in Feet | FID Results (in ppm) | USCS | GRAPHIC | DESCRIPTION |
|---|---|---|---|---|
| 0 | ND | | | |
| 2 | ND | ML/SM | | Sandy SILT (ML) gradational change to sitly SAND (SM), Tan, fine to medium grains, poorly sorted moist, wet at 8 feet BGS, firm to hard weathered biotite and plagioclase feldspar present |
| 4 | ND | | | |
| 6 | 60 91 | | | |
| 8 | 19 06 | | | |
| 10 | 8.93 | | | |
| 12 | 9 04 | | | |
| 14 | 1 53 | | | |
| 16 | 9 07 | | | |
| 18 | 14 21 | | | |
| 20 | 25 71 | | | |
| 22 | NR | | | |
| 24 | 51 5 | | | |
| 26 | 23 34 | | | |
| 28 | 55.2 | | | |
| 30 | 154 | | | |
| 32 | 210 | | | |
| 34 | 653 | | | |
| 36 | 1069 | ML | | Sandy SILT (ML), Olive green, fine grains, no plasticity, moist, hard, chlorinated odor present |
| 38 | 407 | | | |
| 40 | | ROCK | | Pegmatite-Plagioclase feldspar |
| 42 | | ROCK | | Diorite, very hard 45' BGS to 54' BGS, hit water bearing fracture at 54' and 57', very hard from 57' 60', chlorinated odor present |
| 44 | | | | |
| 46 | | | | |
| 48 | | | | |
| 50 | | | | |
| 52 | | | | |
| 54 | | | | |
| 56 | | | | |
| 58 | | | | |
| 60 | ND | | | |
| 62 | | | | |
| 64 | | | | |
| 66 | | | | |
| 68 | | | | |
| 70 | | | | |
| 72 | | | | |
| 74 | | | | |
| 76 | | | | |
| 78 | | | | |
| 80 | | | | |
| 82 | | | | |
| 84 | | | | |
| 86 | | | | |
| 88 | | | | |
| 90 | | | | |

Well: PMW-20B
Elev : 686 34




## Well Construction Information

WELL CONSTRUCTION

| | |
|---|---|
| Date Compl | :12/10/14 |
| Hole Dia | :8 25" (HSA) 3 5" (Air) |
| Drill Method | Hollow Stem Augers/ Air Rotary |

OUTER CASING

| | |
|---|---|
| Joints | :Threaded |
| Material | :PVC |
| Diameter | :4 in |

INNER CASING

| | |
|---|---|
| Joints | :Threaded |
| Material | :PVC |
| Diameter | :2 in |

| | |
|---|---|
| WELL SCREEN | :0 010" Slotted |
| | :5 foot length |

NOTES

TYPE III WELL -
Monitoring well boring drilled using hollow stem augers and air rotary to a depth of 60 feet Signs of moisture at ~8 feet

Outer Casing set at 45 ft BGS
5-foot length of well screen set from 55 ft to 60 ft
Filter sand installed from 53 ft to 60 ft
Bentonite pellet seal installed from 39 ft to 53 ft

Soil samples collected: SB-20-60'

Completed with stick up type protective cover set in 2 by 2 ft concrete pad

ND=No Detection of VOCs
NR=No Return

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS

# LOG OF BORING PMW-21A

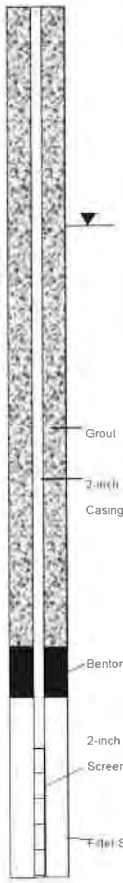


Trex Property
Groundwater Assessment
Charlotte, NC
W&R Project No. 03134.30.01

| | | | |
|---|---|---|---|
| Date Started | 12/3/2014 | Drilling Company | SAEDACCO |
| Date Completed | 12/3/2014 | Logged By | Chris Fay |
| Hole Diameter | 8.25" | Northing | 1459932.6512 |
| Drilling Method | Hollow Stem Augers | Easting | 550662.9112 |
| Sampling Method | Split Spoon | | |

| Depth in Feet | FID Results (in ppm) | USCS | GRAPHIC | DESCRIPTION |
|---|---|---|---|---|
| 1 | ND | | | |
| 2 | 3.17 | CL | | Sandy CLAY (CL) Brown, orange, tan mottled, fine grain sand, moderate plasticity, firm, moist, sand content increase with depth |
| 3 | | | | |
| 4 | 1.79 | | | |
| 5 | | | | |
| 6 | 2.3 | | | |
| 7 | | | | |
| 8 | 1.13 | | | |
| 9 | | SM | | Silty SAND (SM), Brownish orange, fine to medium angular grains, poorly sorted, wet, micaceous, weathered plagioclase feldspar present |
| 10 | 2.27 | | | |
| 11 | | | | |
| 12 | 1.1 | | | |
| 13 | | | | |
| 14 | 1.4 | | | |
| 15 | | | | |
| 16 | 1.84 | | | |
| 17 | | | | |
| 18 | 0.64 | | | |
| 19 | | | | |
| 20 | 1.02 | | | |
| 21 | | SC | | Clayey SAND (SC), Brown and black, clay content <10%, fine to medium angular grains, poorly sorted, saturated, micaceous, weathered plagioclase feldspar present, very hard |
| 22 | 0.8 | | | |
| 23 | | | | |
| 24 | 0.31 | | | |
| 25 | | | | |
| 26 | 1.05 | | | |
| 27 | | | | |
| 28 | 0.81 | | | |
| 29 | | | | |
| 30 | 1.27 | | | |
| 31 | | | | |
| 32 | 2.58 | | | |
| 33 | | | | |
| 34 | 2.14 | | | |
| 35 | | | | |
| 36 | | | | |
| 37 | | | | |
| 38 | | | | |
| 39 | | | | |
| 40 | | | | |

Well PMW-21A
Elev. 682.91




## Well Construction Information

WELL CONSTRUCTION

| | |
|---|---|
| Date Compl | 12/3/14 |
| Hole Dia | 8.25" |
| Drill Method | Hollow Stem Augers |

OUTER CASING

| | |
|---|---|
| Joints | NA |
| Material | NA |
| Diameter | NA |

INNER CASING

| | |
|---|---|
| Joints | Threaded |
| Material | PVC |
| Diameter | 2 in |

| | |
|---|---|
| WELL SCREEN | 0.010" Slotted |
| | 5 foot length |

NOTES

TYPE II WELL -
Monitoring well boring drilled using hollow stem augers to a depth of 35 feet. Signs of moisture at ~8 feet.

5-foot length of well screen set at 30 ft to 35 ft.
Filter sand installed from 28 ft to 35 ft.
Bentonite pellet seal installed from 26 ft to 28 ft.

Soil samples collected: SB-21-0.5', SB-21-2', SB-21-34'

Completed with bolt-down manhole lid protective cover set in 2 by 2 ft concrete pad.

ND=No Detection of VOCs
NR=No Return

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS

# LOG OF BORING PMW-21B

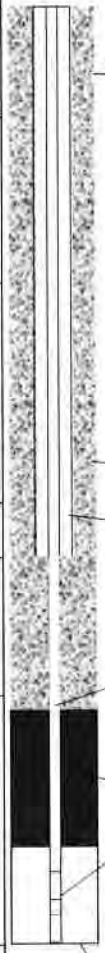


Trex Property
Groundwater Assessment
Charlotte, NC
W&R Project No 03130430 01

| | | | |
|---|---|---|---|
| Date Started | : 12/1/2014 | Drilling Company | : SAEDACCO |
| Date Completed | : 12/2/14 | Logged By | : Chris Fay |
| Hole Diameter | :8 25" (HSA) 3 5" (Air) | Northing | :1459924 6313 |
| Drilling Method | : Hollow Stem Auger/Air Rotary | Easting | : 550660 9251 |
| Sampling Method | Split Spoon | | |

| Depth in Feet | PID Results (in ppm) | USCS | GRAPHIC | DESCRIPTION |
|---|---|---|---|---|
| 0 | ND | | | |
| 2 | 3.17 | CL | | Sandy CLAY (CL), Brown, orange, tan mottled, fine grain sand, moderate plasticity, firm, moist, sand content increase with depth |
| 4 | 1.79 | | | |
| 6 | 2 3 | | | |
| 8 | 1.13 | | | |
| 10 | 2 27 | SM | | Silty SAND (SM), Brownish orange fine to medium angular grains, poorly sorted, wet, micaceous, weathered plagioclase feldspar present |
| 12 | 1 1 | | | |
| 14 | 1 4 | | | |
| 16 | 1 84 | | | |
| 18 | 0 64 | | | |
| 20 | 1 02 | | | |
| 22 | 0 8 | SC | | Clayey SAND (SC), Brown and black, clay content <10%, fine to medium angular grains, poorly sorted, saturated, micaceous, weathered plagioclase feldspar present, very hard |
| 24 | 0 31 | | | |
| 26 | 1 05 | | | |
| 28 | 0 61 | | | |
| 30 | 1 27 | | | |
| 32 | 2 58 | | | |
| 34 | 2 14 | | | |
| 36 | | | | |
| 38 | | PWR | | PWR, diorite, weathered, heavy weathered from 38 to 40 feet BGS |
| 40 | | | | |
| 42 | | PWR | | PWR, Olive green, weather plagioclase feldspar present, dry, fracture at 47 feet BGS |
| 44 | | | | |
| 46 | | | | |
| 48 | | | | |
| 50 | | | | |
| 52 | | PWR | | PWR weathered diorite, fractures at 50 and 51 5 feet BGS 53 to 56 feet BGS very soft silt present 66 to 69 feet heavily weather black rock, chlorinated odor present |
| 54 | | | | |
| 56 | | | | |
| 58 | | | | |
| 60 | | | | |
| 62 | | | | |
| 64 | | | | |
| 66 | | | | |
| 68 | 2 69 | | | |
| 70 | | | | |
| 72 | | | | |
| 74 | | | | |
| 76 | | | | |
| 78 | | | | |
| 80 | | | | |
| 82 | | | | |
| 84 | | | | |
| 86 | | | | |
| 88 | | | | |
| 90 | | | | |

Well: PMW-21B
Elev : 682 96




## Well Construction Information

WELL CONSTRUCTION

| | |
|---|---|
| Date Compl | :12/2/14 |
| Hole Dia | :8 25" (HSA) 3 5" (Air) |
| Drill Method | : Hollow Stem Auger/ Air Rotary |

OUTER CASING

| | |
|---|---|
| Joints | :Threaded |
| Material | :PVC |
| Diameter | :4 in |

INNER CASING

| | |
|---|---|
| Joints | :Threaded |
| Material | :PVC |
| Diameter | :2 in |

| | |
|---|---|
| WELL SCREEN | :0 010" Slotted |
| | :5 foot length |

NOTES

TYPE III WELL
Monitoring well boring drilled using hollow stem augers and air rotary to a depth of 67 feet Signs of moisture at ~8 feet

Outer Casing set at 40 ft BGS
5-foot length of well screen set from 62 ft to 67 ft
Filter sand installed from 60 ft to 67 ft
Bentonite pellet seal installed from 50 ft to 60 ft

Soil samples collected: SB-21-67'

Completed with bolt-down manhole lid protective cover set in 2 by 2 ft concrete pad

ND=No Detection of VOCs
NR=No Return

WITHERS & RAVENEL
ENGINEERS · PLANNERS · SURVEYORS

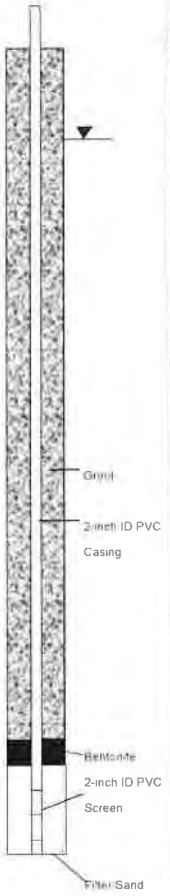
# LOG OF BORING PMW-22A



| | | | | |
|---|---|---|---|---|
| Trex Property | Date Started | 12/4/2014 | Drilling Company | SAEDACCO |
| Groundwater Assessment | Date Completed | 12/4/2014 | Logged By | Chris Fay |
| Charlotte, NC | Hole Diameter | 8 25" | Northing | 1459929 4298 |
| W&R Project No 0313430 01 | Drilling Method | Hollow Stem Augers | Easting | 551060 4063 |
| | Sampling Method | Split Spoon | | |

| Depth in Feet | PID Results (in ppm) | USCS | GRAPHIC | DESCRIPTION |
|---|---|---|---|---|
| 0 | ND | | | |
| 2 | ND | CL | | Sandy silty CLAY (CL), orange and gray, moist, soft, moderate plasticity wet at 7 feet BGS, sand content increase with depth |
| 4 | ND | | | |
| 6 | ND | | | |
| 8 | ND | | | |
| 10 | 0 34 | SC | | Clayey SAND (SC), Gray, medium angular grains well sorted, wet, clay content decreases with depth, 12 feet BGS little to no fines |
| 12 | ND | | | |
| 14 | 0 88 | | | |
| 16 | NR | SM | | Sandy clayey SILT (SM) Green and white mottled to olive green, low plasticity, moist weathered plagioclase mica and biotite present from 14 feet to 26 feet BGS, sand content increases with depth |
| 18 | ND | | | |
| 20 | 0 12 | | | |
| 22 | ND | | | |
| 24 | 0 12 | | | |
| 26 | 0 24 | | | |
| 28 | ND | | | |
| 30 | 1 6 | | | |
| 32 | 0 3 | | | |
| 34 | 1 51 | | | |
| 36 | ND | | | |
| 38 | ND | | | |
| 40 | ND | | | |
| 42 | ND | | | |
| 44 | ND | | | |
| 46 | ND | | | |
| 48 | 2 03 | | | |
| 50 | 0 46 | SM | | Silty SAND (SM), White and green mottled, fine to medium angular grains, poorly sorted, moist, rock fragments present |
| 52 | 1 6 | | | |
| 54 | 1 2 | | | |
| 56 | 0 8 | | | |
| 58 | 2 87 | | | |
| 60 | 5 3 | SC | | Silty SAND (SC), Brownish orange, little to no fines, fine angular grains, poorly sorted, saturated weathered plagioclase feldspar present, very hard |
| 62 | 3 8 | | | |
| 64 | | | | |
| 66 | | | | |
| 68 | | | | |
| 70 | | | | |
| 72 | | | | |
| 74 | | | | |
| 76 | | | | |
| 78 | | | | |
| 80 | | | | |

Well PMW-22A
Elev 686 74




## Well Construction Information

WELL CONSTRUCTION

| | |
|---|---|
| Date Compl | 12/4/14 |
| Hole Dia | 8 25" |
| Drill Method | Hollow Stem Augers |

OUTER CASING

| | |
|---|---|
| Joints | NA |
| Material | NA |
| Diameter | NA |

INNER CASING

| | |
|---|---|
| Joints | Threaded |
| Material | PVC |
| Diameter | 2 in |

| | |
|---|---|
| WELL SCREEN | 0 010" Slotted |
| | 5 foot length |

NOTES

TYPE II WELL -
Monitoring well boring drilled using hollow stem augers
to a depth of 63 feet Signs of moisture at ~7 feet

5-foot length of well screen set at 58 ft to 63 ft
Filter sand installed from 56 ft to 63 ft
Bentonite pellet seal installed from 54 ft to 56 ft

Soil samples collected SB-22-0 5', SB-22-60', SB-22-62'

Completed with stick up type protective cover set in
2 by 2 ft concrete pad

ND=No Detection of VOCs
NR=No Return

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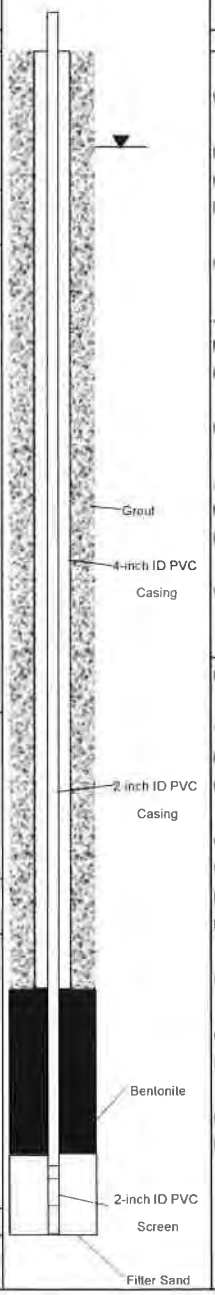
# LOG OF BORING PMW-22B



| | | | |
|---|---|---|---|
| Trex Property | Date Started | : 12/7/2014 | Drilling Company | SAEDACCO |
| Groundwater Assessment | Date Completed | : 12/8/14 | Logged By | Chris Fay |
| Charlotte, NC | Hole Diameter | 8 25" (HSA) 3 5" (Air) | Northing | 1459925 0887 |
| W&R Project No 03130430 01 | Drilling Method | : Hollow Stem Auger/Air Rotary | Easting | 551069 9543 |
| | Sampling Method | Split Spoon | | |

| Depth in Feet | FID Results (in ppm) | USCS | GRAPHIC | DESCRIPTION |
|---|---|---|---|---|
| 0 | ND | | | |
| 2 | ND | CL | | Sandy silty CLAY (CL), orange and gray, moist, soft, moderate plasticity, wet at 7 feet BGS, sand content increase with depth |
| 4 | ND | | | |
| 6 | ND | | | |
| 8 | ND | | | |
| 10 | 0 34 | | | |
| 12 | ND | SC | | Clayey SAND (SC) Gray, medium angular grains, well sorted wet clay content decreases with depth 12 feet BGS little to no fines |
| 14 | 0 88 | | | |
| 16 | NR | SM | | Sandy clayey SILT (SM) Green and white mottled to olive green, low plasticity, moist, weather plagioclase, mica and biotite present from 14 feet to 26 feet BGS, sand content increases with depth |
| 18 | ND | | | |
| 20 | 0 12 | | | |
| 22 | ND | | | |
| 24 | 0 12 | | | |
| 26 | 0 24 | | | |
| 28 | ND | | | |
| 30 | 1 6 | | | |
| 32 | 0 3 | | | |
| 34 | 1 51 | | | |
| 36 | ND | | | |
| 38 | ND | | | |
| 40 | ND | | | |
| 42 | ND | | | |
| 44 | ND | | | |
| 46 | ND | | | |
| 48 | 2 03 | | | |
| 50 | 0 46 | SM | | Silty SAND (SM), White and green mottled, fine to medium angular grains, poorly sorted, moist, rock fragments present |
| 52 | 1 60 | | | |
| 54 | 1 20 | | | |
| 56 | 0 80 | | | |
| 58 | 2 87 | | | |
| 60 | 5 30 | | | |
| 62 | 3 80 | SC | | Silty SAND (SC), Brownish orange, little to no fines fine angular grains, poorly sorted saturated, weathered plagioclase feldspar present very hard |
| 64 | | | | |
| 66 | | PWR | | PWR-Diorite rock chips with orangish brown silt |
| 68 | | | | |
| 70 | | | | |
| 72 | | | | |
| 74 | | | | |
| 76 | | | | |
| 78 | | | | |
| 80 | | | | |
| 82 | | | | |
| 84 | | | | |
| 86 | ND | ROCK | | Rock-Diorite |
| 88 | | | | |
| 90 | | | | |

Well: PMW-22B
Elev : 686 76




## Well Construction Information

WELL CONSTRUCTION

| | |
|---|---|
| Date Compl | :12/8/14 |
| Hole Dia | :8 25" (HSA) 3 5" (Air) |
| Drill Method | :Hollow Stem Augers/ Air Rotary |

OUTER CASING

| | |
|---|---|
| Joints | Threaded |
| Material | :PVC |
| Diameter | :4 in |

INNER CASING

| | |
|---|---|
| Joints | :Threaded |
| Material | PVC |
| Diameter | :2 in |
| WELL SCREEN | :0 010" Slotted |
| | :5 foot length |

NOTES

TYPE III WELL -
Monitoring well boring drilled using hollow stem augers and air rotary to a depth of 86 feet Signs of moisture at ~7 feet

Outer Casing set at 68 ft BGS
5-foot length of well screen set from 81 ft to 86 ft
Filter sand installed from 79 ft to 86 ft
Bentonite pellet seal installed from 68 ft to 79 ft

Soil samples collected: SB-22-86'

Completed with stick up type protective cover set in 2 by 2 ft concrete pad

ND=No Detection of VOCs
NR=No Return

# ATTACHMENT 9

# MAPS AND CROSS SECTIONS

# Trex Properties, Charlotte NC

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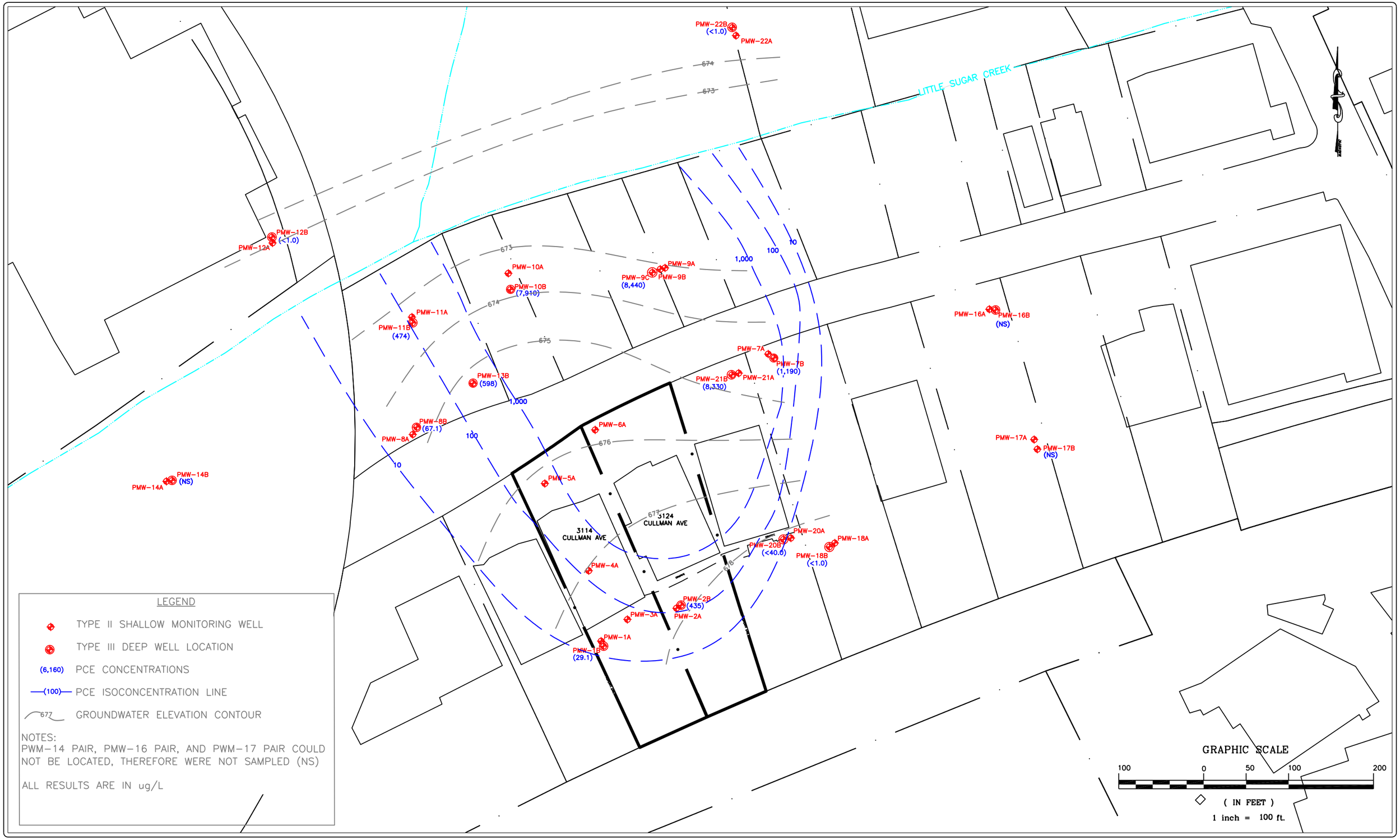
*TREX PROPERTIES CHARLOTTE, NC*
*3114 AND 3124 CULLMAN AVE*
*CHARLOTTE, NORTH CAROLINA*

*PCE IN SHALLOW GROUNDWATER*

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

Job No. 03130430
Sheet No. 10

W:\13\13-0430\130430.01-TREX CHARLOTTE OFF SITE WELLS\CAD\TREX PROPERTY - BASEMAP-GW ASSESSMENT.DWG 11/2/2015 9:04 AM FAY, CHRISTOPHER 1:1




LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- (6,160) PCE CONCENTRATIONS
- —(100)— PCE ISOCONCENTRATION LINE
- 677 GROUNDWATER ELEVATION CONTOUR

NOTES:
PWM-14 PAIR, PMW-16 PAIR, AND PWM-17 PAIR COULD NOT BE LOCATED, THEREFORE WERE NOT SAMPLED (NS)

ALL RESULTS ARE IN ug/L

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TREX PROPERTIES CHARLOTTE, NC
3114 AND 3124 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

PCE IN DEEPER GROUNDWATER

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

Job No. 03130430
Sheet No. 11

W:\13\13-0430\130430.01-TREX CHARLOTTE OFF SITE WELLS\CAD\TREX PROPERTY - BASEMAP-GW ASSESSMENT.DWG 11/2/2015 9:16 AM FAY, CHRISTOPHER 1:1

## LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- (6,160) TCE CONCENTRATIONS
- (100) TCE ISOCONCENTRATION LINE
- 677 GROUNDWATER ELEVATION CONTOUR

NOTES:
PWM-14 PAIR, PMW-16 PAIR, AND PWM-17 PAIR COULD NOT BE LOCATED, THEREFORE WERE NOT SAMPLED (NS)

PWM-4 CONTAINED INSUFFICIENT AMOUNT OF GROUNDWATER TO SAMPLE

THE WELL CASING FOR PMW-18A WAS BENT ~5.5 FEET BELOW TOC AND COULD NOT BE SAMPLED

ALL RESULTS ARE IN ug/L

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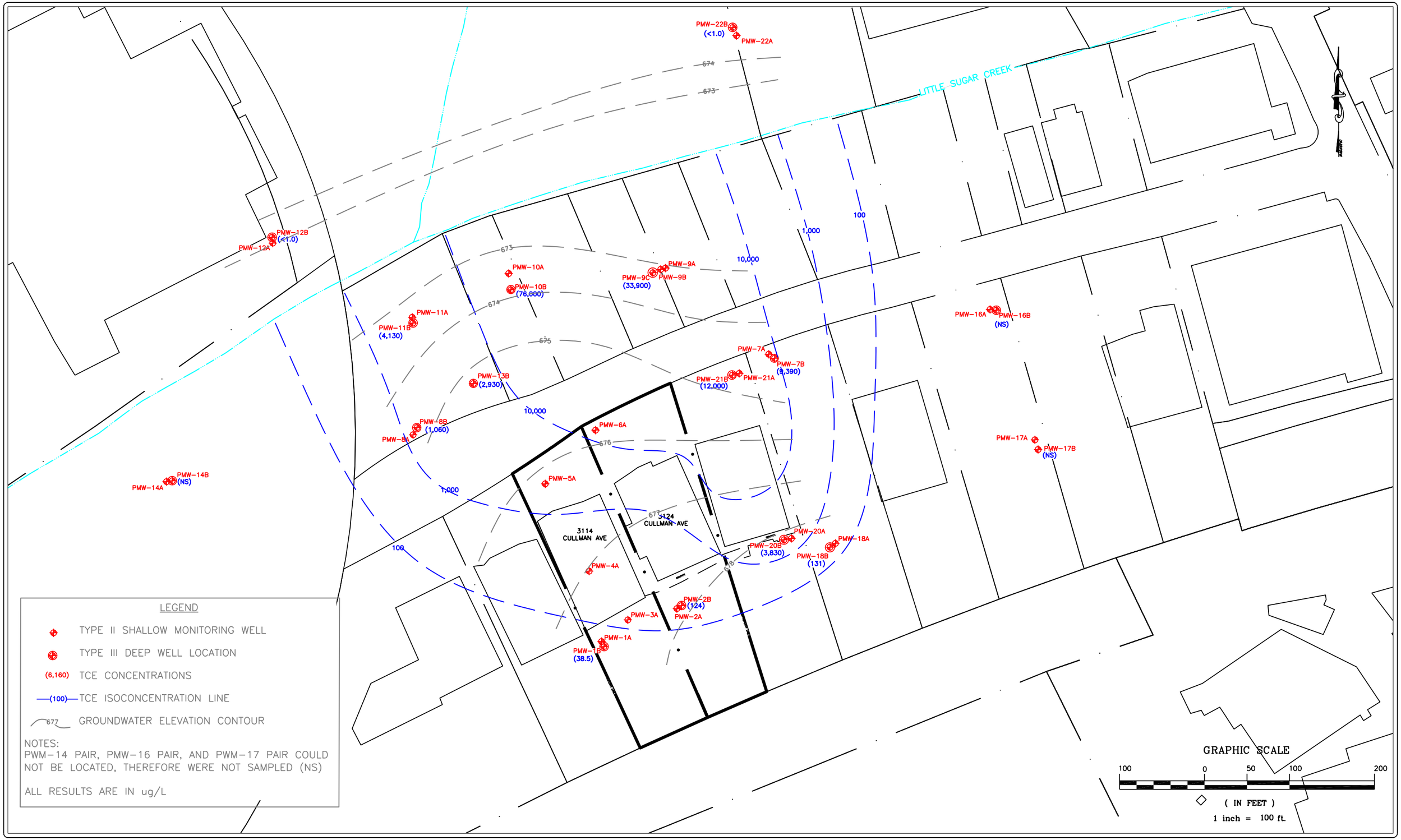
TREX PROPERTIES CHARLOTTE, NC
3114 AND 3124 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

TCE IN SHALLOW GROUNDWATER

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

Job No. 03130430
Sheet No. 12

W:\13\13-0430\130430.01-TREX CHARLOTTE OFF SITE WELLS\CAD\TREX PROPERTY - BASEMAP-GW ASSESSMENT.DWG 11/2/2015 9:20 AM FAY, CHRISTOPHER 1:1




LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- (6,160) TCE CONCENTRATIONS
- (100) TCE ISOCONCENTRATION LINE
- 677 GROUNDWATER ELEVATION CONTOUR

NOTES:
PWM-14 PAIR, PMW-16 PAIR, AND PWM-17 PAIR COULD NOT BE LOCATED, THEREFORE WERE NOT SAMPLED (NS)

ALL RESULTS ARE IN ug/L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TREX PROPERTIES CHARLOTTE, NC
3114 AND 3124 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

TCE IN DEEPER GROUNDWATER

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

Job No. 03130430
Sheet No. 13

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LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- (6,160) 1,2 cis DCE CONCENTRATIONS
- —(100)— 1,2 cis DCE ISOCONCENTRATION LINE
- 677 GROUNDWATER ELEVATION CONTOUR

NOTES:
PWM-14 PAIR, PMW-16 PAIR, AND PWM-17 PAIR COULD NOT BE LOCATED, THEREFORE WERE NOT SAMPLED (NS)

PWM-4 CONTAINED INSUFFICIENT AMOUNT OF GROUNDWATER TO SAMPLE

THE WELL CASING FOR PMW-18A WAS BENT ~5.5 FEET BELOW TOC AND COULD NOT BE SAMPLED

ALL RESULTS ARE IN ug/L

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TREX PROPERTIES CHARLOTTE, NC
3114 AND 3124 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

CIS 1,2 DCE IN SHALLOW GROUNDWATER

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

| Job No. | 03130430 |
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| Sheet No. | 14 |

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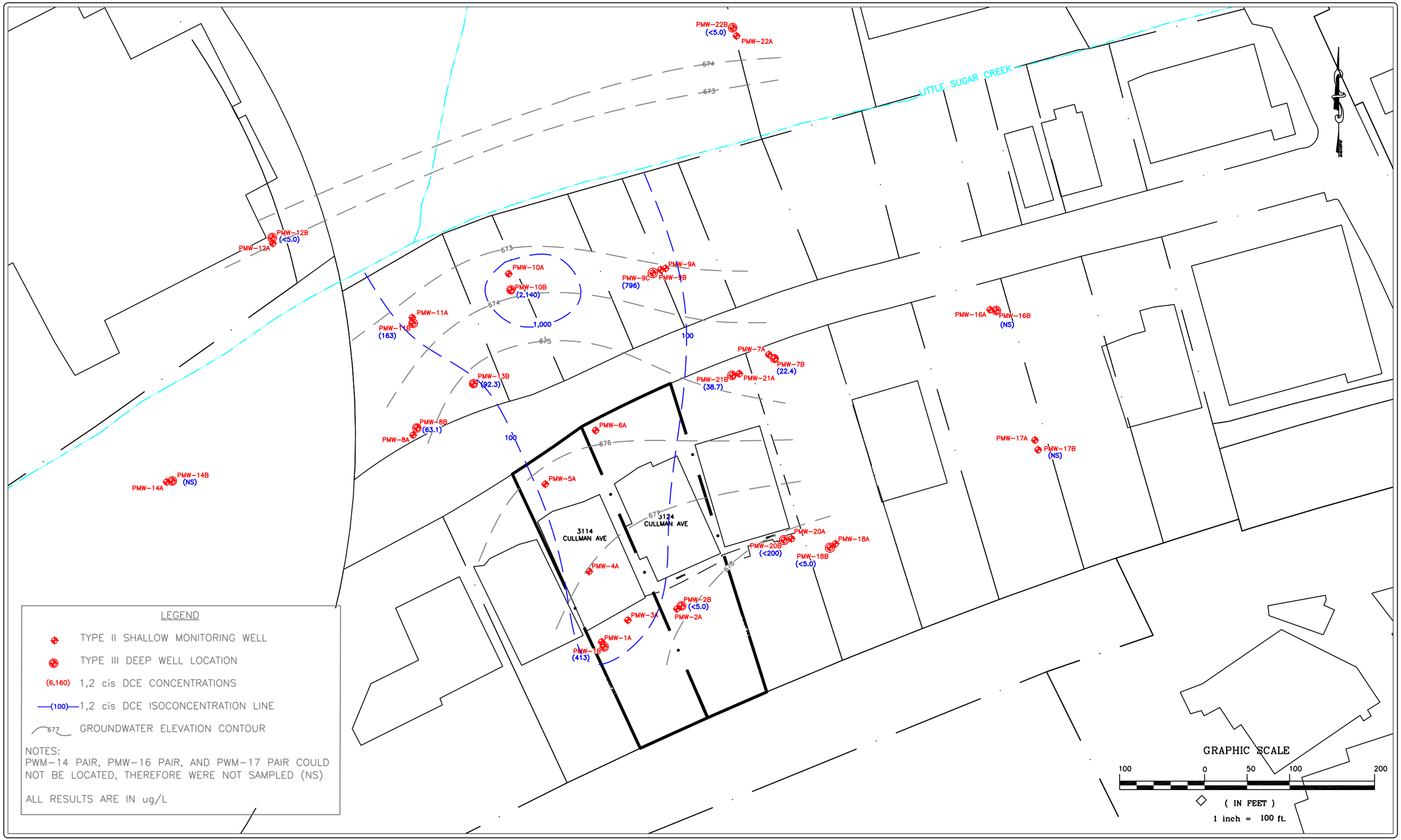


LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- (6,160) 1,2 cis DCE CONCENTRATIONS
- —(100)— 1,2 cis DCE ISOCONCENTRATION LINE
- 677 GROUNDWATER ELEVATION CONTOUR

NOTES:
PWM-14 PAIR, PMW-16 PAIR, AND PWM-17 PAIR COULD NOT BE LOCATED, THEREFORE WERE NOT SAMPLED (NS)

ALL RESULTS ARE IN ug/L

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TREX PROPERTIES CHARLOTTE, NC
3114 AND 3124 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

CIS 1,2 DCE IN DEEPER GROUNDWATER

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

Job No. 03130430
Sheet No. 15

W:\13\13-0430\130430.01-TREX CHARLOTTE OFF SITE WELLS\CAD\TREX PROPERTY - BASEMAP-GW ASSESSMENT.DWG 11/2/2015 9:55 AM FAY, CHRISTOPHER 1:1

LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- (6,160) 1,1 DCE CONCENTRATIONS
- (100) 1,1 DCE ISOCONCENTRATION LINE
- 677 GROUNDWATER ELEVATION CONTOUR

NOTES:
PWM-14 PAIR, PMW-16 PAIR, AND PWM-17 PAIR COULD NOT BE LOCATED, THEREFORE WERE NOT SAMPLED (NS)

PWM-4 CONTAINED INSUFFICIENT AMOUNT OF GROUNDWATER TO SAMPLE

THE WELL CASING FOR PMW-18A WAS BENT ~5.5 FEET BELOW TOC AND COULD NOT BE SAMPLED

ALL RESULTS ARE IN ug/L

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TREX PROPERTIES CHARLOTTE, NC
3114 AND 3124 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

1,1 DCE IN SHALLOW GROUNDWATER

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

| Job No. | 03130430 |
|---|---|
| Sheet No. | 16 |

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LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- (6,160) 1,1 DCE CONCENTRATIONS
- —(100)— 1,1 DCE ISOCONCENTRATION LINE
- 677 GROUNDWATER ELEVATION CONTOUR

NOTES:
PWM-14 PAIR, PMW-16 PAIR, AND PWM-17 PAIR COULD NOT BE LOCATED, THEREFORE WERE NOT SAMPLED (NS)

ALL RESULTS ARE IN ug/L


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TREX PROPERTIES CHARLOTTE, NC
3114 AND 3124 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

1,1 DCE IN DEEPER GROUNDWATER

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

Job No. 03130430
Sheet No. 17

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LEGEND

- TYPE II SHALLOW MONITORING WELL
- TYPE III DEEP WELL LOCATION
- (6,160) 1,4 DIOXANE CONCENTRATIONS
- (100) 1,4 DIOXANE ISOCONCENTRATION LINE
- 677 GROUNDWATER ELEVATION CONTOUR

NOTES:
PWM-14 PAIR, PMW-16 PAIR, AND PWM-17 PAIR COULD NOT BE LOCATED, THEREFORE WERE NOT SAMPLED (NS)

PWM-4 CONTAINED INSUFFICIENT AMOUNT OF GROUNDWATER TO SAMPLE

THE WELL CASING FOR PMW-18A WAS BENT ~5.5 FEET BELOW TOC AND COULD NOT BE SAMPLED

ALL RESULTS ARE IN ug/L

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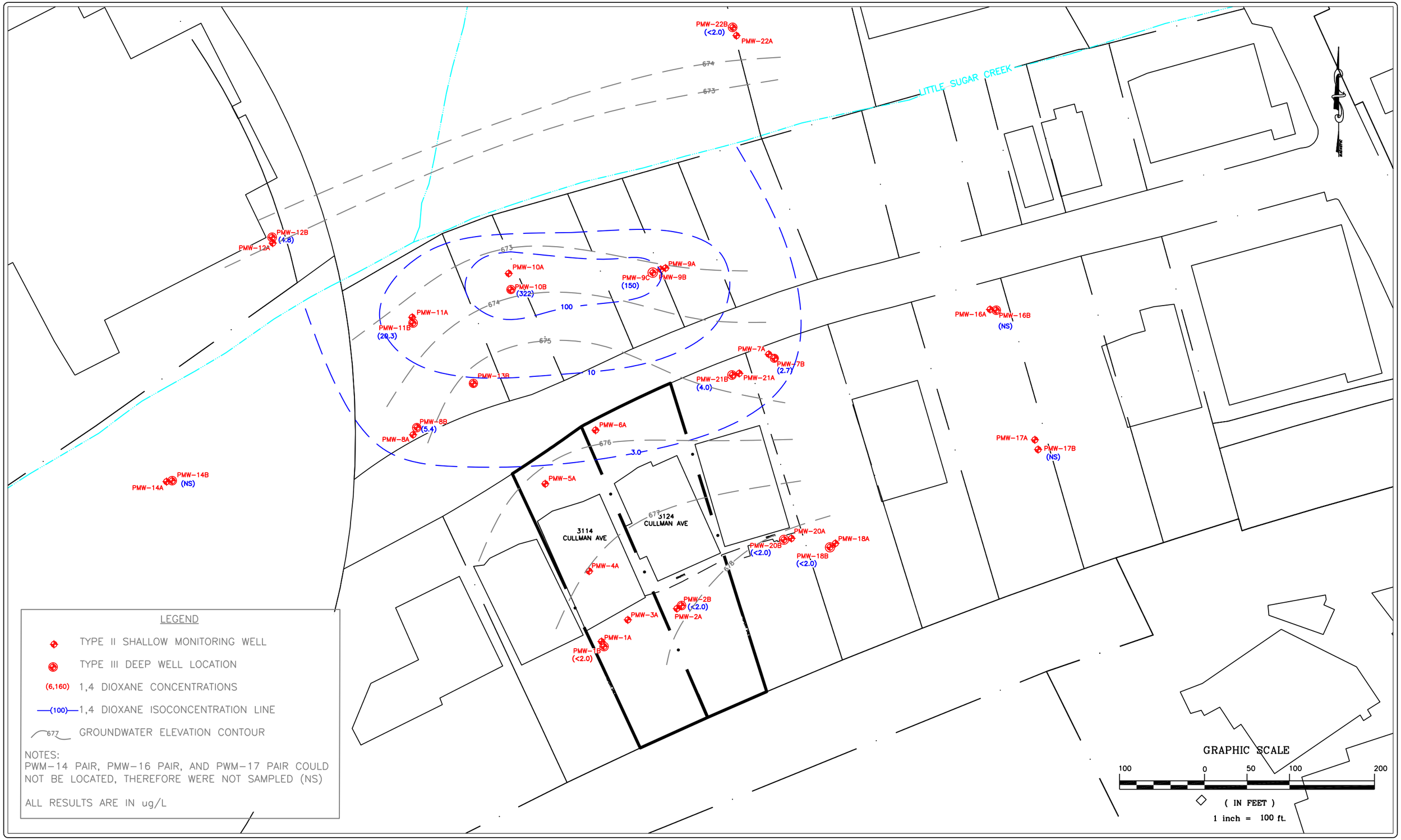
TREX PROPERTIES CHARLOTTE, NC
3114 AND 3124 CULLMAN AVE
CHARLOTTE, NORTH CAROLINA

1,4 DIOAXANE IN SHALLOW GROUNDWATER

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

Job No. 03130430
Sheet No. 18

W:\13\13-0430\130430.01-TREX CHARLOTTE OFF SITE WELLS\CAD\TREX PROPERTY - BASEMAP-GW ASSESSMENT.DWG 11/2/2015 9:56 AM FAY, CHRISTOPHER 1:1

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*TREX PROPERTIES CHARLOTTE, NC*
*3114 AND 3124 CULLMAN AVE*
*CHARLOTTE, NORTH CAROLINA*

*1,4 DIOXANE IN DEEPER GROUNDWATER*

| Drawn By | Scale |
|---|---|
| CF | 1"=100' |
| Checked By | Date |
| BB | 10/8/15 |

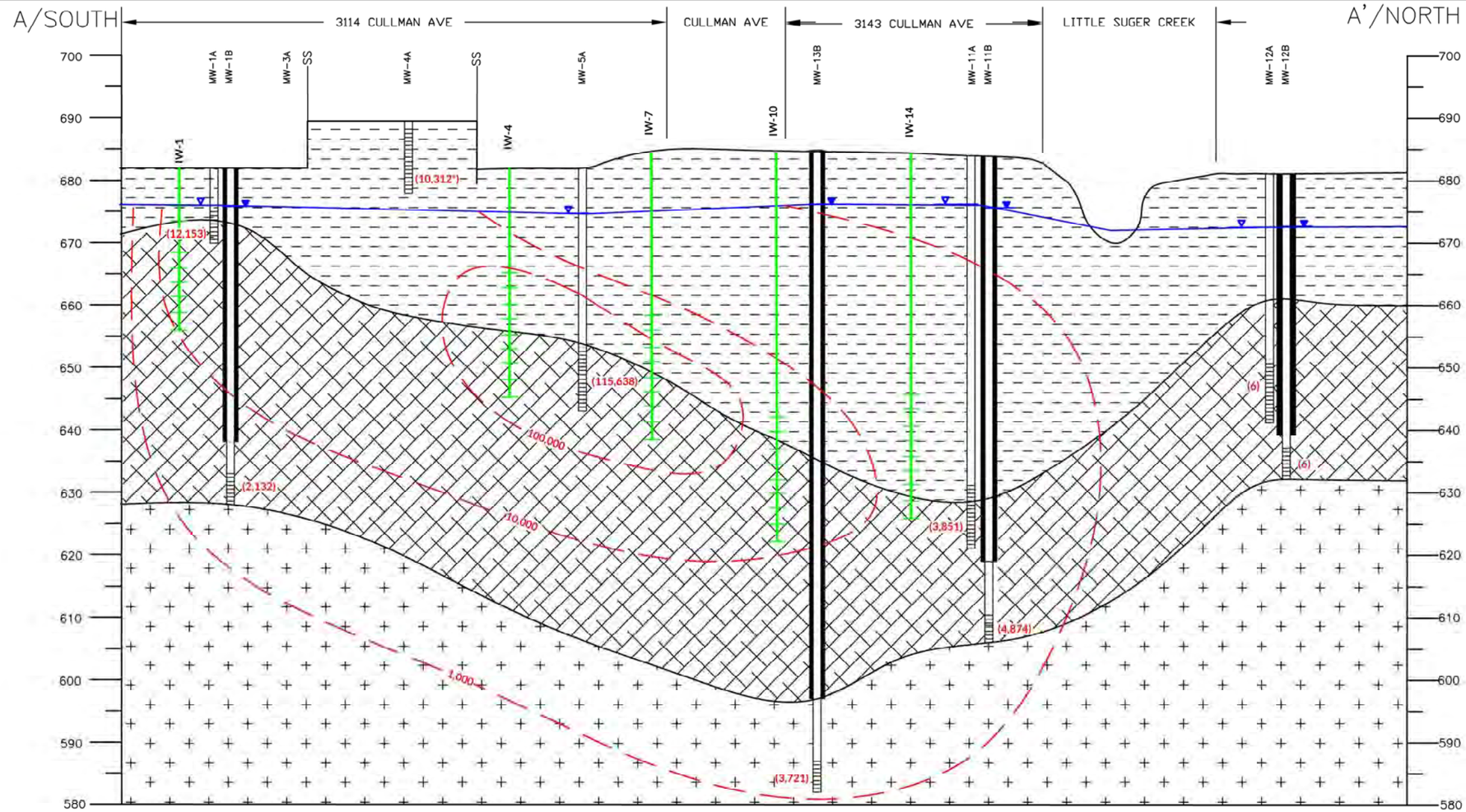
| Job No. | 03130430 |
|---|---|
| Sheet No. | 19 |

W:\13\13-0430\130430.01-TREX CHARLOTTE OFF SITE WELLS\CAD\TREX PROPERTY - BASEMAP-GW ASSESSMENT.DWG 11/2/2015 9:57 AM FAY, CHRISTOPHER 1:1

LEGEND

- OUTER WELL CASING INTERVAL
- WELL SCREEN INTERVAL
- INNER WELL CASING INTERVAL
- INJECTION WELL
- SHALLOW GROUNDWATER ELEVATION
- DEEPER GROUNDWATER ELEVATION
- (5,200) TOTAL VOCs IN ug/L (2015)
- TOTAL VOC IN ug/L ISOCONCENTRATION LINE
- RESIDUAL SOIL/SAPROLITE
- PARTIALLY WEATHERED BEDROCK
- COMPETENT ROCK

NOTE;
INFERRED BOUNDARIES BETWEEN GEOLOGIC UNITS ARE TRANSITIONAL.
*=RESULTS ARE FROM THE 9/25/12 SAMPLING EVENT




4X VERTICAL EXAGGERATION

GRAPHIC SCALE
0 40 80 160
1 inch = 80 ft.

| | |
|---|---|
| FIGURE NO.: | 9 |
| SCALE: | 1"=80' |
| PROJECT NO.: | 03130430.06 |
| DRAWN BY: | CF |
| DATE: | 3/22/2016 |
| APPROVED BY: | BB |

# GEOLOGICAL CROSS SECTION A-A' WITH TOTAL VOCs IN GROUNDWATER RESULTS AND PROPOSED INJECTION POINTS

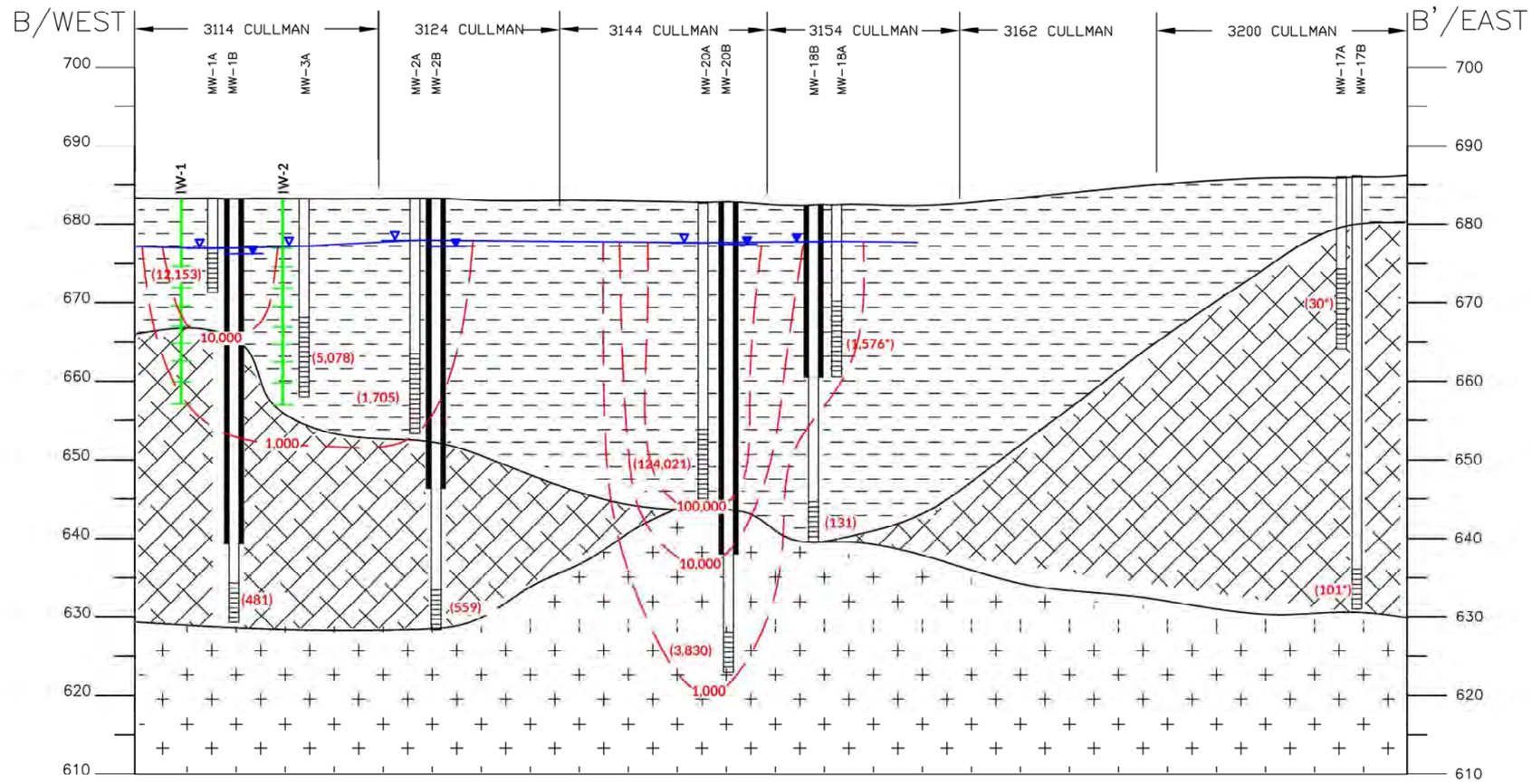
**TREX PROPERTIES, CHARLOTTE, NC**
3144 AND 3124 CULLMAN AVE.
CHARLOTTE, MECKLENBURG COUNTY, NC


WithersRavenel
Engineers | Planners | Surveyors
115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

LEGEND

- OUTER WELL CASING INTERVAL
- WELL SCREEN INTERVAL
- INNER WELL CASING INTERVAL
- INJECTION WELL
- SHALLOW GROUNDWATER ELEVATION
- DEEPER GROUNDWATER ELEVATION
- (5,200) TOTAL VOCs IN ug/L (2015)
- TOTAL VOCs IN ug/L ISOCONCENTRATION LINE
- RESIDUAL SOIL/SAPROLITE
- PARTIALLY WEATHERED BEDROCK
- COMPETENT ROCK

NOTE;
INFERRED BOUNDARIES BETWEEN GEOLOGIC UNITS ARE TRANSITIONAL.
*=RESULTS ARE FROM THE 9/25/12 SAMPLING EVENT




4X VERTICAL EXAGGERATION

GRAPHIC SCALE
0 35 70 140
1 inch = 140 ft.

FIGURE NO.: 10
PROJECT NO.: 02130430.06
DRAWN BY: CF
SCALE: 1"=70'
APPROVED BY: BB
DATE: 03/22/2016

# GEOLOGICAL CROSS SECTION B-B' WITH TOTAL VOCs IN GROUNDWATER RESULTS AND PROPOSED INJECTION POINTS

**TREX PROPERTIES, CHARLOTTE, NC**
3144 AND 3124 CULLMAN AVE.
CHARLOTTE, MECKLENBURG COUNTY, NC

WithersRavenel
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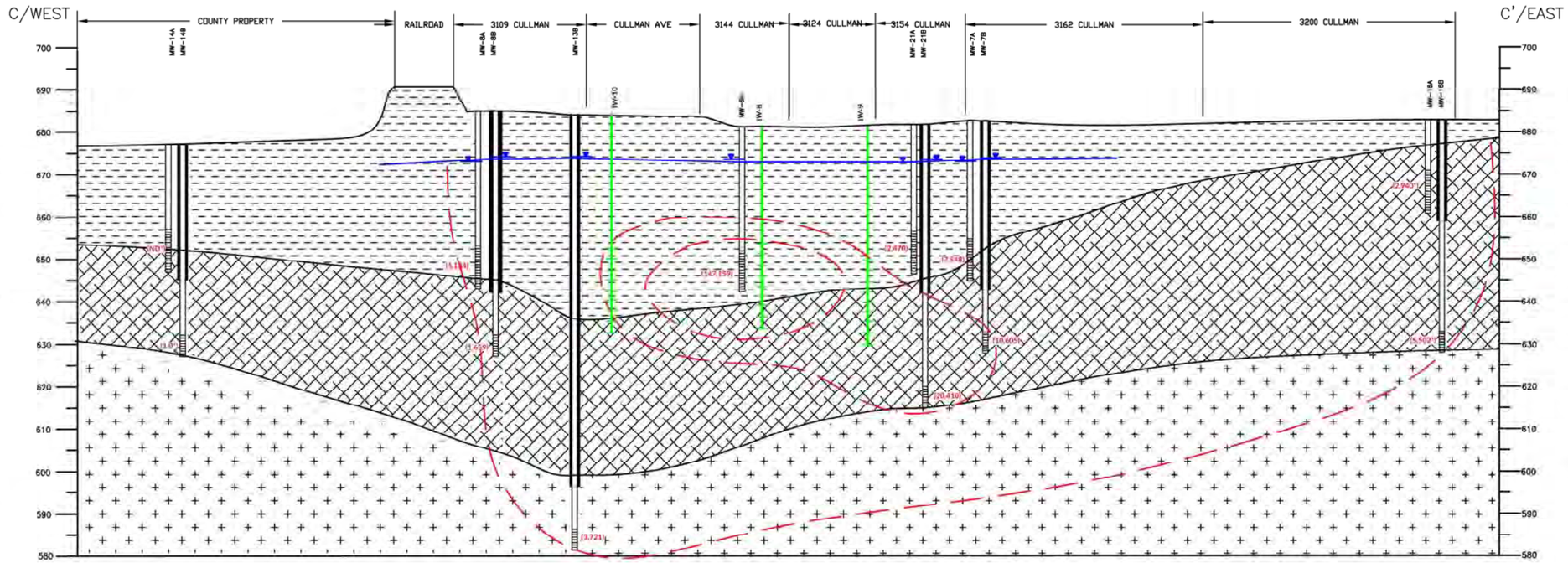
LEGEND

- OUTER WELL CASING INTERVAL
- WELL SCREEN INTERVAL
- INNER WELL CASING INTERVAL
- INJECTION WELL
- SHALLOW GROUNDWATER ELEVATION
- DEEPER GROUNDWATER ELEVATION
- (5,200) TOTAL VOCs (IN ug/L)
- TOTAL VOC ISOCONCENTRATION LINE (IN ug/L)
- RESIDUAL SOIL/SAPROLITE
- PARTIALLY WEATHERED BEDROCK
- COMPETENT ROCK

NOTE;
INFERRED BOUNDARIES BETWEEN GEOLOGIC UNITS ARE TRANSITIONAL.
*=RESULTS ARE FROM THE 9/25/12 SAMPLING EVENT.




4X VERTICAL EXAGGERATION

GRAPHIC SCALE

0 60 120 240

1 inch = 120 ft.

FIGURE NO.: 11

SCALE: 1"=120'

PROJECT NO.: 03130430.06

DRAWN BY: CF

DATE: 03/22/2016

APPROVED BY: BB

# GEOLOGICAL CROSS SECTION C-C' WITH TOTAL VOCs IN GROUNDWATER RESULTS AND PROPOSED INJECTION POINTS

**TREX PROPERTIES, CHARLOTTE, NC**
3144 AND 3124 CULLMAN AVE.
CHARLOTTE, MECKLENBURG COUNTY, NC

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